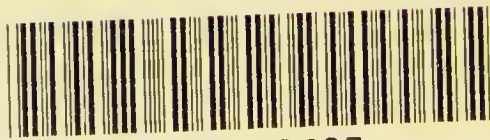
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FOUNDATION

FOR A

NEW THEORY AND PRACTICE OF MEDICINE.

FOUNDATION
FOR
A NEW THEORY AND PRACTICE
OF
MEDICINE.

BY
THOMAS INMAN, M.D. LOND.,

MEMBER OF THE ROYAL COLLEGE OF PHYSICIANS, LONDON ;
LECTURER ON THE PRINCIPLES AND PRACTICE OF MEDICINE ;
PHYSICIAN TO THE LIVERPOOL ROYAL INFIRMARY ;
AUTHOR OF " A TREATISE ON MYALGIA," " TREATMENT OF INFLAMMATION,"
" HISTORY OF ATHEROMA IN ARTERIES,"
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CLOSE OBSERVATION AND CLEAR INDUCTIVE REASONING

IN "SEA-SIDE STUDIES"

AND "THE PHYSIOLOGY OF COMMON LIFE,"

This Essay is dedicated,

BY THE AUTHOR.



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PREFACE TO FIRST EDITION.

FROM the period of his reading the first book on the Theory and Practise of Medicine which was presented to his notice, the Author has been struck with the absence of all trustworthy *principles* in such works. They contain descriptions of disease more or less accurate ; they detail the symptoms which are to be looked for ; they give names to certain groups of morbid phenomena ; they classify the various complaints according to one standard or another ; they speculate upon the causation of disease, and they give an account of what they consider to be the best method of cure. But on the broad principles upon which that treatment is to be conducted they are absolutely silent,—or if they do give reasons, such are based upon presumed experience and dogmatic teaching; and not upon a rigorous appeal to nature. From this category, however, the Author must exclude the recent work of Dr. J. H. Bennett, whose philosophical precision he fully appreciates and warmly admires.

Disease in such treatises is looked upon as if it were an entity, and the prevalent metaphor is, that it invades the body, and must be overcome and driven out. Medicines are spoken of as weapons ; and “a powerful remedy” is a name given to one, whose onslaught upon a disease is supposed to be as energetic as that of the disease upon the body.

In consequence of this, the student is educated with the idea, that the patient must necessarily be well as soon as the disease is driven out, and the natural result follows:—viz., that endeavours are made to restore health by overcoming disease, instead of endeavouring to cure disease by restoring health.

Philologically, the difference between the two plans is small, but practically it is great; for the former fixes the attention prominently on the condition of one organ, or set of organs, while the latter never loses sight of the whole constitution. In actual practice, the viciousness of the first plan soon becomes apparent, and our annals of Medicine are loaded with instances in which patients have suffered severely from the erroneous ideas entertained by physicians of the best means of combating disease. But if once the second is adopted, all these dangers are avoided; for the daily question will be asked, Is the patient nearer health than he was? and no plan of treatment will be continued which is manifestly depressing the patient's powers.*

* This will be more readily comprehended if we take pneumonia for an example. In that disease we have a certain physical change in a large portion of one or both lungs, with a certain set of symptoms referrible to that change, and another set dependent upon a constitutional cause. Percussion and auscultation enable us day by day to mark the progress of the physical change, and to mark the first sign of improvement. If the physiological symptoms were due to the pneumonic changes alone, we should expect to find that the general signs would not improve until the local ones had improved. Yet the contrary is the fact; the patient's general health (in cases of recovery) returning first, and this even although the physical signs show that the condition of the lung is getting worse for a day or two. I have known a man well enough to go to work on the seventh day of an attack of double pneumonia, the lower third of both lungs remaining solidified for some months afterwards. In this case the disease in the lung extended for two days subsequent to the constitutional change. Here we may say that (comparative) health was

That we have not misrepresented the tendency of the former plan, will be evident to any one who will take the trouble to read those medical treatises which have hitherto been most in vogue.

We are told by the most popular of our modern medical authors, that blood-letting is the most effectual and important of all the direct *remedies* of inflammation : next in rank is mercury ; then purging, antimony, digitalis, colchicum, &c. These are to be given to overcome the disease, and there the account ends. There is not a word about the patient and his condition when the inflammation is over and done with ; a condition which, experience tells us, is generally a very deplorable one.

If we turn to a few other topics in the same author, we see a similar idea carried out. Is dropsy spoken of, we are told to procure the evacuation of the fluid by one means or another, irrespective of the effect such a drain may have on the constitution or the condition in which the patient is left.

Is the disease hæmorrhage, hydrocephalus, iritis, catarrhal restored first, and the disease was ultimately cured in consequence. Contrast this with cases reported by Dr. Acerbi as occurring in the Milan Hospital. One, a robust countryman, was bled nineteen times in twelve days, and took tartar emetic for ten days, when it was exchanged for kermes mineral. He survived : the disease was cured, we suppose, for he left the hospital after sixty-nine days, but he had œdema of the legs, diarrhœa, and excessive pallor and weakness. Another strong fellow, who had been *cured* of pneumonia in January by eighteen bleedings, and who had been sickly during his absence from the hospital, was admitted in the May following, on the eighth day of a second attack. He was actually bled fifteen times in nine days, and took tartar emetic the while, and died on the twenty-eighth day, after being bled *thirty-three times* during the two attacks. In these instances it is clear that the doctor considered that the patient would be well if the lung returned to its normal condition. We presume that the lung may have been cured, but the patient died from the process adopted by the doctor to bring the cure about !

ophthalmia, or apoplexy, we have given to us, as weapons, venesection, purging, mercury, &c. Is the disease delirium tremens, we are told to use opium, so as to procure sleep at all hazards.

But throughout the book we are not told how long the remedies are to be used, or what *principles* are involved in their administration, and why and when they should be changed.

The thoughtful student naturally asks, why inflammation is treated by venesection, mercury, and the like, in one case, *e. g.* iritis, and by an opposite plan in another, *e. g.* bronchitis? and why it is that delirium tremens is to be treated by opium, which in the doses recommended is of itself a poison? He asks, why it is that the intense inflammation of the *skin* in small-pox is allowed to take its course?—and yet if, in the same complaint, inflammation of the *lungs* supervene, why it is not to be allowed to take its course too?

Disappointed with books, the student naturally turns to the practice of their authors, and of others whose experience he may profit by. But he is no better thus, for one man swears by the lancet, another has quite abandoned it, and a third seeks for a middle course. One man treats his patients by large doses of medicine, another by small doses, and another by (such infinitesimal quantities, that they are, practically, good for) nothing. Yet all say they are successful.

But common sense dictates that all cannot be right: the questions then arise, Are any of them correct? if so, which? Are all wrong? if so, why do they find success? Or are all wrong and all right to a limited extent? if so, what have all these plans in common?

No sooner are these questions agitated than the inquirer finds fresh difficulties. He has to ask himself, "What is

the standard of success by which I am to judge of the relative value of treatment?" Two replies to this query suggest themselves, viz., the *mortality* from certain diseases, and the *duration* of those complaints which are not fatal to life.

Ere, however, he can prosecute these ideas, the student finds himself in the presence of another difficulty—he does not know the natural mortality or duration of disease if left alone; and still further, he is positively without any data, whether, in any particular case under treatment, the symptoms of disease and its duration are due to Nature alone, or to the interference of the doctor with her.

Sundry remembrances of the past may now cross his mind about the surgeon's practice before the weapon-salve heresy, and after it; and he may entertain a fear lest, in the physician's practice of the present day, a fallacy may lurk akin to that which was prevalent amongst surgeons in days of yore.

If he be a shrewd observer, it will probably occur to him, that the popularly accepted doctrine of infinitesimal dosings bears the same analogy to the Medicine of to-day as the weapon-salve heresy did to the Surgery of the past.

In working out the problems thus presented to his mind, the student would naturally ask, how it could be, that so transparent a fallacy as the weapon-salve, and of "power increased by diminution," could ever become popular? Turning to the past, he would find the same reason given as is applicable to the present age; viz., that the new plan was found to be more pleasant and less tedious than the old. Flitting still onward in his inquiry, the student would consider why it was, that, at the present day, charlatans had such a hold upon the public. If he laid himself out to receive the answer from the mass, he would find it run thus—

that quacks *promise* always a speedy cure ; while regular doctors, it is known, too often keep their patients in hand for a long period.

This would give him the idea that the public tested the skill of the individual whom they choose for a medical or surgical attendant by the *rapidity* of the cure effected. Putting himself into the position of a sufferer, he would readily allow that the test was a good one. He would be equally satisfied with the *mortality* test.

Armed with these two tests, he proceeds to read the books of rival authors and rival sects ; and he finds to his profound astonishment, that Hahnemann and his *early* followers were able to demonstrate that they had the advantage over the *older* school of Medicine, both in reduced mortality and duration of illness.

This fact being once established—and it would be ignoring the rules of evidence to deny it—the next question which suggested itself would be, whether there was not a principle wrapped up in Homœopathy, as there was one in the use of the weapon-salve ?

The natural solution to this query would be the same as in days of yore, viz., that the value of the system consisted in letting human nature alone ; for of the potency of a twentieth or fiftieth dilution of a drug it is irrational to speak.

Now comes the most difficult part of the inquiry : how is the physician to test the unaided power of nature, and retain his patient's confidence and his own peace of mind ?

He can only do this by observing the course of disease in brutes, and in those of the human race who are unable or unwilling to have medical assistance.

Having satisfied himself upon this point, the student naturally again inquires, Can nature be assisted in any way,

and by means which commend themselves to our reason ; or must we be content, after years of painful toil, to say that art can do nothing ? To answer this, he finds it necessary to go to the first principles of human life ; to inquire into man's normal condition under varying circumstances, the influence that external agents have upon it, in health and disease, and the extent to which those agents may be beneficially employed.

In this investigation, it is soon seen that disease is simply a departure from health, and that recovery is simply a restoration to health ; and the broad principle which must underlie all theory and practice presents itself as a truism thus—To cure disease, we must bring back the patient to health.*

Absurdly simple as this truism appears, it involves an abstruse question which ought to be constantly present to the mind of every practitioner, viz. :—

On what principle do I endeavour to restore an individual to health when I use medicines in doses which would make a sound man ill ?

At first sight, the answer to this question seems easy enough. Nothing is more simple than to say, “Bleeding lessens the force and frequency of the circulation, which is excessive in inflammation. Mercury bridles adhesive inflammation, which is a dangerous accident. Antimony produces faintness, and that empties the blood-vessels ; a purgative unloads the bowels, and they are always too full ; low diet makes a person weak, and prevents the continuance of inflammation ; opium relieves pain,” and the like.

* The converse of this is not true ; for a disease may be cured—*e. g.* the lung recover from pneumonia, and yet the patient may die from the direct effects of the means employed to promote the cure. Of this instances will be adduced further on (pp. 327 to 321).

But when these answers are rigidly examined, they complicate the subject greatly; instead of one question, we have a host, *e. g.* Does bleeding lessen the force and *frequency* of the heart's action? and, if so, is the patient better in consequence? will not the force and frequency diminish without venesection being practised? Again, if mercury bridles the adhesive inflammation, does it not promote suppurative or destructive? is the latter preferable to the former? Why must adhesive inflammation be bridled at all? Why is this Bucephalus, so much feared as it is, allowed to go on unchecked in one case while it is to be curbed tightly in another? and if mercury be really necessary, how much of it is to be used? Is it necessary for persons to be salivated, and how long must they be so? Cases of antimonial poisoning are now rife: why does the doctor, who would swear a man's life away for administering this drug to his *healthy* wife for the purposes of murder, use this same material in even larger doses when people are ill from pneumonia?

Again, the question is put, How can the low diet which weakens a strong man make a weak man strong? how shall we justify ourselves in imitating the diet of the poverty-stricken, for the cure of the wealthy, when they have similar diseases to the poor? In answering these and other questions, each one naturally turns to his own experience, or quotes that of others; but that only widens the number of questions still to be disposed of ere trustworthy results can be attained; *e. g.*, Does the man who has experience of the use of a drug in any disease, have equal or similar experience of the course of the disease *without that drug*? and when he scarcely ever uses another than his favourite medicine, can he be said to know the best remedy for any disease, or even what does the least harm?

Is he sure that he reads symptoms rightly? that apparent strength is real strength, and that mental activity necessarily indicates intellectual power? Is he sure that the stout woman is strong, the florid too full of blood, and the spare man weak, or disposed to consumption? These and a host of other queries are involved in the question we have deduced as a corollary from the truism we have alluded to;—who can say they are unimportant?

In working out the subject which the preceding considerations suggested, the Author came upon many facts which grouped themselves in a manner both new and interesting. He thought he could see the reasons why treatment once popular in the profession had died out; why some thought drugs overrated, which others praised highly; why such diseases as hysteria and dyspepsia were considered so intractable; why it was that there were so many fluctuations in the general theory and practice of Medicine, and in the particular tenets of individuals.

He found, in ordinary instances, that a recognition of the broad principle above enunciated gave great clearness to diagnosis, and that in all cases, whether they were obscure or apparently clear, it gave comparative precision to practice; for in every instance the condition of the patient's health became the touchstone by which every direction or prescription was tried. In other words, the *dynamical condition* of the organism was thought to be of more importance than its physical state.

He has felt conscious that the necessity of a strict observance of this principle has a strong tendency to force the mind to close observation and thoughtful inquiry; while, at the same time, it discourages routine practice and a blind subservience to "authorities."

Thus the principle—truism though it be—involves the

necessity of progress : it cannot exist without it. It involves a new investigation into the action of all drugs and articles of diet, and of the effects of every means used by the physician and surgeon. Hitherto the influence of these things *upon disease* has been the sole thing tested : now we must examine their influence upon life and health as well.

The investigation into the true value of the means generally employed for the cure of inflammation, was undertaken by the Author in 1856 ; and he hopes, at some future time, to extend the inquiry into other diseased conditions of the body ; meanwhile, he is content to lay before the profession, in a prominent manner, that broad principle of action on which, he doubts not, many an one has already acted ; but which, having been attained at the end of a long life, has not been published, either from want of leisure or, possibly, from a fear of being considered heretical.

We have heard of one physician, who said, that when he started life, he thought he had twenty remedies for every disease ; but when he was old, he found, on the contrary, that there were twenty diseases for which he had no remedy. Dr. Baillie doubted whether his medicines had not done more harm than good. Dr. Williams, we hear, had no faith in Medicine, and others there are who scruple not to declare that the present practice is unsatisfactory. Why is this so ? Simply because none of these men ever looked upon medicines in any other light than that of remedies for disease.

If, on the contrary, medicines had been regarded as adjuvants, not as independent powers, a far different estimate of their capabilities would have been formed.

In conclusion, the Author would state, that he does not lay the smallest claim to originality, as regards the facts he brings forward ; the subject precludes the possibility of such a thing : his sole aim is to show that there exists in Medi-

since a fundamental principle, by undeviating attention to which our science may surely attain that general position and esteem which, though it has always claimed, it has never yet enjoyed.

In the following pages, the words "force" and "power" are freely used. It is well to say a few words upon their significance. We employ them to signify what Mr. Lewes and others speak of as the *dynamical* condition of the organism, or what others might call the attributes of matter.

If two structures, essentially similar so far as their physical condition is concerned, have tendencies distinct from each other, we naturally conclude that they possess some essentially distinct force, power, or principle. It really signifies very little whether we consider this principle inherent in living organism—as magnetism is in the loadstone—or whether we consider it as something superadded, as magnetism is to soft iron when surrounded by a galvanic circuit. It is quite sufficient if there be a distinct understanding that "force" and "matter" are not identical.

The importance of this will be readily recognised when we find that there are many who imagine that *structures* which are identical have their *functions* equally identical. It is not so, however; for the structure of all eggs is alike, yet one becomes an eagle, another a fish, another a barn-door fowl, another a turtle, and another an alligator. A yet more striking illustration of power or force irrespective of matter, may be seen thus: we place on two slips of glass two drops of serum; the chemist and microscopist can detect no difference between them, and we should pronounce them identical did we not know that the one, when applied to a wound, will produce vaccinia, while the other will have no

effect. Again, we may take three specimens of pus: the microscope, &c., detects no variation between one and another; yet one will reproduce a chancre, another gonorrhœa, and the third will be harmless. A scab from a variolous sore will give rise to small-pox, while a similar one from lepra will do nothing. Again, we may point to four specimens of saliva, all apparently of the same structure, and containing the same physical ingredients: the first is saliva from a fasting or an angry dog; the second from a full and placid one; the third is from a rabid wolf; the fourth from a rabid sheep; but how different is their power! The first and third will produce hydrophobia, the second and fourth are innocuous.

When it is remembered that all eggs are not hatched; that vaccinia does not always follow vaccination; that venereal disease does not always follow contact with syphilitic pus; that variola does not invariably follow inoculation, or hydrophobia *necessarily* result from the introduction of rabid saliva into the system,—it is evident that an inquiry is necessary into the reasons why these things do or do not occur: and we are driven to investigate the “force” of the recipient, as well as the structure of his body.

This can only be examined satisfactorily in the *living*. Yet medical inquiry has for long been directed chiefly to the inspection of the *dead*, and pathology has been based upon *material change*, rather than a *modification of imponderable and vital powers*.

We do not deny that a great advantage was gained, when every one felt it a duty to study the post-mortem results of disease. But it was only a step in the right direction.

To turn this knowledge to account, it is necessary to know the powers concerned in such morbid changes, the circumstances that put those forces in operation, and the

way in which the organism is to be restored to its ordinary healthy condition.

The necessity of considering these forces has often been acknowledged, and we can find in Celsus the germs of the most important of those rules we are endeavouring to enforce.

In his writings we find him acknowledging that the medicinal art admits of scarcely any precepts of general application; that while we are well, we should take care lest our barriers against disease be destroyed; that each individual has a constitution of his own, which he should study; that purgatives, &c., may be very prejudicial to some; that certain parts of the body may be constitutionally weak; that debility predisposes to disease. In his remarks about bleeding he lays it down that it is more necessary to consider the state of the strength than the age of the patient or the nature of the illness. We find him also duly appreciating the natural vital forces; for when speaking of certain critical fluxes, &c., he remarks, "Since most of these occurrences happen spontaneously, one may understand that, by giving effect to the means employed by art, *nature is of more avail than the remedies themselves.*" He uses still stronger expressions in the third book, viz., "To confess the truth, there is no disease over which chance exerts less influence than art, for with nature against us, our treatment is of no avail." What, again, could be stronger in favour of the views advocated in this volume, than the following sentences? "But even when the malady is not in the whole body, but in part only, it is more to the purpose to aim at increasing the strength of the whole system than to remedy diseased parts exclusively;" "If any one after imprudent treatment survive *with his energies unimpaired*, by instituting a proper method of cure he is soon restored

to health." And what can be more pregnant than the following?—"There is another circumstance of which we ought not to be ignorant, that the same curative agents do not suit all patients. It is meet, therefore, when a remedy fails, to place a higher estimate *on the patient's life* than on the writer's authority (who has praised it)."

All these are jewels of their kind. Had they been accompanied by a close investigation of "chance" in medical matters, of "Nature" and her laws, of art and its tendencies, and had Celsus given us any directions how we could fairly estimate the remedies, and the plans of treatment he recommends, his book might have stood alone as one of the greatest authorities in our science.

PREFACE TO SECOND EDITION.

IN presenting a second edition of his work to the public, an author has an opportunity of criticising those who have passed judgment on the first.

Few, however, avail themselves of the privilege; for critics, like wasps, sting the more fiercely when they are attacked.

But criticism deserves correction whenever it panders to prejudice, and allows the bigotry of the *man* to override the impartiality of the literary *judge*.

Hitherto, the progress of Medicine, as a science, has been damned by intolerance, and it is time that those who profess to direct the medical mind should free themselves from the charge.

Many periodicals have laid themselves conspicuously open to this charge, and the author will attempt to establish it, careless of any subsequent sting. The *Lancet*, true to its assumed mission of improving the purses of professionals rather than their mental qualifications, finished its review by saying, "Why is the author so fond of talking about Homœopathy? He first pets and then abuses it; pets it again, and again casts it from him. To the pure all things are pure; and no doubt Dr. I. does all this from the mere love of science, and the desire to exhibit the absurdities of charlatanry. But we are bound to tell him that pitch is

sticky—very, and we would therefore advise him for the future to cease to meddle with it.”

The *Medical Times and Gazette*, whose intellectual tendencies infinitely surpass those of its contemporary, falls into the same error, but the lesson is put into a more gentleman-like form. “The author is, we think, *too liberally inclined* (!) towards others; admitting as facts what we should either disbelieve or receive with great hesitation. For instance, he says, in his Preface, ‘that it would be ignoring the rules of evidence to deny that Hahnemann and his early followers were able to demonstrate that they had the advantage over the older school of Medicine, both in reduced mortality and duration of illness.’”

The *Dublin Quarterly*, in its review of the “Preface,” beyond which the critic does not go, expresses the same idea. “The author gently and, seemingly, with a sigh of regret, puts Hahnemann aside in his systematic capacity, though he admires the success of his mode of treatment;” and then the same quotation is added as that referred to above.

In all these observations there is real or affected ignorance of the present condition of Medicine, and of the influence the new practice of globulism has exercised upon what is called orthodox Medicine.

One steady idea seems to be uppermost in the minds of such writers—viz., that no opportunity must be lost of abusing Homœopathy—with the *arrière pensée* that the old doctrine will be proved to be true if the new can be demonstrated as false! But as one man standing on a sinking plank does not raise it higher above the water by trying to engulf any other rotten wood that comes in his way, so the orthodox doctors do not whiten their own ease by blackening that of their opponents.

For a long period the Author has been profoundly dis-

gusted with the manner in which the contest between the Allopathic and Homœopathic practitioners has been carried on. The former have been carrying on the war much like John Chinaman did against the British — by vapouring, gesticulating, and calling them “foreign devils,” and dooming them to destruction. The latter have gone right at the enemy, and had a success which has intensely galled their adversaries. So long as the Celestials adhered to their old way of fighting, and their own old weapons, so long the “foreign devils” were victorious. But when once they condescended to learn wisdom from their adversaries, they beat them conspicuously; as the fight on the Peiho abundantly testified.

Now, we may fairly ask, which writers did the Chinamen most good, those who only abused their enemies, or those who taught them that they could conquer by adopting a new method themselves?

What the former were to China, with all its old traditions, the *Lancet* and other medical journals are to Medicine and its hereditary errors.

When one of the latter class of writers springs up, it is at once attempted to crucify him for averring, that a change from the old practice is necessary ere the warfare can be successfully waged; and he is treated as an enemy in disguise because he adopts the maxim, “*Fas est ab hoste doceri.*”

From the commonalty one would expect such a thing, but not from those who profess to be leaders—unless, indeed, they are leaders solely because they possess in a conspicuous degree the prejudices common in the multitude—and are blind leaders of the blind.

So far from his being an admirer of Hahnemann, it so happens that the Author has been opposed to Homœopathy

from the first occasion of his reading an account of its doctrines. Educated as he was in the old school, he believed, as a young man, that none could adopt the new doctrine but fools or knaves. But, as his experience progressed, and his knowledge of Homœopathic practice and its results extended, he felt obliged to confess that a majority of those who adopted the new views were conscientious men, and were in mental calibre superior to the majority of their opponents. Circumstances enabled him to hear the *bonâ fide* results of the new practice in a great number of instances ; while, at the same time, he heard the results of another practice which was very similar to what the Author now advocates.

From Mr. Nisbet (of whose medical acumen mention will repeatedly be made) the Author learned that many of the drugs then—as now—relied on, were positively prejudicial, and that he (Mr. N.) had gained the character of a Homœopathist simply because he employed very few medicaments. On similar grounds the Author subsequently found himself placed in the same category. On comparing his friend's results and his own, first with those of the older school, and secondly with those of the new, the conclusion was inevitable, that an indiscriminate system of “drugging” was inferior to an equally indiscriminate system of “letting nature alone ;” but that there was a middle way which was safer than the two extremes.

What that way was had next to be demonstrated.

This involved a very close examination of natural processes, a rigid examination of old theories, a careful appreciation of old practice, and a collation of experiences and of opinions from an infinite variety of medical practitioners. The mass of information thus acquired was chaotic enough at first, and, like the lady with the tangled skein, the Author

sought industriously for "an end." A clue having been obtained, it was assiduously followed up. In doing so, the Author heard the intellectual history of many of those who had seceded from the ranks of the old to those of the new school.

One was converted by treating successfully a case of puerperal peritonitis with globules, and finding his patient well on the third day. Such a "success" was unknown amongst the Allopathists then. No amount of objurgation could alter the fact. But in the course of the Author's inquiries he ascertained that there was a form of myalgia universally mistaken for peritonitis—that this was aggravated by the plan of treatment commonly adopted for its cure, but that it was curable by simple rest. The natural inferences were, first, that there was a common error in diagnosis; secondly, that doing nothing was superior to "active" treatment; and the conclusion was irresistible, that the old school would be surpassed by the new, unless the former improved both in diagnosis and treatment.

About the same period the Author saw, in the persons of near relatives, the prejudicial effects of "active" treatment, and this, fortified by a perusal of Sir J. Forbes's views, obliged him to the belief, that he would rather have his friends let alone, entirely, than be assiduously cared for by those Allopathists with whose practice he had been familiar.

He next learned that the cause of the secession of another medical man was, that one of his own family had recovered from convulsions, by globulism, whereas others had died from the same disease when treated by him in the then orthodox fashion.

On conversing with other seceders, he found that they all had possessed unbounded confidence in drugs, blisters, bleeding, purging, &c., especially in acute disease, and that they

had been won over by finding more success under the new system than the old.

The Author, as these inquiries went on, ventured to treat patients in many acute disease by diet, &c., or such small doses of medicine that he believed them harmless, and was soon in a position, from his own and others' experience, to show as many patients "cured," without any medicine, as Homœopathy could show cured by globules.

His conclusions received corroboration when he was told by an hospital Physician, in whose judgment he had unbounded confidence, "that he felt that if any one had induced him twelve years ago to try Homœopathy, he should have become a convert, because he then believed in the *necessity* for medicines, &c., in acute disease, which he now saw were *really prejudicial*." His success had increased steadily in proportion as the "heroism" of his original practice had subsided. With a full knowledge of all this, the Author felt that the whole science of Medicine had to be "re-cast," if its professors hoped to gain the confidence of the public. Conflicting systems had carefully to be examined, and in a manner which would at any rate appear to be rational. The end proposed was an ambitious one; its success was problematical. Further reflection might modify his views. Criticism was expected. It came,—but in what guise? Pitch is sticky! Liberality to our adversaries is bad! Foreign devil! Down with the man who studies an enemy's tactics!

The review in the *British and Foreign Medical Quarterly* demands, from its position, a little more extended notice. It sets out with demonstrating that the idea of basing all medical practice upon the dynamic condition of the organization rather than its physical state, is one which is apparent throughout the writings of Drs. Watson, Elliotson, Corrigan,

Gordon, Russell, Alison, and Messrs. Tyrrell and Critchett ; and then, in the next place, it adduces cases which prove the contrary, and eulogises a practice based entirely upon the physical condition of organs. The reviewer comments upon the diagnosticating acumen of his favourites, and quotes a passage lovingly, in which it is distinctively shown that they could *not* diagnose between inflammatory and asthenic headache, except by the test of an anti-inflammatory treatment, which is first tried, and then failing, is abandoned for tonics ! Clever doctor ! admirable and reverend critic !

He then instances croup, as being a disease for which all old authors favour a prompt and energetic employment of blood-letting, and presumes that they *must* have been right, because their names are worshipped to this present day ; and yet, he adds, "*It is very true that our own experience in croup does not encourage us to hope for much success from this practice.*" Now, a reference to the writers quoted does not show much success, for 50 per cent.,* or thereabouts, of their patients died ; and in the thirty-first volume of "Ranking's Abstract," page 87, which appeared simultaneously with the above review, we find that croup has been very successfully treated by Dr. Eastman with *quinine* ! "and this

* This reviewer's style of argument forcibly recalls to one's mind a few keen passages in Molière's "Malade Imaginaire"—*e. g.* : "Mais sur toute chose, ce que me plait en lui," says the father when eulogising his son, "et en quoi il suit mon exemple, c'est qu'il s'attache aveuglement aux opinions de nos anciens, et que jamais il n'a voulu comprendre, ni écouter les raisons et les expériences des prétendues découvertes de notre siècle touchant la circulation du sang, et autres opinions de même farine. . . . Le public est étonné ; . . . et pourvu que l'on suive le courant des règles de l'art on ne se met point en peine de tout ce qui peut arriver. Mais ce qu'il y a de fâcheux auprès des grands, c'est que, quand ils viennent à être malades, ils veulent absolument que leurs médecins les guérissent."—Act ii., scene 6.

for several years," the author adds, "with as much confidence of success as I treat ague and fever, or any other intermitting disease."

The reviewer then goes on to quote some cases of pneumonia which improved while the patient was taking antimony. No wonder; I remember having read of some thirty cases which recovered while taking infinitesimal doses of aconite and bryony; and of others which recovered after being bled some twenty times, or thereabouts. If a disease runs a definite course, as pneumonia generally does, it is quite possible to suppose it may improve even if antimony should be given.*

* I would call attention here to a very interesting oration delivered to the Harveian Society by Dr. Ward, Physician to the Dreadnought Hospital Ship, February 15, 1860, and published as a pamphlet, entitled "The Position and Prospects of Rational Medicine." So philosophical is its tone that I would willingly quote the whole, did not the limited space ordinarily assigned to a preface prevent me. I must, however, reproduce the following remarks, as they corroborate in a striking manner those views which the *Medico-Chirurgical Review* so vigorously opposes. "Being resolved," says Dr. Ward, "to test by my own experience the conclusions of the physicians already cited as to the non-treatment of those inflammatory affections for which men of the old school were wont to employ their more heroic remedies, I allowed the last seven cases of *acute sthenic pneumonia* which came under my care, to run a perfectly natural course. I gave no drug whatever in any one of them, used neither leeching or counter-irritation, but attended strictly to hygienic appliances, and they all did perfectly well." Again, "I have alluded to one disease, and I could cite several, in which the delicate and protracted administration of mercury has, in my experience, been very serviceable. In many cases, however, in which I should formerly have thought this drug to be indispensable, more extended experience has led me to regard its action as prejudicial. Thus, in pericarditis in all cases, and pleuritis, and peritonitis in cachectic subjects, it opposes the conservative efforts of nature, breaks down those salutary adhesions which are the best result we can hope for, and determines in their

Not content, however, with pneumonia, a case of acute laryngitis in an adult is told, to demonstrate the value of antimony and calomel, and recovery is recorded in a *fort-night*. On the same day I read another case by Dr. Eastman, in which a cure of a very severe case was effected in *two days by quinine!*

Two other cases are given by the reviewer, the first of which seems simply to show that he sometimes gives tonics himself; in the second, a calomel and opium treatment is adopted for three days in acute conjunctivitis; and then, as no good result followed, quinine and iron were substituted with very good effect. Of the opinion given of its worth we leave any one to judge. "*The calomel did not act directly curatively, yet we believe it prepared the eye for the tonics*" (!) Poverty certainly is not pleasant, but it prepares one wonderfully for the enjoyment of riches;—ergo, bleed Baron Rothschild's purse

The reviewer then, leaving his own experiences, quotes Mr. A. Martin as a powerful authority for venesection in acute hepatitis in tropical countries: to this we must, of course, bow, as the mortality is only from 5 to 15 per cent.; but seeing that Claude Bernard shows that loss of nervous influence conduces to produce inflammation, and that instead effusion of serum or pus." With experiences like these, increasing as they are in numbers every week, we cannot help concluding that many a disease which appalled the doctor by its severity, *acquired its chief terrors from his own plan of treatment*, and, consequently, that when a new sect arose which practically eschewed all medical heroism, its success would be conspicuous, and its professors become popular. Against the new school it is urged that if it had to treat the fearful symptoms familiar to the old, it must resort to active means. The answer is natural: we do not anticipate ever having these symptoms to meet, for we do not use the means which produced them!

rience shows the hepatitis of hot climates to be most severe in those whose constitutions have been broken down, we should like to have a little experience on the other side.

Again, Mr. Martin is quoted to prove the value of venesection in acute dysentery; yet the mortality varies from 15 to 25 per cent., and Sir James Macgrigor, Mr. Amiel, Dr. Latham, and Dr. McCarthy, are all against it. The last authority says, "My *opinion* was favourable to the early use of the lancet. My *experience*, however, has greatly altered my views on this subject. I am satisfied very few cases were benefited by blood-letting, that in several it did mischief, and *that in all it rendered the subsequent debility considerable, and the convalescence tedious.*" If any of our friends, therefore, should happen to have acute dysentery, we hope that they will not fall under the care of so strong an admirer of Mr. Martin's practice as our reviewer is.

The reviewer then quotes approvingly a passage from Dr. Copland, recommending large vascular depletions (from three to six pounds) during the excitement of fever.* This was the very practice adopted and abandoned by Dr. Clutterbuck, recommended by Dr. Armstrong, largely practised by Dr.

* This approving passage of the reviewer again reminds us of Molière's "Malade Imaginaire."

QUATRIÈME DOCTEUR.

Dès hiero maladus unus
 Tombavit in meas inanus
 Habet grandem fievram cum redoublamentis
 Grandam dolorem capitis
 Et grandum malum au côté
 Cum granda difficultate
 Et pena à respirare
 Veillas mihi dire
 Docte bachelière
 Quid illi facere ?

Southwood Smith, and eventuating in such terrible lesions of the brain, and elsewhere, such fearful maniacal delirium, and such a large mortality, that few, if any, have ventured to adopt it since.

Dr. Gooch is next quoted as in favour of extensive bleeding in peritonitis, and his tact and knowledge are eulogised ; yet two cases are quoted which he speaks of as being *peritonitis*, when there is little reasonable doubt that they were simply *myalgia* ! A reference, too, to most of his successful cases, where the cure was effected by an early bleeding, shows them to have been of the same stamp. Surely we are

ARGAN.

Clysterium donare
Postea seignare
Ensuita purgare.

CINQUIÈME DOCTEUR.

Mais si maladia
Opiniatria
Non vult se garire
Quid illi facere ?

ARGAN.

Clysterium donare
Postea seignare
Ensuita purgare
Reseignare repurgare et reeclysterisare.

CHŒUR.

Bene, bene, bene, bene, respondere
Dignus dignus est intrare
In nostro docto corpore.

Let us charitably hope, however, that we can soon all join in quoting another well known passage from the same author :—

“Où : eela était autrefois ainsi, mais nous avons changé tout eela, et nous faisons maintenant la médecine d’une méthode toute nouvelle.”

not now to be expected to follow such a guide, nor should a medical author be deterred by a reviewer who worships such an authority from forming an independent judgment. Nor will he be greatly distressed to be told that his doctrines are dangerously and mischievously untrue when he finds himself placed in the medical pillory with men like the late Dr. Todd and the present Dr. H. Bennett, who are amongst the most profound thinkers and successful physicians of our time.

The reviewer still farther announces that "the great and palpable error which underlies all the author's arguments and reasonings is this, that he has never admitted the possibility of febrile reaction or inflammatory exudation being *themselves* the cause of death." What does this mean? That people die *of* fever who die with feverish symptoms; that those who die with malignant remittents, intermittents, typhus, erysipelas, small-pox, measles, scarlatina, and heetie, die all of them *of* or from fever, simply because fever is present? Or does it mean to say that when strong fever is present, as in the early stage of variola, it must at all hazards be subdued? and that the disease is cured if the fever be quieted, even though the patient should die of the remedy? Then again, we should like to ask our eritie for an example of a ease wherein inflammatory exudation is *per se* a cause of death, except in the brain, and then will he tell us in his next review whether any anti-inflammatory treatment will at once bring back this exudation from the parts whence it came, or give us *proof* that venesection can prevent its oocurrence. So far from venesection cheeking exudation, there is abundant testimony to prove that it favours it considerably. This is well known to those who have studied the past and present plans of treatment in acute rheumatism and in croup. The worst ease of the latter which the Author has known was one seen very early, and where the ehild was profusely

bled at once, and twice after that ; the symptoms were aggravated after each bleeding, and death ensued in seventeen hours. The reporter made a *post mortem* examination, and remarked that he had never heard of a case in which the exudation of lymph had been so rapid and so dense, and the disease so speedily fatal ; and this in spite of the vigorous antiphlogistic measures he had employed. It evidently did not occur to him, any more than it would have done to my reviewer, that the so-called means of cure were in reality the passports to death, and that the child died of the doctor rather than of the disease.*

Who now pretends that death arises in pneumonia from the extent of exudation into the pulmonary tissue simply, and that it can be diminished by the largest bleeding, when we know that all the physiological symptoms of the disease will meliorate, even while the exudation is proved by physical examination to be extending ? We often see the pericardium distended by inflammatory exudation ; yet the patient does not die of that, for far greater exudation is common in dropsy. In peritonitis, too, who will affirm that it is the exudation which kills the patient, when we see the enormous amount of

* We fear that there are many Dr. Purgous still extant, of whom we may say, "C'est un homme tout médecin depuis la tête jusqu'aux pieds ; un homme qui eroit à ses règles plus qu'à toutes les démonstrations des mathématiques, et qui eroirait du erime à les vouloir examiner, qui ne voit rien d'obscur dans la médecine, rien de douteux, rien de difficile, et qui . . . donne aux travers des purgations et des saignées, et ne balancee aucune chose. Il ne lui faut point vouloir mal de tout ce qu'il pourra vous faire, c'est de meilleure foi du monde qu'il vous expédiera ; et il ne fera en vous tuant, que ce qu'il a fait à sa femme et à ses enfans, et ce qu'en un besoin il ferait lui-même.—*Le Malade Imaginaire*, Act iii., scene 3.

a similar fluid in ascites ?* Or does the reviewer mean that active measures are to be taken, lest fever should come on or exudation take place ? Surely, if we wish to ward off these, we should not adopt the very means which have been proved to be the most certain for inducing them. Nor are we without evidence on this point, for the following is from the pen of a writer who began his medical career as ardent a disciple of the antiphlogistic plan as any one could desire, but who, like many other close observers, has seen that the relief afforded by the anti-inflammatory treatment praised by the reviewer was transitory, and the mischief that it did great.

The cases all occurred in the practice of Dr. Cameron, of the Southern Hospital, Liverpool, by whom they are reported in the *Liverpool Medico-Chirurgical Journal* :—

PLEURITIS.

Antiphlogistic treatment, 29 cases.

Recovered, 24. Died, 5.

* As the reviewer seems a great worshipper of authorities, we append the following quotation from Claude Bernard :—

“If we examine some of the diseases which most frequently produce death, we shall be obliged to have recourse to general effects, in order to explain the mechanism through which the ultimate result is attained :—numberless patients die of peritonitis, and in a very short space of time too. How does this take place ? for peritonitis, at first sight, does not seem to interfere with any of the higher functions of life. Inflammation of the lungs, or pleura, frequently proves mortal in a few days ; and in such diseases the respiratory functions are of course impeded ; yet mere asphyxia is evidently not the cause of death in acute cases of pneumonia ; and in affections which prove rapidly fatal, the animal, although deprived of food, cannot evidently be supposed to die from mere inanition in so short a space of time.” It seems, therefore, that Claude Bernard is in as dreadful error as the Author, seeing that he does not sufficiently admit the possibility of inflammatory exudation being the cause of death !

Of the 24 who recovered—

Duration of illness, in 12 cases, 14 days or more.

„ „ 10 „ 7 „ „

„ „ 2 „ uncertain.

Progress of case—In 15 unfavourable ; in 9 favourable.

Bleeding gave relief in all the cases, though in several it was only temporary.

Mercury administered in 16 cases.

In 12 no action on the mouth.

In 5 abdominal irritation, increase of febrile and pulmonary symptoms.

In 4 progress favourable.

In 3 results uncertain.

In 4 mouth affected (on the 4th, 5th, 6th and 9th days).

In 2 immediate improvement.

In 2 results doubtful.

Antimony administered alone, or with opium, in 6 cases.

In 4 cases it seemed to act beneficially, without any gastric or intestinal disturbance.

In 2 abdominal irritation was present, with consequent depression of the system, and aggravation of the pulmonary symptoms.

Of the fatal cases—

Bleeding was practised in all, and with temporary relief.

Mercury administered in all ; in none did it seem to arrest the disease ; in one it brought on severe dysenteric symptoms, *which appeared to hasten the fatal event.*

Treated without bleeding or mercury, 13 cases, all recovered.

Duration of cases—In 2 cases, 14 days or more.

„ „ In 11 „ 7 „ „

Progress—In 4 unfavourable ; in 9 favourable.

PNEUMONIA.

Antiphlogistic treatment—20 cases.

Recovered, 15. Died, 5.

Of the 15 who recovered—

Duration of illness in 9 cases, 14 days or more.

“ “ 6 “ 7 “ ”

Progress of the case—In 8 cases, favourable.

“ “ 7 “ unfavourable.

Bleeding.—In most cases immediate relief followed the use of this remedy, but frequently this relief was only temporary. In five cases, extension of the disease, either in the substance of the lung or to the pleura, occurred after bleeding.

Mercury was administered in 5 cases.

In 2 improvement of the disease occurred.

In 1 no benefit was recognisable.

In 1 aggravation occurred during its administration.

Antimony was given alone in 10 cases.

In 4 cases, gastric or intestinal irritation, accompanied by depression, occurred; in 2 of these cases an aggravation of the disease ensued.

The 5 deaths occurred respectively on the 2nd, 5th, 5th, and 18th days.

In the 5th case the period of illness was uncertain.

The 5 cases were treated by bleeding and antimony; in one case mercury was given in addition.

Bleeding.—In 3 cases immediate though temporary relief.

“ In 2 “ no relief.

Mercury.—In 1 case, mouth affected on the 11th day; notwithstanding, increase of the febrile symptoms occurred, extension of the disease, and death by acute gangrene.

Antimony.—Intestinal irritation in one case.

Treated with antimony, diaphoretics, quinine, or stimulants (opium administered in nearly all), 34 cases.

Recovered, 24. Died, 10.

Of the 24 who recovered—

Duration of case in 17 cases, 7 days or more.

“ “ 7 “ 14 “ “

Progress of the case—16 cases favourable.

“ “ 8 “ unfavourable.

In the 8 cases in which the progress was unfavourable, the change coincided with the supervention of depression, attributed, in one case, to severe diarrhœa; in another to sickness and nausea. Antimony had been administered in all.

10 Deaths.—3 cases in less than 12 hours after admission.

2 on the 2nd day after admission.

3 on the 3rd “ “ “

1 on the 4th “ “ “

1 on the 13th “ “ “

Antimony was administered in two cases. The stimulating treatment was adopted in the other cases, in which the disease was far advanced either into the second or third stage at the time of admission.

ENDOCARDITIS AND PERICARDITIS.

Antiphlogistic treatment—Bleeding and mercury.

17 cases { 7 Endocarditis.
10 Pericarditis.

Recovered, 16. Died, 1.

Duration of illness in 11 cases, 14 days or more.

“ “ 2 “ 7 “ “

“ “ 3 “ uncertain.

Bleeding.—In all the cases relief was obtained by bleeding, but in ten it was only temporary. In one case of endo-

carditis, the pericardium became engaged the day after bleeding; and in another—a case of uncomplicated rheumatism—the heart affection appeared after the patient had been bled.

Mercury was administered in all the 16 cases.

No action on the mouth in 7 cases. In three of these dysenteric symptoms occurred, aggravation of the heart disease supervening at the same time.

Mouth became affected in 8 cases, in 2 on the 4th day.

”	”	”	in 2	”	8th	”
”	”	”	in 1	”	5th	”
”	”	”	in 1	”	6th	”
”	”	”	in 1	”	11th	”
”	”	”	in 1	”	12th	”

Increase of the febrile disturbance coincided with the appearance of salivation in 3 cases, in two of which extension of the disease occurred.

In 5, the progress of the disease was favourable.

In 1, the results from mercury were uncertain.

One case died.

Bleeding gave temporary relief.

Mercury gave rise to dysenteric symptoms—did not affect the mouth.

The case was characterised by repeated relief, followed by an aggravation of the symptoms.

Two cases treated without bleeding or mercury recovered.

Our critic, to make his case good against the new school of Medicine, as represented by the late Dr. Todd and others, should be able to prove first, that the mortality from disease under the *régime* of active treatment was and is much less than on the milder system, and that the older an observing Physician grows the more unsparing is he in the use of

depressing remedies. This he cannot do, as it is notorious that the very reverse is the case. The young practitioner, as our reviewer seems to be, is bold, active, heroic, when he is twenty-five years old, but when he reaches forty he is far less energetic; at fifty he becomes very cautious, and at sixty earns the title from his juniors of an old woman. He may say the type of disease is changed; doubtless he thinks so, for he views symptoms through a different medium; when young he saw with the eyes of others, and thought according to rule; when old he sees with his own eyes, and trusts to his own judgment, and the results of his own experience. How often do we hear the idea enunciated by the old, that beauty and worth have departed from our women; public spirit, eloquence, and honesty from our men. Yet what young man ever believed it? Our notions vary with our years; yet we aver that it is the times which are changed, and not ourselves.

Sir Walter Scott tells of an old lady who wished to read again one of the most agreeable novels of her young days, but she found it too indelicate to be bearable. Yet she did not think so once. So if any of our older practitioners could now call up the very patients they saw in their young days, and see the treatment they adopted for their diseases, they might equally blush. At any rate, the Author can remember duly holding the basin on many occasions while an apprentice, and valiantly bleeding many of his own patients as he grew older, under the notion that he had to strangle a fever, and obviate some fearful exudation; and he strongly regrets it, for he can now see clearly the harm it did.

As a parting word to our critic, let us commend to his notice through life the gradual change in the *practice* of those whose *writings* he admires so much. Common report is strangely wrong if the written productions of our older

living authors are to be taken as an exposition of their present plan of treatment. Yet it is by the former, and not by the latter, that they influence their contemporaries and their successors. "Literæ scriptæ manent;" the precepts promulgated in their books remain, the example perishes. "The evil that men do lives after them; the good is oft interred with their bones." Surely there is no harm in opposing the writings of those who have lived to alter their treatment, but not their treatises.

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FOUNDATION

FOR A

NEW THEORY AND PRACTICE OF MEDICINE.

CHAPTER I.

INTRODUCTION.

The human body not a machine—Necessity for knowing its motive power, as well as its mechanism—The living power not of equal duration in all animals, or in all individuals of one genus—Progress of man from conception to death—Whence comes the vital force?—Influence of parents—Hybrids—Influence limited—Growth modified by parental influences—Nutrition of the fœtus in utero—Of the child after birth, at various periods—Growth always definite within certain limits—After growth, persistence—Then decay and death—Is the natural duration of life for man uniform?—The vital power is shown in repairing injury, as well as in growth—Value of the new part compared with the old—The reparative power is as definite as the nutritive, and varies with it—Case—Circumstances influence the reparative form—In health every organ performs a definite function—Disease essentially consists in a departure from health—That departure necessarily implies deterioration—Disordered function indicates a disabled organ and a diminution of vital power—A function can only be restored to its normal state by a restoration of the healthy condition of the organ—Conservative and reparative forces—Disease may show itself by departure from the definite changes consequent upon health—Individuals can only be restored to health through the instrumentality of the vital powers.

BEFORE any one is able to combat disease successfully, it is necessary that he should have a definite and accurate

knowledge respecting the laws of health, and of those natural processes which take place in the body under certain circumstances.

The human body is not simply a machine, which will only continue working till the spring runs down, provided that no accident throws the machinery out of gear; but it is one which possesses in itself the power of repairing damages sustained, and of continuing to work in spite of derangements in its wheels.

As in any piece of mechanism we cannot have motion without a moving force, so it is clear, that to understand its movements, we must be well acquainted with its motive powers, as well as familiar with its machinery; without this knowledge, we should be unable to tell whether, when motion ceased, the cessation was due to a flaw in the mechanism or the expenditure of the motive force. In the same way, before we can fully understand the human body, we must not only investigate its integral parts, but the power or force which puts them in motion, and keeps them going; we must endeavour to ascertain how a living man differs from the corpse, and how he comes to be a living man at all.

In passing a rapid glance over the phenomena of life and health, we recognise at least three stages—growth, persistence, and decay; we recognise the fact, that all living creatures have to pass through these stages, and that they would soon disappear from the world did they not reproduce their likes, each of which in its turn will grow, persist for a time, and then decay and disappear.

But all creatures have not the same natural duration of life: the horse is longer lived than the dog, and the tortoise than the lion. And inquiry shows us, that some individuals and races amongst men have a longer duration of existence than others of the human family.

Reason would dictate, however, that the parallelism here drawn is not absolutely correct; and we are, therefore, driven to inquire whether the varying duration of life in individuals, comprising a "genus," is not due to other causes than that which determines the generic period of existence, and these we shall by and by investigate.

Ere we go into the subject further, we must notice more at length the phenomena of health.

Beginning our history of man at the earliest possible period, we know that by the congress of father and mother a new being is produced. But here, in the very threshold of our inquiry, our attention is arrested by the fact, that congress often takes place hundreds of times without producing such new being; and we consequently are not certain, whether it is the simple union of two vital products which gives rise to the future man, or whether there is not required for his formation something additional in the way of "*force*."* In other words, we ask ourselves, has the

* It is extremely interesting to remark that the formation of new beings does not essentially depend upon the flourishing condition of the old. The wild flowers of our fields are prolific enough in a state of nature, but become barren when they are removed to our gardens and carefully manured. The individual expands in bulk and beauty, but gives no seed. Wheat, when over-cultivated, runs to straw, not to full ear. So it is with man; the wealthier and more comfortable the individual, the less is the probability of a family. The peers and wealthy commoners have, as a class, few children to follow them; their race would become extinct, were it not constantly recruited from new sources. The poor, on the contrary, have a superabundance of offspring. The greater the poverty, the misery, and, in some respects, even the unhealthiness of a people, the greater is the proportion of births. The Registrar-General tells us, that the largest proportion of births to population is where there is the largest proportion of deaths; while the smallest proportion is in the healthiest of the rural districts. The consumptive couple has many children; the strong healthy couple has few. The savage Tasmanian, while

material formed by the contact of the male and female element an inherent power produced by the act of comingling, or does that mixture remain simply living matter until a definite force is given to it, and if so, what furnishes that force? The Holy Scriptures refer to life as something superadded to matter, and poetically speak of man as simple clay, until the Almighty breathes into his nostrils the breath of life, after which he becomes a living soul (or being); and say that, after death, his body shall return to the earth as it was, and his spirit or life shall return to the God who gave it. In whatever way we choose to answer this question, of this there can be no doubt, that it is not in the power of either the male or female to give or withhold this force at pleasure, as the histories of Abraham and Sarai, Jacob and Rachel, and others, abundantly prove, yet that the future condition of the new being is most materially influenced by the condition of both parents, and especially of the father, at the time of the conception.

The microscope has revealed to us a wonderful similarity between the embryo in its earliest condition in man and in all other animals: a few cells, containing some mysterious matter in their interior, are alone to be seen, and from these proceed, by definite progression and change, all those organs of which the body is ultimately made up. The new being generally resembles its parents in all essential particulars: the duck does not, in the next generation, become a hen, or the dog a canary. But growth is necessary, ere the similitude is complete; the child is not born with all its body,

living as best he could, was prolific, in spite of the white man's persecution; yet when the whole race were transported to Flinders Island, and abundantly fed without any labour on their side, they became all but absolutely barren. The individuals flourished—the race rapidly decayed.

liver, lungs, or heart, closely resembling its parents. Its limbs and theirs have not the same proportions, yet everything is proportionate according to its condition, and such proportions will vary with its age. It is clear, then, that the force called into existence at conception is a progressive one, and acting in a definite direction.

That the force is in some way due to parents is probable, for its direction may be modified by changing the parentage. Thus horse with ass, or ass with mare, will alike give rise to a mule—a creature possessing physical and moral affinities to both parents, yet not being the image of either. But the circumstance that these hybrids cannot propagate their like, and keep up the new race, although to all appearance the reproductive organs are perfect, coupled with the fact that hybrids are not produced by the congress of such animals as the dog and cat, naturally leads us to the belief, that something more is necessary to the formation of the embryo than the *physical commixture* of the male and female elements.

Be this as it may, it is clear that when conception does take place, and a child is formed, its growth is modified by parental influences. These govern, to a great extent, its future figure, stature, features, moral and intellectual qualities; and not only these, but the various internal organs of the body are likewise influenced.*

In saying that a child inherits moral qualities from its parents, we do not wish to touch upon the question of the religious responsibility of each individual, but simply to express the fact that propensities are hereditary as well as features and shape. In the lower animals this is undoubted: no amount of education would make a hare bold, the wolf anything but a savage coward, or one of a herd of sheep

* For some very interesting observations on this head, see Lewes' "Physiology of Common Life," chapter xii.

independent of the proceedings of the flock. The offspring of a pointer has been known to point without the smallest training ; and comparing the domesticated dog with the dingo, we may fairly say that its educational capacity is an hereditary thing. In our own race we see that certain propensities are clearly transmissible through many generations. Thus drunkenness is often hereditary in families for centuries, and this quite irrespective of education and example. I have repeatedly known it to occur where the fathers have died while the children were in infancy, and where the training of their minds has been most carefully attended to. Penuriousness, extravagance, timidity, courage, &c., are also hereditary. This is very noticeable in nations whose moral qualities are as fixed as their physical ones. From the earliest age the Celts had the same qualities that characterise them now. Caesar's description of the Gauls answers for the Frenchmen of to-day. Nor is there much difference between the Germans described by Tacitus and those we see now. For a far longer period the Arab has preserved his moral peculiarities, and those of the Jews are as clearly marked. What reader of our own history can fail to find the same Englishmen in Cromwell's time as he finds around him now, and cannot recognise in the heroes of Inkermann and India, the descendants of the warriors of Cressy, Agincourt, Poitiers, and Plassy ?

If the inheritance be so well marked when the parents are in health, we may reasonably expect that it will be so when they are diseased.

The child having come into the world, it continues to grow, though in a different manner to what it did in the uterine state of its existence. Then, no food, as such, was required ; it gained its nourishment by other means than deglutition, digestion, &c. Now, on the contrary, food of an

appropriate character is requisite ; and without it, death must ensue. A proper supply being given, this is digested, changed, and converted into the various materials of which the body is composed ; growth continues—teeth appear—hair grows strong—the muscles and bones become firm—the first teeth decay, drop out—another set comes—growth continues—the reproductive powers are developed—new masses of hair come into view—man's voice and woman's mammæ undergo definite changes—the catamenia are established in the female, and then she almost ceases to grow.* But man does not come to maturity so soon as woman ; his growth is rarely complete till the age of thirty-five, about which time the sternum becomes covered with a thick coat of hair, and the chest develops itself in breadth, and all further growth ceases. During this time all the organs perform their functions in a definite manner ; the eye sees, the ear hears, the stomach digests, and in females a monthly change occurs, and those which are incidental to pregnancy follow a regular course.

The cessation of growth is followed by a period of persistence, of long or short duration, and then there is evidence of decay. In the female the womb becomes unfitted for its duties, and in both sexes the various organs do their work imperfectly : the eye is not now undimmed and the vision perfect—the hearing is not acute—the stomach no longer digests with the same facility as in youth—the weakened

* We cannot give any satisfactory explanation why woman should attain to her maturity of growth sooner than the opposite sex, the duration of their respective lives being about the same ; yet it certainly is so in our own climate. A woman at thirty years of age does not materially differ from one at eighteen ; while the difference between such ages is in the male sex so great, that the elder is designated a man, the other is still a boy. In warmer climates, as woman attains maturity the soonest, so she decays the first.

heart flags—the circulation becomes languid—the arteries lose their elasticity, and other changes go on, until death from old age closes the scene.

The duration of life, unchecked by accidents, &c., we believe would be about the same for all, if all were precisely alike and under the best possible circumstances for the full development of the healthy powers. But, practically, we find that death, by sheer failure of the powers of life, occurs in some individuals sooner than in others, and we express this by saying that they have died from “premature old age.”

Comparing the human body to a watch, we express the same idea, by saying that the mainspring is much stronger in some than in others, although the mechanism of all is on the same model.

By and by it will be our business to inquire whether the human clock-work runs down in one man sooner than another, because the mainspring is weak, or because the works have been allowed to go too fast, or from these causes combined; at present we must pursue a little further the phenomena of health.

We have as yet seen the man holding along the even tenor of his way, unchecked by accident or disease; we have now to consider how he comports himself when these have injured his frame. If a dead body be cut, the wound remains unclosed; in a living one, however, it is not so—for no sooner is the wound made, and the injury accomplished, than there is an almost immediate provision made to repair the damage. The vessels in the vicinity of the cut refuse to allow the blood to pass through them; the hæmorrhage ceases, a new material is formed, which gradually assumes the character of the part injured; and after a definite lapse of time, the injury is more or less perfectly repaired, bone by bone, skin by skin, and tendon by tendon.

It is, however, to be noted, that the new parts are never equal to the old, either in strength or the power of resisting extraneous forces. The cicatrix of a wound in the skin is not equivalent to healthy skin; muscular fibre is replaced by tendinous; and during scurvy, fractures of bones long ago united will reappear, the new parts being absorbed or destroyed, while the old ones remain.

It must be noted still further, that the process of reparation does not go on equally in all living individuals; some there are whose wounds will continue to bleed until death ensues, unless art interposes to prevent the catastrophe; they, in this respect, resemble a living corpse. In others a wound may not bleed much, but it will not heal. Others, again, there are, who when wounded seem to be so deeply hurt, that not only the spot injured, but its contiguous parts, die completely, involving, sometimes, in their death, localities remote from the original wound.

It is clear, then, that there is variety in the *reparative* powers of the body as regards wounds, much in the same way as there is variety of original, conservative, or main-spring power.

The following case illustrates this proposition perfectly:—

Mr. P., æt. 25, came under my care a short time ago. He was a stout, healthy man, but had contracted three chaneres, situated round the corona glandis. They were cauterized by the acid nitrate of mercury; but they showed no disposition to heal, and the parts around became much indurated. Mercury was then administered, but not to salivation. The induration somewhat diminished under its use, but the sores remained in the same condition. Black wash, and subsequently a ten-grain solution of nitrate of silver, was applied to them, but still they did not mend. Six weeks had now elapsed, and the patient was as bad as ever. It then occurred

to me that it was very unphilosophical to continue to employ a depressing drug like mercury while I was using a local stimulant to the sore, and I resolved to stop the blue pill and have recourse to steel. The effect was magical: in three days the sores had diminished one half, and they were well in a week, the induration disappearing as the cure progressed.

I told these circumstances to a medical friend who had under his care a very similar case. He had, according to strict routine, been treating it with mercury, and the sores refused to heal, though he stimulated them locally with sulphate of zinc, &c. After hearing the preceding case, he adopted the same plan, and his patient was well in four days.

In both these instances mercury kept down the reparative force of the system. A host of cases in which wounds have shown no disposition to heal until the patient has been "put" upon wine, quinine, or steel, or has been sent into the pure air of the country or the sea-side, will occur to the surgeon's memory. Let us take one reference from Dr. Cruikshank's "Vade Mecum." Speaking of the non-union of bones after fracture, he says:—"Care should be taken to detect and remedy any constitutional disorder to which the want of union can be attributed. Debility must be counteracted by tonics, nutritive food, and stimulants. Mr. Fergusson relates a case of fractured thigh in which no callus was formed for three weeks, until the patient was allowed a reasonable quantity of whiskey, to which he had previously been accustomed; and Sir B. Brodie relates similar instances."

On speaking of this subject to my friend Mr. Long, a surgeon of whose skill I have the highest estimate, and a practical man in the fullest meaning of the term, he told me that he had often noticed after severe burns or scalds, that the parts would not heal, and remained pale and

stationary for days or weeks, until the patient was treated liberally with meat, wine, ale, or porter. Bright red granulations would then start up, and you might fairly expect the wound to begin to heal, but it does not. It seems as if the wound had become a new organ to make away with superfluous nutriment. If, now, the patient has his wine or malt liquor cut down, the sore will heal rapidly.*

This observation points to an important fact, viz., that recovery from injuries may be retarded by too good living, in the same way as it may be prevented by too poor a diet.

Two instances which have come under my notice confirm this conclusion.

1. A delicate man, æt. 24, had his leg amputated for scrofulous disease of the ankle-joint. As he looked pale and strumous, a very abundant and generous diet was ordered for him ; everything went on well for a fortnight, but at the end of that period the process of cicatrization was arrested, and the man had, for the first time in his life, an epileptic attack. The meat diet was suspended, a purgative given, and everything again went well. In a few days more the meat diet was restored ; cicatrization was again arrested, and another epileptic fit occurred. After this a less liberal allowance was ordered, and the man got rapidly well.

2. A man-servant, æt. 20, was cut as for stone, to remove a foreign body which had been impacted in the bladder for nine months. At the time of the operation he was much emaciated, and had a large sore on the sacrum. After it was over he was ordered an extraordinarily generous diet, and he got well rapidly for the first few days ; cicatrization was then suspended, the appetite left him, and he had a most violent and prolonged epileptic seizure, which lasted for

* For an account of the influence of alcohol on the vital, and consequently on the reparative force, see a subsequent chapter.

eighteen hours. The diet was afterwards materially reduced, and the man rapidly got well.

What is true of physical injuries is equally true of certain diseases. It does not much signify whether a poniard is introduced into the liver, or arsenic into the stomach—both alike do a certain amount of mischief; and when the injury has been inflicted, there is in both the same necessity for reparation of damage. Now, as a gun-shot wound differs from a simple cut, and this again from a stab (the weapon remaining in the wound), both in the immediate results and subsequent progress, so the effects of the introduction of one poison into the system differ in many points from the effects of another. As the progress and effects of a dagger wound are much governed by the patient's condition, so are the progress and effect of a disease, originating in a poison or other cause, modified by the same state; and as an injury may be fatal to one person which will scarcely affect another at all, so a source of disease, *e.g.* small-pox, may become fatal in one individual, though it barely affects another.

Each living man, then, we conclude, has a power which keeps him alive, and enables him to counteract the effects of accident or disease. These powers we may designate conservative and reparative forces—a purely artificial distinction, inasmuch as they are both alike phases of the generally pervading vital power.

The following case is interesting, as it shows the advantage of a close observation of the healthy reparative processes.

John S., *at.* 44, labourer, was admitted into the Northern Hospital, Liverpool, with acute rheumatic fever. In the course of the complaint the left hand and wrist became inflamed, and I treated the affection by painting the parts with tincture of the sesquichloride of iron. In two days it was well. Shortly after, the right hand became affected;

but having a suspicion that there was a natural tendency in this form of rheumatic inflammation to subside in a definite time, I resolved to let it alone. In two days' time it was quite well.

If this case stood alone, which it does not, it would suffice to show that the treatment which has hitherto been considered as *necessary* when this complication occurs, is not necessary at all. This being so, it becomes a matter for inquiry how far treatment is advisable in other forms of rheumatic inflammation; whether, in fact, rheumatic endocarditis and pericarditis has not in an otherwise healthy subject a tendency to spontaneous cure, which may be interfered with by depressing medicines. I have only had three opportunities hitherto of putting this idea to the test, but in all cases the result has been sufficiently encouraging to induce me to repeat the practice when I have a chance.*

* These cases are of sufficient importance to be given at greater length. The first was a labouring man, at the Northern Hospital, æt. 35, whose heart became affected on the seventh day of the rheumatic attack, and when the severity of the symptoms had passed. There were friction sound, irregular pulse, some dyspnoea, and drowsiness. I made no alteration in the treatment, which consisted of large doses of lime-juice, beyond applying a very small blister to the cardiac region. In three days all the symptoms had disappeared.

The second was essentially the same, except that there were no signs of cardiac disease except physical ones; in this instance I omitted the blister, and made no change whatever in my previous treatment. The patient was very weak, however, and sallow, and in two days I considered it advisable to add steel and wine to his lime-juice. No bad result followed, and at the end of ten days I could find no sign whatever of cardiac disease.

The third occurred in the Royal Infirmary; the patient, a young lad, æt. 14, on the fifth day of the fever. The symptoms of cardiac disease were sudden and distressing palpitation, with great irregularity of pulsation, and considerable dyspnoea, but there was no bruit to be detected. The junior house surgeon, Mr. Rawdon, simply applied a very small blister, gave opium, and continued the lime-

It is not often that we can attribute death to a simple deficiency of vital force, except in extreme old age. Then, indeed, we can see that our patients die, not from disease, but, as the ordinary phrase runs, "from failure of the powers of life." Yet there is not, *à priori*, any difficulty in the belief, that a similar failure to that which occurs at 70, or 80, or 90, in some persons, may happen to others at 50 or 60.

It has been my lot, as a medical referee for certain Life Insurance offices, to record the remark of applicants, stating that their father or mother has died of premature old age, between 50 and 60. The words employed have been used, doubtless, because in their case there have been the usual phenomena met with in the aged. Is it not equally probable that there may be death by decay without the appearance of old age?

The following cases seem to support the idea:—

Mr. R. E., a gentleman of somewhat delicate family, and himself spare and weakly-looking, began to complain, at the age of 50, of unusual debility and some slight sickness. For this he consulted various physicians, in London and elsewhere, but, after a most careful examination of his case, none of them could detect any lesion of any organ. Everything was tried that science could suggest; but, in spite of all, the debility increased slowly, and was at last so extreme that he was confined to bed and was almost unable to speak

juice before ordered, and in twenty-four hours the heart seemed to have recovered perfectly.

I remember, years ago, being greatly staggered to find that cases of cardiac complication in acute rheumatism were reported by trustworthy authorities to be more successfully treated by Hahnemann's method than by Latham and Watson's; now, it is easy to see the reason why they were so. The one party ignored a "*vis medicatrix*," yet gave it full power. The other party believed in its existence, yet unwittingly threw obstructions in its way.

audibly. He could nevertheless take a considerable quantity of milk, and digest it perfectly, and there was no emaciation. He died at the age of 54, expiring slowly, like white clouds under the influence of the morning sun. On making a post-mortem examination, all the organs of the body were found in a perfectly healthy condition, the small intestines abounding in chyme, and the lacteals most beautifully distinct, from being full of chyle. The blood was pale and watery.

Some called this case one of disease of the blood, regarding it as being an "organ" quite as much as the liver or the heart; and they were so far right, inasmuch as the blood was the only part which did not appear normal. But if we ask, what was the nature of the disease of the blood?—the only answer to be given is, that it had lost its power of reproducing itself; and as this power is one which it has only in consequence of its vitality, we may fairly say, that the essential character of the disease in question was want of vital force in the blood, accompanied with similar deficiency in other organs.

If this case stood alone, the difficulty on one side and the other would still be great, and the most impartial thinker would have difficulty in saying, whether the preponderance of evidence lay in favour of those who argue for histological change, or those who argue for impaired force.

The difficulty is rather increased than diminished, when we extend our inquiries to other cases, in which a somewhat similar change takes place in the blood.

E. g. there is one set of cases in which a watery condition of the blood and a very marked deficiency in globules is a prominent symptom. These have been grouped together under the name *purpura hæmorrhagica*, and experience has hitherto shown us, so far as we have been able to read her

teachings, that this group of complaints is one far more dependent upon some chemical condition of the blood than upon any recognisable alteration in vital power. What the condition really is it is difficult to say; but seeing that it is one much modified by the use of turpentine—a medicine which has no special action on the vital powers—and that it is not much, if any, modified by alcoholic and other stimulants, whose beneficial influence on impaired vitality is marked, we conclude that the essential nature of purpura is not *simply* deterioration of vital force, and that it may be a disease of the blood as much as pneumonia is a disease of the lung, or cirrhosis a disease of the liver.

We believe that there are many cases—pyemia, uremia, ague, cancer, &c.—in which the blood becomes vitiated in a manner similar to, though not identical with, that which obtains in purpura, and in none of these we should attribute the death of a patient to deficient vital power. In ague, the blood is often restored at once to its normal condition by quina. On the other hand, there are cases in which such change in the blood takes place that can only be fairly attributed to deficient vital force.

A. B., æt. 25, housemaid, pale and exsanguine, has laryngeal phthisis; as the disease advances, the blood becomes more watery and pale, and at her death is more like serum than blood.

Miss J., æt. 23, has simple debility. The blood becomes pale and watery. The usual tonics, &c., are administered, and recovery is rapid.

In neither of these cases were the catamenia suspended.

Of chlorosis I have great hesitation in speaking at the present time, except to say that it does not appear to result from loss of vital power only, and that it does seem to depend much upon the redundancy or want of certain constituents in

the body, just as men may be blanched by the imbibition of malaria, or the privation of fresh food.

The preceding remarks, however, do not serve to explain those cases we so often see, in which persons, after being in the first place affected with consumption, recover from that and die of gradual decline. I have now seen many of this stamp, viz. : consumption has been in the family ; they have had all the early signs ; these have gone away, leaving the patient free from cough, diarrhœa, peritonitis, or any tangible disease. The appetite may or may not fail, and emaciation may or may not be present ; but the patient steadily sinks down in the scale, and dies, as it were, by inches. A post-mortem is made, and reveals no adequate cause for death.

In fine, it is generally now admitted in the profession, that asthenia may be a cause of death, irrespective of recognisable structural change.

This being so, the importance of a study of vital force, as contradistinguished from a study of change of structure and composition alone, is at once apparent.*

We have said that in health all organs perform their functions in a certain and definite manner. By that we

* Claude Bernard remarks (Lecture 20, Experimental Pathology) :—
 “If we examine some of the diseases which most frequently produce death, we shall be obliged to have recourse to general effects in order to explain the mechanism by which the result is attained. Numberless patients die of peritonitis, and in a very short space of time too ; how does this take place ?—for peritonitis, at first sight, does not seem to interfere with any of the higher functions of life. Inflammation of the lungs or pleura frequently proves mortal in a few days ; and in such diseases the respiratory functions are of course impeded ; yet mere asphyxia is evidently not the cause of death. In acute cases of pneumonia, and in affections which prove rapidly fatal, the animal, although deprived of food, cannot evidently be supposed to die from mere inanition in so short a space of time.”—*Medical Times and Gazette*, July 14, 1860.

mean that each organ is formed with a special intention, and has special duties. As long as those duties are performed, we say that the individual is healthy ; but when those organs do not perform their normal functions, we say they are in a diseased or disordered condition.

Now, it is self-evident that when disease exists in an individual he must have departed from health ; still further it is clear that he cannot be in a better condition than he was before ; he must, therefore, be in a worse. *Disease, then, implies deterioration, and the presence of disordered function implies a disabled condition of the organ.**

As we speak of the vital power as that which keeps a person in a healthy condition, so, when a person is diseased, we say that in some way or other his vital power has been impaired or overcome.† Deterioration of vital power implies

* The following remark by Bernard illustrates this :—“In an animal *previously enfeebled*, we can produce, directly, pleuritis with purulent deposit by the simple division of the great sympathetic nerve ; in order, however, to insure success in this experiment, it is absolutely necessary that the state or condition of the animal’s health be previously lowered.”—*Med. Times and Gazette*, January 21, 1860.

Again, he remarks—“Every disease which gives birth to morbid tissue is evidently a perversion of the nutritive function.”—*Ibid.*

† The following remarks of Claude Bernard are appropriate :—

“Being about,” he says, “to perform certain experiments on animals kept fasting for a long space of time, I left some dogs without food for several days ; but during the late severe frosts these animals died unexpectedly—from pneumonia, in one case, pleurisy in another, and inflammation of the bowels in the two last. . . . When rabbits are placed under total abstinence, they generally live a fortnight or three weeks ; but when certain branches of the sympathetic have been previously divided, the animals die within a few days when deprived of food, through acute inflammation of the viscera connected with the nervous twigs that have been divided. . . . I discovered that the section of large divisions of the sympathetic nerve was, apparently, unattended with the slightest inconvenience, so long as the health of these animals remained perfect. Some of them even

in its turn a direct tendency to premature death, in a part or in the whole of the body. But death does not take place unless the deterioration reaches a certain point; that point is reached when the conservative or reparative force is weaker than the disturbing or destructive one.

When restoration to health follows disease, it can only be brought about through the powers then inherent in the individual, by processes purely natural, and which art cannot imitate, and only indirectly promote.

But the word "disease" is not to be confined to a departure from the standard of health in a healthy man; it may be equally shown in a departure, in an injured individual, from those changes that ought naturally to have occurred after a hurt had been received. Thus, if a bruise is inflicted, and extravasation of blood follows, we say there is disease; if suppuration ensue in the place of absorption, and if after a cut the wound is followed by ulceration, sphacelation, or suppuration, instead of adhesive inflammation, we say there is disease.

We say, equally, that disease is present if after an attack of measles the patient remains ill, or gets worse at the very period when convalescence should have been established.

Now as we cannot restore a part or the whole body, when diseased, to a healthy condition, except through the instrumentality of the natural powers, it follows that a study of

became pregnant, and brought forth their young; but as soon as a general debilitation of the system arose, from want of proper nourishment, acute inflammation was produced in the organs deprived of nervous influence."

From this, and other corresponding remarks of C. B., we may infer that inflammation is very frequently the first step on the road to mortification; the frequency with which this process is known to be followed by suppuration or gangrene, and especially where lowering remedies are used, supports the idea.

the dynamic condition of the organization, the "vital force," or of the conservative and reparative powers of the system, is pre-eminently necessary ere we can fairly enter upon a study of the Principles and Practice of Medicine.*

* A very interesting lecture by Claude Bernard, and one quite in accordance with the views here promulgated, will be found in the *Medical Times and Gazette*, March 31, 1860.

CHAPTER II.

VITAL FORCE.

Vital force—What is it?—What it is not—Compared with other forces—Chemical, electrical, &c.—The intensity of vital force shown by the amount of resistance to chemical force, &c.—*Force* is as indestructible as *matter*—Illustration—We cannot make force—Dissipation of available force—Expenditure of force analogous to expenditure of matter—Necessity for new supplies—Resemblance between the laws of vital and other forces—Exhaustion of force—Conversion of vital force into motive—Chemical, electrical, luminous, &c.—Is the amount of vital force possessed by each individual essentially the same?—What influences it?—Influence of parentage, of “breed,” of intermarriage, of more or less transient debility, of intoxication—Diseases transmitted to offspring—The disease transmitted is not always a definite one—It may show itself simply as deficient force—Hereditary disease necessarily implies constitutional debility—Maternal influences on offspring, at conception, in utero, in nursing—Examples—Conclusions.

It is now necessary that we investigate the subject of vital force. What is it? Whence comes it? Can its amount be influenced by circumstances? What exhausts it? Can it be augmented beyond a certain point? When diminished, can it be increased again? and if so, by what means?

By vital force we mean that which makes the living man differ from the corpse. When the active soldier is struck in battle by a fatal bullet, he falls at once, and soon becomes a

putrefying mass. We say he has lost his life. The principle of action which once existed in him exists no longer. During life certain changes went on in his body ; they now go on no more, and in their stead other changes are set on foot of a different character. The processes of life we call *vital* ; the principle which puts them into operation we call a *force*. The words "vital force," therefore, signify the living principle which exists in every organized being. It is the power which enables the eye to see, which a camera obscura cannot do ; which converts inanimate matter into combinations that the chemist cannot imitate ; which frames out of the same materials various organs, each having a different function. We recognise it alike in the acorn and the oak, in the crawling worm and the stately elephant. Without it the world would be a desert filled with rocks and salts, and clouds of vapour.

It is not simply the result of a fortuitous concourse of atoms, for they may be present and no life be there. It is not nerve force, for that is dependent upon life, and a dead nerve is as powerless as a stone. It is not organization alone, for organs may be present as in a corpse, where there is no life or vital force.

In one of his Lectures, C. Bernard remarks :—"If in the case of an adult in the full enjoyment of all his faculties, we ask ourselves what is the regulating agent, what the *primum mobile* of all physiological actions, we are constrained to reply that its seat is in the nervous system . . . it is the origin of all the normal phenomena of life—it is also that of all pathological action."—*Medical Times and Gazette*, January 21, 1860.

On this we remark, 1. That physiological changes take place in the embryo before any nervous system exists. 2. That the nervous system must itself be subject to patholo-

gical changes. 3. That the importance of the nervous system is not greater than that of the blood, without which it cannot exist. 4. That though the most important physical element in the body—the one most essential to life—it is not necessarily the vital force, without which it could not even be a nervous system at all. If, as we hope subsequently to show, the nervous system may be enfeebled, we see no reason to believe that other parts cannot be so too; and if there is evidence of deterioration in all the organs of the body simultaneously, we see no reason to assert that such pathological changes as may then be witnessed have their origin in the nervous system. Pathological action and physiological changes take place in trees (witness the formation of “galls”) as well as in animals, and yet the former have no nervous system at all.

Of the residence and dimensions of vitality, if such terms are applicable to a “force,” we can say little; it is not in the brain and nervous system, for it exists in animals and plants that have neither brain nor nerves: these organs, too, may be removed, as in the turtle and others, and yet life continue; it is not in the blood, for the embryo has vital power long ere the blood is formed.

In man it is, as it were, one and indivisible; but in some of the lower animals, and in vegetables, it seems capable of infinite subdivision. If one of our limbs be amputated, its vitality soon leaves it, and it rots away under the operation of chemical force; but if we cut a worm or a potato into a dozen pieces, each may produce a perfect animal or plant.

We cannot isolate it so as to make it perceptible to our senses; we cannot see it as we can the electric flash, or hear it as we can the explosive force of gunpowder; we cannot feel it as we can the passage of a galvanic shock, or the

effects of chemical force as shown in fire. Allied in many respects to other forces, it is yet identical with none.* The philosopher, with his apparatus, may make a muscle contract, while yet its life remains within it, as distinctly as could the nerves; but to provoke a muscle, absolutely dead, to move, and still more, to make a muscle which will contract, is beyond his power. The chemist, by his art, can find out all the materials of which a stomach is composed—nay, he may even, with the help of a dead stomach, make a fluid which will digest food, but he cannot make a stomach, or even the pepsine on which its solvent powers depend.

The chemist can analyse an egg, and he can by imitating nature's working for this end develop it into a chicken, but he cannot make one, nor can he hatch it after its vitality has gone.

Some authors object to the idea of vitality being a simple force, and regard it as a collocation of other forces; in a succeeding page, a quotation from Mr. Bain shows this to be his view. We do not think it worth while to discuss the point at length, for the difference between one view and another

* "To all intents and purposes, therefore, we are as ignorant of the true nature of other forces as we are of the true nature of the vital principle. The difference in our knowledge of the one and the other is, that we *can* make direct and conclusive experiments upon *them*; but we cannot make such experiments upon *it*. We can find out by direct experiment how fast an apple falls to the ground, and what mathematical formula will rightly express the increments of force in equal intervals of time; and which of two or more elementary or compound substances a given element or compound will attract; and further, in what proportion or proportions it will unite with them; but we cannot in any manner measure, and set down in numbers, the intensity of the vital force. This, then, and not a greater ignorance on our part of the nature of the force with which we have to deal, is the secret of part at least of our difficulties and perplexities."—*W. A. Guy, M.B., Croonian Lectures.*

is of no practical value. If it be said that vitality is a collocation of forces, we answer, What collocates those forces? they did not collocate themselves. The sun's rays never begot a boy, or the lightning-flash a girl; nor did coal and iron ore ever make a locomotive. We say that it is vital power which collocates the forces, and that every individual collocates and modifies those forces in its own peculiar way. We say that vital power is to the other forces what man is to inanimate matter: he collects materials, and by the use he makes of them he develops heat, light, magnetism, electricity, motion, and the like. He does not make the force, but he directs or controls it. He can at his will convert soft into magnetic iron. Who says that it is the electricity alone that does it? The galvanic current which was used had no volition—it remained dormant till man directed it. Man makes the steam-engine, and drives it when made. So it is with life; it is life which makes the body, and life which keeps it going.

We have already spoken of vitality as being a force acting in a definite direction, and adverted to the amount present in some creatures being greater than that in others.

This is strikingly true of plants: some there are which spring up, flower, bear fruit, and wither in a year; others which do not bear fruit until the second year, and others again which arrive at a far more advanced age before they flower at all. Some we call annual, others biennial; while others have, as far as we can learn, an unlimited tenure of life. There is an "Adamsonia" spoken of as having already attained an age of four or five thousand years. We know of no animal which has existed for a similar period. Stories, it is true, there are, of toads having been found enclosed in rocks, to which geologists attribute a greater age than that. If the statements made are reliable, they simply prove that there is

one animal whose tenure of life would appear to be indefinite, and thus the analogy between plants and animals is completed. Plants like animals are to a great extent under the influence of the inorganismal forces, *e. g.* light, heat, &c. ; and it is sometimes useful to refer to them as affording proof of the controlling power which one force has over another. Thus town air will destroy the health of plants as completely as of men. Excess of heat or cold has the same effect. Cold stunts the growth and dwarfs the plant, while heat expands it to a stately tree. A plant that "sleeps," or closes up by night, may, by artificial light, be rendered wide awake ; and by dint of careful management, grapes may be induced to bear flower and fruit at any period of the year. By particular nurture, the "single" cherry, rose, or other flowers, may be made "double," and their pistils and stamens be converted into leaves. By excess of manure, a vine may be made sterile, but with leaves equal in size to the rhubarb ; while by privation of manure and water, a luxuriant plant can be made poor in leaves, though rich in seed.

Here we have vital force modified to a certain extent, but that extent is limited ; for no amount of horticultural skill can make a rose-tree bear potatoes, or a cherry-tree produce gooseberries.

Recent observations tend to show that the analogies between plants and animals are even greater than might at first sight have been supposed, for it has been ascertained that there are such things as hereditary resemblances in plants—the same as in animals : a dwarf pea or bean produces its like ; a fine plant producing a fine big seed will be followed by another fine plant, while a pigmy plant bearing a small seed will rarely produce a giant. But—and the reservation is important—if the pigmy seed be well nourished from the first, it may attain a growth equal to the finest of

its kind ; and the growth from a large seed may, by neglect, assume no greater dimensions than if it had been a poor thing to start with.

In plants, as in animals, life is not simply organization. The seed is a seed at the end of ten years, as it was at the end of five ; its organization is the same ; the chemist can detect no difference in its constituents, or the microscopist in its minute structure ; yet the latter will grow, and the former will not. The one possesses a vital force that the other has lost—a certain inherent power shown only by its results. Little difference can be seen, during the winter months, between one tree and another—all may be equally covered with snow, and frozen by icy blasts ; but when warm, genial spring returns, a great difference may be seen between them : the majority begin to bud and blossom, showing signs of renewed life, while others remain dead and leafless, and then begin to decay. All have been subject to the same influences, but only a few have succumbed to them. Surely we may infer that they had a less amount of vitality than their neighbours. Similar remarks may be made respecting trees of different kinds ; some are “hardy,” and can resist such extremes of temperature as will certainly kill others. They equally apply to many animals. In expressing this fact, we endeavour to account for it by saying that some have a greater tenacity of life than others. What is this but the enunciation of the doctrine that the vital force is more capable of resisting injurious influences in some than in others, *i. e.* that the amount of vitality varies in different individuals, and in different species and genera, and this quite independently of their organization.

The application of these remarks to man is readily made ; for we all know that injuries which will kill one man are not fatal to another, and that when a dozen are all exposed

to the same poison, many may escape with apparent impunity, while some will suffer little, and others die.

But though vital force *is not identical* with any of the non-organismal forces, it resembles many of them in certain important points: it resembles chemical force, inasmuch as the products formed under its influence are all more or less definite in their composition; but it is not simply chemical force, inasmuch as all those compounds become decomposed and changed into other combinations, under the influence of ordinary chemical force, as soon as they are withdrawn from the influence of vitality. The body becomes amenable to the usual laws of chemical action after death, and the same may be said of all the excreta after they have been passed; and as vital power prevented this during life, it follows that to a certain extent vital and chemical forces are antagonistic. If this be true, we draw the very important corollary, that the rapidity of decomposition in vital products, after their separation from the body, is in direct proportion to their deficiency of vitality while they remained within, a subject of which we shall have to speak more at length by and by. Vital force is not electricity, yet it is more or less allied to it; for we have in the "torpedo" and "gymnotus electricus" nerve force producing electricity; and in paralysed limbs electricity producing a similar effect to nerve force. Vital force is not heat; and though a certain amount of heat is necessary for its existence, it is destroyed by too great an exaltation of temperature. It is equally destroyed by deprivation of heat,* *e. g.* by frost, &c.

* The influence of warmth in modifying vital characteristics is well illustrated by experiments by Claude Bernard. "In its state of torpor," he remarks, "a cold-blooded animal presents phenomena slow in their character and easily observed; we see them, on the contrary, succeed each other with such rapidity in warm-blooded

Vital force is not light ; yet, under the influence of vitality, light is produced in the firefly, the glowworm, and the medusæ. It is not simply cohesion or adhesion, although by simple contact of freshly wounded parts we know that union will take place.

It is a force completely *sui generis*, but one which, being more or less allied to non-vital forces, has its phenomena more or less modified thereby.

Perhaps the most interesting point connected with vital force is its inter-dependence upon a certain condition of organization. Life is not water, yet without a definite amount of water neither plants or animals can conserve their life. When once they become dried beyond a certain point, so great a change has been produced in their organization that vitality has gone. The same result is effected by other causes, *e. g.* the organs may be saturated with opium, strychnine, aconite, scarlatina, small-pox, and other poisons ; or they may have been crushed by some physical force, or torn asunder by machinery ; or they may be torrefied by heat or withered by cold : in any case they are unfitted for life, and the vital force has fled or been destroyed.

These considerations have led some to the idea that there is in reality no such thing as a definite vital force, but that what we call by that name is simply an attribute of organization, and has no separate existence.

They assert that integrity of vital force depends upon animals, that it becomes impossible to seize them in the order of their occurrence. If by the section of the spinal marrow we transform a mammiferous animal into a cold-blooded one, we discover in it the electrical phenomena observed in the frog ; we see these disappear in the Batrachian when *plunged into a medium, the temperature of which is higher than that which is natural to it.* Under these circumstances, the Batrachian manifests the conditions peculiar to a warm-blooded animal."—*Med. Times and Gazette*, January 14, 1860.

integrity of organization, and not organization upon vital force.

However plausible this doctrine at first sight appears to be, the following considerations induce us to believe it to be untenable.

Plants, seeds, cuttings, &c., resembling each other in organization, have not all the same tenacity of life; frost and heat alike killing some and sparing others, though all are subjected to the same intensity of each force.

Dr. Carpenter has shown the same to be true as regards certain animalecules.

The same is true of the higher animals: some recover with ease from injuries that destroy their fellows.

There is no difference between the organization of the weakly and the strong child, yet one comes into the world to die almost instantly, the other exists for the common number of years.

The organization of an adult is not changed by mental emotion, and yet, under the influence of intense fright, an individual may die. We cannot believe that the organization of a man can be altered by one sexual congress, yet experience shows that the vital powers may be destroyed thereby, as some cases hereafter to be noted will show.

But if these points are insufficient to establish the existence of a "force" superadded to organization, we have only to inquire what is meant by the word "organization," to find that it implies the existence of an organizing power; and the difference between the expressions "vital force" and "organizing power" is too small to encourage discussion upon it.*

* It is with a feeling of considerable regret that I find myself opposed to our distinguished physiologist, Mr. Lewes, in this matter. He denies the presence of a vital principle or force *in toto*. "A vital principle is," he says, "incapable of proof—if it exist we cannot

It has recently been shown, that all our known "forces" are as indestructible as is matter itself—that they disappear in one form only to be reproduced in another; but that,

know it, and unless its existence can be proved it is to us a mere phrase concealing our ignorance. Phrases serve to build systems, but they hamper the progress of knowledge."—*Physiology of Common Life*, p. 417.

Again he remarks:—"So long as vital force merely indicates the dynamical condition of the organism, the phrase is unobjectionable; and if the vital forces are taken in the abstract, of which the vital phenomena are the concrete, we may use the term as freely as we use the terms 'mechanical force,' 'locomotive power,' and the like. But when the abstract misleads us into the belief in there being a concrete existence corresponding with the abstraction; when we suppose that there are vital forces independent of and controlling the sum of material conditions present, it is as if we imagined a watch principle turning the hands of a dial plate, or a moving principle driving the engine irrespective of coal burned and water expended. To conceive the organism in action and to call its activities by the name of vital forces is one thing; to conceive that these activities are anything more than dynamic states of the organism is another."—P. 415.

If we examine into his own views, we find Mr. Lewes writing (p. 421): "The life of a highly-organized animal is *the sum-total of the activities of all the forces at work*, and is complex in proportion to the complexity of the organism."

It is really a difficult matter to seize all the points of disagreement between us when there are so many that we hold in common. The main one, however, is the question of the very existence of a principle of life. When Mr. Lewes says (p. 420), "Life is proportional to organization," I ask what makes organization? If life be the sum-total of the activities of all the forces at work in the organism, we ask what was it that determined the formation of the organism with all its forces?

Let us, however, put the subject in another form. Let us suppose a solution of any salt and other materials to be exposed to the air, we know that certain changes take place in it which ultimately end in the formation of crystals of a definite shape. Though we cannot demonstrate the presence of a distinct crystallizing principle, we consider that there is some "force" present which compels the atoms of which the crystals are composed to arrange themselves in a certain

though indestructible, they may be so dissipated as to be lost to us. Let us take an interesting illustration, founded on a saying by the great Stephenson : Thousands of years ago, he

method. Whatever that force may be, we place it in the inorganic class, because under no circumstances does it eventuate in the formation of a living being.

Let us now imagine another solution, viz., the milt and spawn of the male and female frog to be exposed to the same air ; the result is the formation of a number of living creatures of definite shape and with definite tendencies. Are we unphilosophical in placing the force under which these were formed in the organic class ? And when we consider that life never eventuates from any fortuitous concurrence of inorganic atoms ; that there is no such thing as spontaneous generation ; that the life of any one thing is derived solely from the life of some previous organic being, are we not justified in considering that the forces in operation in living beings differ from those in the inorganic world ? and if we are right in assuming that there are really inorganic forces, we are equally justified in assuming the presence of vital or organic force.

That these two classes of forces may modify each other materially we do not doubt. But we cannot deduce that there is no vital force in the seed simply because it will not grow without light or sun force. A tadpole does not develop itself into a frog if kept in the dark, nor will an infant develop itself into a man without food and air ; but this does not prove the non-existence within them of a force essentially non-organic.

Of the modification of the phenomena of vitality by non-organismal forces, we shall see abundant examples further on.

Mr. Lewes in discussing this subject further considers three arguments used in favour of the existence of a vital principle, and which he thinks most important, viz., Does life control chemical affinities ? Does life precede organization ? Is life a presiding unity ? (P. 417.) The results he comes to are antagonistic to the idea of there being a vital principle. The arguments he makes use of are to my mind unsatisfactory, and are based upon insufficient facts. When he denies that life controls chemical affinities, for example, it would seem as if he passed by the fact that alcohol, which coagulates albumen when it is directly mixed with the blood, does not do so when it enters the blood through the stomach ; that the feces may remain in the

says, the force of light emanating from the sun called into active exercise the organismal force of myriads of trees, ferns, grasses, &c. ; the organismal force ceased at length, and

living colon exposed to the joint influence of warmth, and the presence of a gas, not differing from atmospheric air, for an indefinite length of time without putrefying, although they rapidly decompose in that same locality after death, or after extrusion from the body. Again, if life did not control chemical affinities, we should by using large quantities of acid or alkali during life be able to make the blood acid or the urine alkaline : yet we cannot do so ; if the body were simply a permeable mass of flesh we could do so readily. Again, when the organism produces acetic and muriatic acids in the stomach during digestion, does it not effect decomposition of certain salts that the chemist can neither understand or copy ? He can, it is true, form these acids, but not without employing forces which the stomach cannot command. But we scarcely require these arguments, for the author himself makes use of similar ones when remarking upon an egg in volume i. page 64-5 ; *e. g.* "Chemical analysis may conduct us to the threshold of life, but at the threshold all its guidance ceases ; there a new order of complications intervenes, a new series of laws has to be elicited ; chemistry confesses its inability to construct complex organic substances," &c. If so, is not the following deduction a fair one ?—If chemistry cannot do such and such things, and a living being can, that there is a force operating in the latter which is not present in the former ; and if we add to this that the living being was called into existence by other living beings, surely the principles of chemical and vital action are essentially distinct from each other ; and if distinct, there must be differences in their manifestations ; and if so, there may be circumstances under which they may be opposed to each other, *e. g.* when chemical action tries to destroy a part of the body, and vitality preserves it.

The next point is somewhat more subtle. Does life precede organization ? Mr. Lewes says, "With regard to life not resulting from organization, this position rests on vague conceptions of both terms : " and the inference drawn is, that life depends on organization, and not organization upon life.

Let us allow our fancy full scope to range for a short period, and try and find where this question would land us.

The world was created : at that period matter had, we believe, all the laws it has now ; all the inorganic forces now in operation were

under the laws of chemistry and gravity, vast tracts of bog and forest became converted into coal ; by and by, this, under the influence of heat, produces light, and raises water

in operation then ; but no living being existed, all was inanimate, almost changeless—except from physical causes—absolutely dead. At some period—subsequent to such creation of inorganic matter (I touch very doubtingly upon such points as these, and with the most profound consciousness of man's ignorance)—organic beings of various forms were produced, the laws connected with whose organism are probably as distinct as those governing the inorganic world with which they have relation. We now ask ourselves, Did the organic beings form themselves, or were they formed by a power ?

We cannot conceive how a thing which has no existence can form itself, but we can conceive how, under the operation of a definite power, things which had existence could be grouped under new forms with different powers ; just as nitrogen, carbon, and hydrogen—innocuous to life when commonly mixed—may become deadly when mixed in a definite manner as in prussic acid.

We should say that the power which called such organization into operation was prior to the organs produced ; and if to such organs when so produced there was a power given to perform certain acts so as to conserve their condition, and certain others to produce beings similar to themselves, which should run a similar course of life to their parents, we should assert that the power to form was existent prior to the thing formed. The power that calls an organization into existence must surely be considered prior, superior, and different to the powers which the organization has when once formed. So long, therefore, as the pre-existence of life is necessary before any organization can take place, we prefer to speak of the latter as dependent on the former, rather than the contrary.

At any rate, we do not consider that the reasoning in the present volume will be seriously affected if we use the words "vital force," and "the dynamical condition of the organism," as convertible terms. The term "deficient vital force" is equivalent to "an adynamic condition of the organism." The question, "Whence comes vital force?" is equally convertible into "Whence comes the dynamic condition of the organism?" and the word "asthenia" may be translated as readily by "loss of vital power" as by "organic adynamia." We think it easier in a medical treatise to speak of life as life, rather

into steam ; by that steam motion is produced, and from that motion we may, by friction, elicit heat, electricity, magnetism, and the like. No matter how we may employ the force, the amount of work done is governed by the original amount of sun force contained in the amount of coal used ; we may economise it to the utmost, but we cannot increase it absolutely. From a gas burner of a certain size, and from gas of a certain quality, we can get a certain amount of heat by thorough combustion. By unscientific contrivances we may lose a considerable amount of the heat which is available ; but do what we will, we cannot augment it indefinitely.*

than as “an ultimate fact ; one of the great revelations of the unknowable ;” and I think it will tend more to the spread of reliable knowledge to speak of the laws of “*vital force*” as we would of the laws of light, heat, electricity, galvanism, &c., rather than to talk of them as the laws of the “sum-total of the activities of all the forces at work” in an organized being.

* The following quotation from Bain on the Senses and the Intellect, expresses in different language much of the same idea :—“It is nevertheless manifest that the nervous power is generated from the action of the nutriment supplied to the body, and is therefore of the class of forces having a common origin, and capable of being mutually transmitted,—including mechanical momentum, heat, electricity, magnetism, and chemical decomposition. The power that animates the human frame and keeps alive the currents of the brain, has its origin in the grand primal source of reviving power, the Sun ; his influence, exerted on vegetation, builds up the structures whose destruction and decay within the animal system give forth all the energy concerned in maintaining the animal processes. What is called vitality is not so much a peculiar force as a collocation of the forces of inorganic matter for the purpose of keeping up a living structure. If our means of observation and measurement were more perfect, we might render account of all the nutriment consumed in any animal or human being ; we might calculate the entire amount of energy evolved in the changes that constitute this consumption, and allow one portion for animal heat, another for the processes of secre-

Now, expenditure of force is practically the same thing as expenditure of matter, and this must end in the exhaustion of the thing expended, unless the force is perpetually renewed. Scientific men have concluded, that for this earth, the main source from which inorganic or inorganismal force is renewed is the sun. The original source of organismal force or vitality we can only trace to the Creator and Sustainer of the universe, the Ruler of the world, the all-pervading God of nature.

But whatever the source of vital power may be, it obeys many of the laws which govern other forces. Every time it is called into operation the available quantity is diminished, and the whole amount would soon be dissipated, unless it were kept up by some means or other. Many an anecdote tells us of the willing horse, who converts his vital power into motion, until he has no force remaining; of individuals, whose vital energies are expended in forming bile, and urine, and sweat, and carbonic acid, and the like, and who, from inability to get food and drink, die from this uncompensated dissipation of their power; however well it may be hoarded, it cannot, under the circumstances, be reproduced.

tion, a third for the action of the heart, lungs, and intestines, a fourth for the muscular exertion made within the period, a fifth for the activity of the brain, and so on till we had a strict balancing of receipt and expenditure. The nerve force that is derived from the waste of a given amount of food, is capable of being transmuted into any other force of animal life. Poured into the muscles during violent conscious effort, it increases their activity; passing to the alimentary canal, it aids in the force of digestion; in moments of excitement the power is converted into sensible heat; the same power is found capable of yielding true electrical currents. The evidence that establishes the common basis of mechanical and chemical force, heat, and electricity, namely, their mutual convertibility and common origin, establishes the nerve force as a member of the same group."

All of us are familiar with the word, and many of us, probably, with the sensation of, *exhaustion*;—what is it but the dissipation of our available vital force? We compare ourselves almost involuntarily to a locomotive, whose speed has become reduced from deficient supply of coals; and we eagerly seek for food and drink to restore our powers—these being the fuel through whose instrumentality our forces are repaired.

Like other forces, vital power may be converted into other forms, or at any rate expend itself in intensifying and changing the action of other forces; thus, by an active operation on the brain, vital force becomes converted into mental power, into nervous energy, into muscular motion—we see it in the stomach, liver, and elsewhere, converted into chemical force, in the formation of gastric juice, hydrochloric and acetic acid, of sugar, bile, urea, and the like—we see it in the reproductive organs of the male actually expended as the principle of vitality itself, giving life to a new being; and the fact is worthy of the deepest consideration, that an excessive waste of semen has a more powerfully depressing or exhausting effect upon the system than the loss of ten or twenty times as much blood or any other secretion would effect. Vital force, as we have adverted to before, becomes apparent as “reparative force,” when any injury has happened to the body.

In fine, wherever there is *change* going on in the animal economy, there is not only *an expenditure of material*, but there is also *an expenditure of force*—“organic” or “vital” force giving place to inorganic or chemical force—a conversion which is very rarely complete until the secretions, &c., are rejected from the body, or the whole individual dies: but death does not ensue, speaking generally, so long as appropriate food and drink are taken, and the supply of vital

force is thus, to a wonderful degree, kept up to a constant standard.

We may now make some special investigations respecting this force. We have already adverted to the fact, that it is given in some mysterious manner to each individual at the moment of conception ; and in our history of man we also adverted to the facts that all men did not attain to the same old age ; and that, in most particulars, children closely resembled their parents, each of them giving to the offspring something of their own peculiarities.

We have now to inquire whether the amount of vital, growing, conservative, or reparative force originally given to each individual is the same—whether all men come into the world with the same powers ; and if not, what it is which modifies those powers, and how those modifications are shown. Experience shows us that many individuals come into the world only to die ; they are carried off in a few hours or a few days, by convulsions, diarrhoea, total want of digestive power, or a simple failure of the powers of life ; nay, we may go further still, and find that children actually die *in utero* at the seventh or eighth month, and come into the world as decaying putrid masses—an occurrence by no means uncommon when there is a syphilitic taint in the male parent. As these can scarcely be said to have been subject to external influences, it is clear that the death must have been due to some imperfection in the vital force which the fetus originally possessed ; and when we find that the disease of which a fetus may die is one which can be traced to syphilis in the father alone, we must conclude that his condition at the period of conception was such, that he was unable to impart the ordinary amount of vital power to his offspring, and we draw the corollary, that the condition of the father materially influences the condition of the child.

General opinion—founded probably upon Jacob's dream, and the expedients he resorted to for the procurement of ring-straked and speckled cattle ; and on Shakspeare's dictum in " King Lear," that bastards " in the lusty stealth of nature take more composition and fierce quality, than doth within a dull, stale, tired bed, go to the creating of a whole tribe of fops, got 'twecn asleep and wake"—has concluded that *active* vigour in the parent, at the time of conception, is necessary for the production of a healthy and vigorous offspring. But the experience of breeders, as far as I can ascertain, goes to negative this idea, and to establish the fact, that if the sire is perfectly sound in wind and limb, and himself of pure breed, a little or even a considerable amount of temporary debility is of small consequence. Thus a stallion, whose pedigree is untainted, and who is a model of his kind, is sought after to serve a mare, even when his powers are so exhausted that he has to stand beside her for half an hour ere the impulse to leap comes on ; and time shows that his offspring, generated at the end of his serving time, are inferior in nothing to those begotten in the earlier periods of the spring. The same may be said of bulls and other animals, whose natural history we are able to study. Speaking generally, too, we may say that younger sons in large families are not inferior to the first-born—" the beginning of the strength" of the father ; and that it is not a fact that illegitimate children are, as a rule, more healthy and vigorous than the legitimate ; on the contrary, the mortality amongst bastard children, from infantile convulsions, shortly after birth, is threefold greater than that amongst the offspring of married parents.* Whether there is any truth in the idea generally

* I have only met with one instance in which a decay of the vital powers in the father seemed to exercise an influence over the offspring. A gentleman married at the age of eighty years, and his

prevailing, that drunkenness in the father at the time of conception produces mental imbecility or idiocy in the offspring, I am unable to say; I have only heard of one instance where idiocy has been attributed to this cause. But, on the contrary, we may remember the case of Lot, who, on two successive nights, became the progenitor of Ammon and Moab, being at the time in such a state of intoxication that he was unconscious of the act; yet both were lusty and strong, and the heads of important and powerful races. We cannot help remembering, too, that drunkenness abounds in our northern towns, and that many of our artizans habitually go to bed intoxicated; and we presume, that they must often be in that condition when a fertile intercourse occurs; yet, as a rule, the children of drunken fathers are not idiotic or imbecile, although they may be, and often are, subject to insanity.

Dr. Copeland, in his Dictionary, gives one instance where sexual weakness, arising from previous abuse in the father, was followed by his first-born being idiotic; after which he recovered his powers, and had a healthy family. But, on the other hand, I know of instances of a similar nature, in which no such result has happened; we are therefore justified in considering such cases as Dr. C.'s, when they do occur, as "coincidences" only.

We conclude, then, as a general rule, that a *transient* state of exhaustion in a father, otherwise perfectly healthy and untainted, will not sensibly affect the vital forces of the offspring.

Experience undoubtedly shows us, that the vital forces of

wife bore him five children. He died at the age of ninety-five. The children, all females, were very delicate. Two died between the age of twenty-five and thirty of pure debility, and it seemed as if the others would shortly follow. I am unable to give further particulars, as my informant has been dead some time.

children are affected by permanently diseased conditions of the parent; and those whose knowledge of breeding horses and cattle is considerable, say that it is almost impossible to get first-class offspring from second-class sires: the faults of the male are reproduced in the young; and should the same fault exist coincidentally in the dam, it is greatly exaggerated in her foal.

Peculiarity of form in the parents is not more completely reproduced in the offspring than is peculiarity of growth; and disease is transmitted as certainly as health. In some instances it would appear that nothing is transmitted beyond deficient power in one organ; in others, a general deficiency is observable. Thus, a parent apparently in perfect health may beget a son, and then, from constitutional causes, become insane; the son, having the same natural conformation as the father, may appear in perfect health until he attains the same age as his father was when his lunacy appeared, and then he too may become affected. Another father, extremely delicate, and himself the offspring of consumptive parents, may have a large family, all of whom may die of diseases in different organs, yet all traceable to the same cause: one dies of convulsions, another of ulceration of the bowels, another of water in the head, another of consumption, another of tubercular peritonitis, another of mesenteric disease, of caries of the spine, white swelling, general decline, aneurism, or simply from the effect of strumous ulcers, abscesses, or the like. The father has not transmitted *a disease* here, but simply *a condition*—he has been unable to implant in his offspring the normal amount of living power; consequently, from one cause or another, his children terminate their existence at an earlier period than would healthy men, and even when in apparent health there is evidence that their conservative and reparative forces are low.

But we find that special conditions may be transmitted as well as general ones, and syphilis and gout descend from parent to child, as clearly as the black skin of the negro, or the large nose of the Jew.

All diseases thus transmitted have a direct tendency to shorten life. The very existence of disease in an individual indicates a departure from the healthy standard, an overpowering of the vital or conservative force. An individual, therefore, who is born with any disease or distinct tendency thereto, must necessarily have a less amount of vital force than one who is born healthy; in other words, the presence of *hereditary disease implies constitutional debility*. We may put this as an aphorism thus:—disease implies debility; hereditary disease implies hereditary debility.

We have hitherto spoken chiefly of the father as influencing the vital force of the child; we now come to speak of the maternal influence. This differs from the former, inasmuch as it is exercised through a longer period, commencing at conception and lasting till the end of lactation. There are many instances on record, where, amongst the lower animals, the characteristics of some male have been transmitted through succeeding pregnancies, although on the first occasion only the dam had seen the sire which had them. These have been attributed (following the lead given to one's thoughts by Jacob's proceedings) to the effect of *imagination* on the female. Whether this be true or not, a vast number of instances have come to light, which show the very powerful influence of imagination in woman, and how it modifies the growth and subsequent appearance of the offspring;* but as

* The following anecdote may be depended on:—A lady had a portrait of a female friend, who, on going out to India, left it in her care. She hung it in her bedroom, where she could always see it when in bed. She was married, and subsequently to the hanging of

we have specially to do with the influence exercised upon *life*, rather than appearance, we must not stay to discuss these more obscure points.

Those who have had much to do with midwifery practice inform us, that the mental condition of the mother during pregnancy has a most marked influence upon the subsequent vitality of the child.* One case is recorded, where a woman who was always extremely passionate during pregnancy, lost three infants successively from convulsions soon after birth. Churchill remarks, "If the mother, when pregnant, receive a great shock, a severe fright, or be the subject of any other strong mental emotion, the child is often attacked with convulsions after birth. It has still further been remarked, that the children of unmarried females, especially of those who have been seduced, and who feel their shame deeply, are more frequently stillborn or affected with convulsions than those of married females; and that the children of married women who experience much unhappiness during their pregnancy, share a similar fate." Dr. R. Ferguson made similar remarks in his Lectures on Midwifery at King's College, and gave many strikingly corroborative cases in illustration.

the picture bore her only child—a daughter. This child grew up to resemble the picture so closely that it was considered by strangers to be her portrait. No resemblance to her parents could be traced in her. Instances of withered limbs and "mother's marks," attributed to imagination, are common enough, though it is difficult to say how far the occurrences are "coincidences," and how far related to each other as cause and effect. I have met with one instance in which the presumption was in favour of the latter. For some very interesting observations on this point, see Lewes' "Physiology of Common Life," vol. ii. p. 405, where imagination seems to have influenced a mare, &c.

* Guersent and Blache. Quoted by Churchill, "Diseases of Children," p. 99.

Of the transmission of struma, insanity, syphilis, &c., from the mother to the child, there can be no doubt.

The influence of lactation on the infant, though less decided than that of pregnancy, is still sufficiently marked. Thus Whitehead, in his book on Hereditary Disease, gives many instances in which a syphilitic taint had been given to a mother some weeks *after the birth* of her child, and who, in her turn, affected her offspring. Instances of tainted nurses affecting healthy children, given them to nurse, are by no means uncommon, and many fatal results have been recorded.

I have myself met with many instances in which, through the influence of lactation, children have suffered severely from diarrhoea, vomiting, indigestion, and convulsions. There is a true saying, heard at times in a noisy dwelling, which points to the same thing, *i. e.* "A weakly mother makes a crying baby," or, "A fretful infant implies a sickly nurse." Dr. Christison has related a still more striking fact: a healthy woman, under the influence of sudden and intense horror, followed by as sudden relief, put her baby to her breast, and it instantly shot out its body rigid, and was dead. Anger, vexation, or mental distress in the nurse, will frequently provoke vomiting, diarrhoea, or convulsions in the infant. And I have known a glass of whiskey toddy taken by the mother produce sickness and indigestion in the child for twenty-four hours thereafter.

The foregoing considerations necessarily force us to the conclusion, that disease on the part of parents very materially diminishes the vital powers of their offspring; and we may add, that such diminution is in proportion to the severity and duration of the parental disease. Thus, the child of a consumptive couple, born before phthisis has commenced in the parents, has a greater power of life than one born when both

are far gone in "decline." By extreme care the one may be reared ; the other is nearly certain to die young, in spite of the most careful tending. The same may be said of syphilis ; the more severe the disease in the parents, the more certain and formidable is its appearance in the child.

In corroboration of the views here put forward, we must notice the influence that a healthy male or female has in counteracting that of an unhealthy consort. If insanity, gout, struma, consumption, and the like, were inevitably to descend from parent to child, the world would soon be depopulated by the steady and increasing deterioration of its inhabitants ; but it is not so. If disease of the nature we have been describing exists in one parent only, the other being perfectly healthy, some children will be perfectly sound in every respect, some will be only moderately delicate, and perhaps only one in five have the weakness of the sickly progenitor.

Health seems in this respect to follow much the same laws as colour ; for there are many shades of colour in the offspring of white and black parents, some being whiter and some darker than the medium.

Some curious observations have been made with the attempt to show in what way the healthy parent's influence may be traced in the child. Thus, it has been said that if a healthy man marries a woman whose brain is weak, and they have a family, those children who resemble their father physically will resemble their mother mentally, and those that resemble the mother in their general configuration will not have the same tendency to mental unsoundness as those which are like their father. This may be true in a few instances ; but in the vast majority of cases, resemblances in physical conformation and mental peculiarities go together.

CHAPTER III.

VITAL FORCE (*continued*).

Can the vital power be modified after immediate parental influences have ceased?—Modifying influence of climate on Anglo-Saxon race—Of sanitary measures in our island and its towns.

Evidence of improvement after deterioration—Healthy lactation for unhealthy infants—Change of climate in phthisis—How is the improvement effected?—Extent of the influence of inorganic forces upon vital—Vital force necessary for its own conservation—Food does not keep up vital force unless there is sufficient power to digest and assimilate it—Vital force incapable of indefinitely prolonging its existence—Influence of air, warmth, light, drink, &c.

Evidence of deterioration—Consumption in the parent—In the offspring—Struma, gout, insanity, &c.—Malarious influences—Overcrowding—Glanders—Darkness—Arctic experiences—Influence of mental emotions—Despair contrasted with hope—Illustrations—Deaths from fright—If intense depressing emotions will produce death, a less amount of such emotion will produce a bodily condition short of death, yet analogous to *dying*—Corollary.

THE next question we have to solve is—Can the vital power be modified after the individual is separated from its parents, and enjoys an independent existence? I propose to consider, firstly, the evidences of simple modification of growth or vitality; then the evidences of improvement where there has originally been deficiency; and, lastly, the evidences of more or less permanent deterioration.

The most remarkable evidence we have of the influences

of external circumstances upon growth and vitality, is the experience we possess of the alterations undergone by the Anglo-Saxon race in America and Australia. In our own country, the average height of the man is about five feet seven or eight, and of the woman five feet five or six ; and the average duration of life is, for those who have reached adult age, about sixty-five. For the most part, men arrive at maturity about twenty-three and women at seventeen, and they remain without appearing aged until fifty and forty-five respectively. In America, on the other hand, and equally in Australia, the offspring of English people shoot up rapidly, and attain an average height of five feet ten or eleven, arrive at maturity at eighteen, and thirteen or fourteen, and begin to appear aged at forty and thirty, while at the same time the average duration of life in adults is diminished about ten years.

Nor shall we have much difficulty in understanding this, when we contrast the present condition of our own island, and specially of our towns, with what it was not much longer than a century ago. About that time, viz., in 1662, John Graunt published some observations about mortality. In 1674 Sir William Petty followed the subject up ; and, after many intermediate authors, the "Northampton Table" was formed by Dr. Price from the burial registers at Northampton between 1741 and 1780. "This table was for a long time the only one used by insurance offices. It is now known to give the probabilities of life too low at the younger and middle ages. Some of this (but probably not all) is due to the increased value of life since the middle of the last century." (Quoted from Penny Cyclopædia ; article, Mortality.)

As far as I can ascertain, insurance offices not only find the Northampton table inapplicable to the present day, but

they all report, from year to year, that the mortality amongst their assured falls short of expectation—thus showing that the average duration of life in England has been increasing since the last century.

In some towns the difference of mortality now and at a former period is very striking : Mr. McGowan reported at the Social Science Meeting, at Liverpool, in 1858, that the annual mortality in the town was, at that date, nearly four thousand less than it had been fifteen or twenty years ago, all due correction being made for increase of population ; and as we may fairly state that the proportion of cases of illness to actual deaths is about twenty to one, it follows, that the number of diseases requiring medical assistance has been diminished to the extent of eighty thousand per annum, in a population of about three hundred and fifty thousand.

This alteration the report attributed, and very fairly, to the improvement which had been effected in drainage and scavenging. We have ourselves seen many instances in which typhus has left a court, where it had previously held uninterrupted sway, immediately after the soil had been well drained, and where a sickly family have had the roses return to their cheeks, by a simple removal from an undrained and damp house to one well drained and dry.

Few there are who are not aware how much over-crowding in close rooms stunts the growth and pales the complexion of young children, and how much struma is fostered by a moist, cold air.

The depressing influence of extreme cold is seen in the small stature and feeble health of the Esquimaux, and the Indians of the higher latitudes of North America. We see it, too, in the ill-clad children of our own country, who suffer frequently from a diarrhoea which is at once checked by the use of warmer clothing. This is occasionally met with even

in the children of the wealthy, who are insufficiently clad, to give the fond mamma a constant opportunity of admiring the round limbs of the growing child, or from a strange notion respecting a "hardening" process. .

The influence of external circumstances in modifying prejudicially the vital powers, is seen to a marked extent in the children of Europeans of healthy constitutions, born in India, or taken to India when young. The effect of the climate upon them is such, that all die unless they are removed to some more healthy locality. It is equally remarkable that the dark races, whose natural locality are hot climates, die off in cold countries as the whites do in the tropics.

The evidence in favour of improvement, after deterioration, is unimpeachable, even where there is the strongest reason for the belief that the deterioration is hereditary. Thus, Dr. Whitehead, of Manchester, records a case where a mother, once infected by her husband with syphilis, habitually produced children who died of some strumous disease at a very early period ; after the loss of many, she was induced to get a healthy wet nurse for the next, and this alone survived ; others were born after this, and the mother herself nursed them, but they all died. At the period when Dr. Whitehead wrote, the child not suckled by the mother was six or seven years old, and in good health. Many similar cases are on record ; and there are few practitioners who have not themselves met with analogous facts.

We see the same broad fact exemplified in the influence produced in children by change from a close town air to the pure air of the country, or the stimulating breezes of the sea-shore. As long as they remain in the town, the children are always drooping, and succumb under such ailments as water in the head, diarrhœa, convulsions, and the like ; but

when located in a purer atmosphere, they become robust, strong, and hardy. The same remark also applies to adults ; for we see many an individual, whose days appear to be numbered in his native land from the effect of phthisis, recover with marvellous rapidity, on arriving at such a genial climate as Madeira ; and not only is he subsequently enabled to reside there, but his vital powers are so much increased, that he can, after a while, come back and live in England to mature age, resisting easily all those baneful influences under which, formerly, he was obliged to succumb.

In these cases, we cannot say that the loss of vital power has been made up from increments, drawn simply from the air, the water, the sunshine, the warmth, or the breast-milk of a healthy woman. None of these are of themselves able to give vitality, nor are other forces convertible directly into vital power. They have some effect, however, which we can appreciate. We have seen in plants the withering influence of town air, and the beneficial effect of a genial climate, a bright clear sky, and abundance of sunshine ; and recognising in them the conversion of light and heat into "organismal" force, we infer that such conversion may really take place in animals and our own race. But this does not explain the vast and rapid increase of strength that takes place in man on removal to a pure air ;* and we are constrained to con-

* C. A., æt. 18 months, after suffering from general debility from his birth, and from a threatening of hydrocephalus, was attacked with vomiting and purging, accompanied with great flatulent distension of the bowels. In spite of treatment, and a most carefully regulated diet, he steadily got worse, and was unable to digest even milk and water. As a last resort he was taken to New Brighton, near Liverpool. No alteration was apparent until he had turned the angle between the river-bank and the open sea ; but the *instant* he had done so a change was perceptible in his features—the haggard look of suffering was replaced by the placid look of ordinary repose.

clude, that his vital force is recruited, in a great degree, from the remains of it which is at the time within himself—a conclusion which appears the more probable, as recovery is almost impossible, when the loss of vital power exceeds a certain limit.

This necessarily leads us to inquire how the vital power is recruited during health. We have seen how, by the formation of sweat, urine, bile, fæces, and the like, vital force is perpetually expended, and how it would be dissipated entirely, unless it were perpetually recruited by fresh air and food and drink. We may go further, and say that unless the amount of the latter is sufficient to make up for the loss of the vital force, a deterioration takes place, slow indeed, compared with that of total deprivation, but yet sensible. Food, then, we say, is the means by which our life is kept up; but food put into the stomach of a corpse will not revive it; nor will food in abundance do that individual any good whose stomach is too weak to digest it. Strong food, given to a starving person, may even act as a poison; he has no more power to digest it than he would over a stomach full of sand. *For food to recruit the body, therefore, there must be power to digest it*, as well as an adequate supply; and we infer,

As soon as he arrived at the lodging taken, he was ready for a meal, and digested with perfect ease a small basinful of bread and milk. The vomiting and purging ceased at once, and the recovery was complete.

A. B. C., æt. 25 months, had convulsions for which all medication had been tried in vain; the child was then sent into the country, and the convulsions ceased immediately. In a few days the child was brought back again to town, and the convulsions returned within twelve hours. He was then taken back again to the country, kept there for some months, and the convulsions never returned.

Stronger proofs of improvement of the vital powers after deterioration it would be impossible to give.

that amongst the attributes of "vital force" is the power of converting the materials composing food into a living structure endued with vital powers; that is, vital force is, within certain definite limits, possessed of a reproductive power.

Vital force, then, is clearly one of a higher nature than other forces, inasmuch as it has a property possessed by none of them to the same extent.

We are not, however, without some analogies which it will be useful for us to call attention to—between vital and other forces in respect to this, apparently, reproductive power. It is by no means uncommon to find individuals who have been exposed for a long period to intense cold, excessive exertion in swimming, or other exercise requiring great expenditure of strength—or who have been half drowned, or half hanged, or nearly starved to death—or who have been intensely frightened—or who have lost a very large quantity of blood—gradually but steadily lose their powers, in spite of everything done to resuscitate them, and die from simple failure of the vital force.

So it is with many a fire: as long as there is abundance of air and fuel, the heat is kept up which is requisite to convert the coal into various gases—the fire burns brightly as long as the supply lasts; but cut off the supply for a certain period, and allow the heat to fall below a certain standard, and not only will the addition of new coals not resuscitate the fire, but the load of *cold* coals will absolutely dissipate the remaining heat, sooner than it would otherwise have passed away.

It is almost as necessary to keep up a certain amount of heat in a fire, to enable it to sustain itself with fresh coals, as it is to keep up a certain amount of vital power, to enable life to sustain itself by food and drink.

This analogy cannot, however, be strained beyond a certain

point—we know that we can keep up a fire for an indefinite length of time, provided the supply of air and fuel is illimitable ; but so far as we know, there is not anything which will enable us to sustain the vital force beyond a certain limit—each man must die at last, in spite of plenty of food and drink, and the period of death will be determined greatly by the original amount of vital force inherited from parents—but in a larger degree, by the way that force has been expended or conserved.

Air, warmth, light, comfort, and many other circumstances, are as essentially fuel for the vital force as coal is for the furnace fire.

The evidence in proof that the vital power may be permanently deteriorated, is unfortunately too strong to leave any doubt on the subject. It may be so by causes personal to the individual, or by hereditary transmission.

We have already adverted to the influence of the Indian climate on the children of Europeans. The influence of malarious atmospheres is equally prejudicial upon the inhabitants indigenous to the country. The duration of life amongst the malarious districts of Italy is greatly inferior to what it is in the healthiest parts of the same country ; and in our own island the same fact has been demonstrated,—the present average mortality in Cambridgeshire and Lincolnshire being much less than that which obtained at a period when those counties were almost undrained.

There can be little doubt that sexual excesses in the male do very materially diminish the vital powers. To prove this it will be well to commence with the lower animals. We all are familiar with the death of insects generally after the eggs have been impregnated and laid. The male toad generally dies after it has vivified the female's spawn ; and we all know how poor both male and female fish are after the

spawning time. The following is an extract from a private letter from Mr. Lewes, the well-known physiologist :—" You know how energetic is the reflex action in the frog whose spinal cord has been divided : well ; I find that four or five days after copulation division of the cord destroys all sensibility whatever in the posterior segment ; neither pinchings, prickings, or acids produce the slightest reflex action ; copulation has exhausted the cord. Moreover, frogs so operated upon will not live over a fortnight ; whereas, before copulation, or during autumn and winter, they live for months with a divided cord. April 27, 1859."—I am informed by breeders, that stallions are occasionally affected with paralysis of the hind-quarters after a "severe" season. I have known a similar result in a goat. Of the influence of sexual excess in producing progressive paralysis and softening of the cord in men, in cats, and in birds, there can be no doubt. The following cases show that copulation may even be fatal to life where much debility previously exists.

Hennen, in his "Military Surgery," relates an instance where an officer who had suffered greatly from loss of blood, went to see his wife, and died during the act of connexion.

A medical friend told me of another, in which a man suffering from phthisis found himself so much better that he determined to have intercourse with his wife ; this was effected, but in a few minutes after he began to sink, and died in an hour.

The following came under my own notice :—A farmer, æt. about 34, had diabetes mellitus and dull headache ; he was much emaciated and very weak. Under the influence of treatment, however, he recovered to such a degree that he considered he was able to fulfil a matrimonial engagement. The wedding took place—against his doctor's advice. He was strictly temperate at the feast, both as regards eating and

drinking. They came to Liverpool in the evening. The next morning he complained of feeling very ill ; stimulants were freely given, but the patient sank with symptoms of cerebral and general exhaustion in twenty-four hours.*

Vitality is equally impaired by any cause vitiating the atmosphere breathed habitually by the individual. Thus, in the days of slow-sailing transport ships, we know that the mortality amongst a number of horses, closely stowed in a ship's hold, was very considerable. They were compelled to breathe an atmosphere tainted by their own breath, and by the ammonia and other products resulting from the decomposition of their urine, fæces, and sweat. Under such circumstances, a disease called "glanders" was generated ; and even those who had not that, were enfeebled and emaciated, and fit only for the knacker. But the experience of the large steamers during the Crimean war has shown us, that if a stream of air is kept constantly circulating through the floating stable, to ensure the expulsion of pulmonary excrements, and a stream of water to carry off the renal and intestinal products, no injury to life results. The experience of emigrant-ships, densely packed with men, of crowded slave-vessels, and of the swarming French hospitals in the Crimea, all point to the same things ; but in them *typhus* replaces *glanders*.

A want of due ventilation in the monkey-house of the Zoological Society's gardens gradually undermined the life of all

* Like many other statements in physiology, the preceding has been challenged ; and amongst others, my friend Mr. Hunt (whose well-known work on Specific Eruptions I shall often have occasion to quote) denies that sexual excesses have any effect upon the general health. I may be excused, perhaps, from entering upon the matter further than to state, that Dr. Copland treats the subject very fully in his Medical Dictionary, and that the conclusions he has drawn from his own observation confirm the remarks in the text.

the inmates, and they died prematurely. A careful attention to this subsequently ensured perfect health to their successors.

The influence of darkness in deteriorating vitality it is not easy to demonstrate with certainty. Report says, that cataract is common amongst the horses used in mines, who never see other lights than those given by furnaces or lamps ; but the same reports represent those animals as being equally long lived with others. Mr. Simon, in some experiments on cats, found that the formation of fatty and tubercular matter was favoured by darkness ; and accounts tell us, that the diseased livers of geese, so much prized by gourmands, are produced in Strasburgh by feeding those creatures in darkness. On the other hand, we have now the testimony of numerous Arctic voyagers to tell us, that the deprivation of light during the long winter has no definite deteriorating influence upon the vitality of the men ; nor does it appear that the duration of life amongst the Esquimaux differs materially from that which obtains amongst savages in general. Report, it is true, states that an attempt to establish an hotel for invalids in the Mammoth Cave in Kentucky, where the temperature is high and equable, signally failed, in consequence of the patients suffering more from the absence of light than they gained advantage from the genial warmth ; and if we turn once again to Arctic experience, we find all narrators agreeing in the statement, that the perpetual daylight of the summer was as invigorating to their spirits as they found the darkness dull and depressing. Coupling all these considerations together, we conclude that darkness has a deteriorating effect on vitality, though not to a great extent.

With regard to the influence which mental emotions have upon vitality, we are in the midst of difficulty, for the reaction of the mind upon the body is not more con-

spicuous than that of the body upon the mind. Thus grief will compel the lachrymal glands to increased secretion, while it will dry up the salivary glands and the muciparous follicles of the stomach. On the contrary, too much alcohol, or privation of food, will produce imaginary sorrows, maudlin griefs, which shall be lamented as much as real ones. We think, nevertheless, that we can demonstrate, that mental emotions have a very decided effect upon vital force, independent of other causes. Army surgeons report, that during the excitement of successful campaigning, the health of the army is high ; while in a retreating army, when the men are all dispirited, the smallest injuries are fatal, producing gangrene, erysipelas, or tetanus ; and this, as far as can be ascertained, is quite independent of the physical circumstances surrounding them. The same thing is seen in shipwrecks ; and probably no more heart-thrilling narrative will ever be penned, than the simple account of the effects of Pym's presence on the sick patients in M'Clure's "Investigator." Cooped up in their ships, seemingly amongst eternal ice, in the frozen North, and almost hopeless of any aid, they had for four years seen no human faces except those of their companions in misfortune, or of the savage inhabitants of a savage country ; their comforts were few, their luxuries small, their distress considerable ; medical skill did all it could, and yet the sick were daily getting worse. At length they note a stir on the deck above them, and hurried tones of joyous import are heard, indistinct at first, but swelling out at last into a cheer. Help had come from England—they were desolate no more. That roar of human happiness had a thrilling effect on the invalids ; in all respects save one, they were in the same condition as before, but hope had come back to their pillows, and despair had fled away—a change at once came o'er them, all began to mend ;

many an one, apparently bound for eternity, came back to enjoy more years of time, and even those too far gone for permanent cure experienced a temporary good.

Poetry and history abound with touching references to the sustaining power of hope and the depressing influence of despair: nor are individual instances wanting which show the same fact. A healthy countryman was induced by a gentleman, who had bet a thoughtless wager about the credulity of the peasant and his own persuasive power, to believe that he was the subject of a mortal disease, of which he would die in a fortnight; he sickened accordingly, and though he was subsequently told it was all a joke, he continued to droop fast, and died at the end of the time named, the victim of despair. I have myself known two cases of similar character, though more happy termination; one, a poor man, had in some way injured himself—the doctor saw him, said that the injury was internal and mortal, that he could do nothing, and that the man would die. He lay in bed, daily expecting his doom, eating nothing, and scarcely venturing to move. As he was missed at his work, his master requested me to see him, and report on his condition. Whatever might have been originally the matter, I could discover nothing wrong: he had long known me, and believed my words when I told him that he was all right. I recommended him some chops and porter, and the next day he was at his work again. The other was more marked still: a strong, burly young seaman had experienced some severe accident, and was brought into the Northern Hospital in a state of collapse. The surgeons in his hearing spoke of it as a hopeless case, that death was inevitable, and would soon take place; he continued in an apparently hopeless condition for thirty-six hours, at which time, from some caprice on the part of his friends, I was requested by them to meet my

surgical colleagues. On reaching the hospital, they were all engaged in an operation in the theatre, and I went alone to see the man. His general aspect at once gave me reason to hope that the case would not terminate fatally, and every answer I received confirmed me in this view; my face doubtless showed what was operating in my mind, and gave the patient comfort, but I declined giving any decided opinion till I had seen the surgeon under whose care he was, except that I did not consider the case a hopeless one. I then left the ward, and did not return till my colleagues were able to join me. On re-entering, the surgeons at once remarked the alteration which had taken place in the man's features; their own assumed the lineaments of hope and encouragement; the patient's face still further brightened; he was told that the worst was over, and he would soon be well. In four days after he could walk about, and came to me to report himself, looking as if nothing had ever ailed him.

Deaths by sheer fright are not numerous, though many, sufficiently well attested, are on record. Now, there can be no reasonable doubt, that if extreme fear, despair, or other depressing emotion will produce such a diminution of vitality as to end in *death*, that a less amount of the same emotions will produce some modification of vitality short of death. If this be true, we draw the corollary, that whenever we can fairly trace any disease or disordered function to fright, prolonged grief, anxiety, and the like, that there must be a deficiency of vital power, and that depressing medicines must be prejudicial. Experience has demonstrated the truth of this proposition in chorea, epilepsy, mania, jaundice, indigestion, sleeplessness, and cancer. Kussmaul and Teimer refer (page 99, op. cit.) to the influence of fear in blanching the cheek, and thence infer that a similarly anæmic condition may exist in the brain, and thus bring about convulsive

attacks. They refer also to the fact that the anæmic and chlorotic are more subject to fright than healthy people.

As experience tells us a full stomach and abundance of alcohol banishes fear, so we should adopt a hearty and jovial plan of treatment in those complaints which have arisen from fright.

CHAPTER IV.

INFLUENCE OF POISONS UPON VITAL FORCE.

The vital force influenced by chemical agency—Poisons—Their operation on the body—Phenomena attending the introduction of poisons differ with the one employed—If poisons do not destroy life, they modify the vital processes, generally in a definite manner—If the vital force is superior to the poison force, no perceptible result follows—The system being under the influence of a poison, is proof that the vital force is deteriorated—Do such unknown poisons as those of scarlatina and small-pox differ essentially in their operations from the known poisons?—Points of resemblance—Presumed identity of many of their laws—Important corollary—Adaptability of system to poisons, &c.—Influence of tonics in promoting this—Treatment of diseases of poison origin—Theory of elimination considered—Its tendencies.

It will be profitable for us now to consider the way in which the vital force, and the natural healthy processes depending upon it, are influenced by other forces of a different kind, such as chemical force and that to which we must give the term "miasmatic." It is clear, that if we apply a powerful chemical agent, such as oil of vitriol, to any part of the body, we destroy its vitality; and we say that such force is antagonistic to life.

Experience tells us that there are poisons, such as arsenic, which may be introduced into the whole body by vital processes, and which will then produce such an alteration in the tissues as is incompatible with life.

But we also know, that the amount of these agents may be so reduced that they will no longer destroy the vital power. Sulphuric acid may be so diluted with water that it will not destroy the part to which it is applied, and may act beneficially in restoring health, as in checking diarrhœa ; and arsenic may be used in such minute doses as to be not only innocuous, but even beneficial. What then, we ask, is the nature of that force which is in operation when an individual has had his vital power *modified*, but *not destroyed*, by the presence of some force of another and probably antagonistic nature ? Is it a compound force, or is it simply the original force deteriorated ?

An answer to this, in the present state of our knowledge, it is difficult to give ; we must, therefore, content ourselves by investigating the phenomena which occur when vitality is modified by other forces. We may investigate this subject, firstly, by inquiry into the history of known chemical agents or poisons ; secondly, into those whose existence we infer, but cannot demonstrate ; thence we may be able to deduce some general law to guide us in our treatment of diseases of poison origin.

In examining the effects of poison on the body, the first thing that strikes us is, that all poisons do not operate alike ; and the second, that all individuals are not affected similarly by the same poison.

Thus, we see strychnia affecting the muscles almost exclusively in one way, and conium affecting the same parts in another way. Aconite affects sensibility ; belladonna produces madness ; opium, stupor ; and mercury, salivation. Antimony gives rise to nausea, while alcohol staves it off ; lead produces colic and constipation, while arsenic causes vomiting and purging. On the other hand, one animal eats

with impunity leaves which would poison another ; and the sufferer from acute agony can take a dose of opium which would kill a man in health. Some are poisoned outright by fish, salt pork, or sausages, while their companions can eat the same dishes with impunity. A fig is poisonous to some sensitive people, and honey equally so to others. One infant dies from a drop of laudanum, while another takes it with advantage.

In attempting to explain these phenomena, we naturally turn to those poisons whose presence in any particular tissue the chemists enable us to detect. Their researches have taught us, that the colouring matter of madder has some peculiar affinity for the bones, and that it is to be found there when its presence cannot be demonstrated elsewhere ; that arsenic permeates the whole system, but chooses the liver especially for its localization ; that more lead is to be found in the extensors of the arm in wrist-drop than in other muscles ; that antimony lingers in the kidneys after it has left other organs ; that mercury and some other metals accumulate in the salivary glands ; and that iodide of potassium affects all parts alike.

Hence we infer that some poisons have peculiar affinities for certain organs, and others are general in their operation.

This inference is strengthened by the influence of certain agents whose course we cannot trace with chemical certainty. Thus, ergot of rye acts definitely on the uterus alone, and on no other organ ; the hydrophobic poison acts on the throat and brain ; the syphilitic poison on the inguinal glands, the throat, skin, &c. ; the erysipelatous affects chiefly the face and head ; the rheumatic, the fibrous tissues and heart ; the gouty, the ball of the great toe, &c. ; the dysenteric, the large intestine ; cantharides, the urinary apparatus ; and

phosphorus, the lungs and the lower jaw. Other poisons are more general in their effects, as opium, plague, typhus, influenza, yellow fever, &c.*

Still further it is to be noted, that what is poisonous at one time in a certain quantity may ultimately become comparatively innocuous by perseverance. Thus, when alcohol is first taken by a child or a youth, he may become speedily intoxicated by three glasses of wine, and become comatose from half or a whole bottleful; but when the habit of wine drinking has been formed, that quantity may positively seem to do him good, and keep him "up to the mark," and in some instances comatose intoxication cannot be induced by quadruple the quantity originally required. So it is with opium—a small amount at first is sufficient to lull pain or secure sleep; but after a while the system becomes so much accustomed to its use, that doses are required of comparatively appalling magnitude.

It has for a long time been fashionable to consider that it is *the blood* in these "poison" cases which is chiefly diseased; but a closer examination will show that the *blood only acts the part of a common carrier* in those cases where a poison has been taken whose locality we can easily demonstrate with the microscope. Thus, if we examine the stomachs and other organs of individuals poisoned by arsenic, we shall, in the majority of instances, find that the drug has been converted into a yellow sulphuret, readily recognisable by the naked eye. I have repeatedly examined this deposit, and have

* I must anticipate in this place an argument used further on, and note that if any poison affect one part specially, we attribute that effect to the direct operation of the poison, not to an effort of nature to remove it. If inflammation of the great toe is the direct effect of gout, we have no right to say, when gout occurs in the stomach, that the vomiting it produces is an effort of nature to get rid of the poison.

found it invariably to be *in the tissues outside of the blood-vessels*.

The natural inference from this is, that arsenic kills, not from its influence *on the blood*, but from its influence *on the tissues* to which the blood has carried it, and which have retained it when it has been so carried. In other words, arsenic has replaced a certain amount of healthy tissue, and each particle has affinities so different from that of the original, that the neighbouring fleshy atoms can no longer act as they would do under the natural state of things. Death occurs when the amount of poison force present exceeds the vital force remaining.

Other poisons* act much in the same way ; but as their affinities are not identical with those of arsenic, the parts in contact with or near to them are influenced differently from what they would be by that metal.

If this idea respecting the action of poisons be worth anything, we shall find instances in which the action of a poison is confined to the locality where the poison has been introduced ; we do so. Thus, I have seen a man who had wrist-

* “The various substances which the physieian employs exert their influence, not upon organs but upon tissues ; not upon the apparatus itself, taken as a whole, but upon some of the histological elements of which it is composed. It would be an entirely mistaken notion to suppose that digitalis paralyses the heart ; not upon the heart itself, but upon the muscular fibres which enter into its structure, is the action of that body directed, the nerves, vessels, &c., remaining, in the meantime, perfectly sound.”

“Digitaline, long before it acts upon the contractile powers of other museles, arrests the motions of the heart, a result which may no doubt be attributed to the ceaseless activity of the cardiac fibres ; being therefore of all muscles the most energetic in the performance of their functions, they are naturally found to be, at the same time, those which experience long before the rest the noxious influence of poisons.”—CLAUDE BERNARD, *Med. Times and Gazette*, May 26, 1860.

drop of the left arm only, and I could trace this solely to his business compelling him constantly to have metallic lead (in alloy) in contact with the skin of that hand and forearm. I have heard it stated, that some compositors suffer from palsy of the finger and thumb which handle the "types;" and I know a man who had palsy of one arm from handling shot. Arsenic produces inflammation equally, whether it is rubbed into and through the skin, or given internally. The external application of turpentine to the abdomen in tympanitis, answers quite as well as its internal use; and pain in an external part may often be relieved as effectually by the local use of opium as from its administration by the mouth.

Every part of the tissue is permeated equally; but being full of blood-vessels, whatever penetrates through their walls must enter the blood current and be taken away. This explains why by the local use of drugs we have general effects following local. I think, then, it may fairly be concluded, that the poisons which we can trace *act directly on the tissues themselves*, and not, in some mysterious manner, through the nervous or vascular or other systems.

Nor are these effects confined to poisons essentially soluble; for the insoluble carbonate of lead, if freely handled, will produce colic, &c., as effectually, and, as a general rule, more frequently than the soluble acetate. It does this by combining with the tissues, not simply by entering into the blood. If the blood were the sole medium by which the transmission of the poison was brought about, we should have the effects as general as if the door of admission into the system was the stomach; but it is not so, for we find the largest quantity in the part to which the substance was applied.

It has long been a dogma in the medical schools, that no medicinal or other agent could act upon the body until in some way or other it had been rendered soluble.

The labour expended to prove this point shows how much more apt we are to adopt a theory than examine facts. Experience daily demonstrates that the dogma is untrue. It tells us that orpiment and Scheele's green, both insoluble salts of arsenic, are quite as deadly as the more soluble arsenious acid. Pereira says that powdered gold operates in the same way as the soluble chloride. We all know that the action of calomel, an insoluble salt, differs essentially from that of corrosive sublimate, a very soluble one; that metallic mercury produces salivation; that an insoluble black wash cleanses a venereal sore as effectually as a soluble salt; and Plummer's pill, containing two insoluble forms of antimony and mercury, is by many averred to be far superior to any soluble form of the same metals.

It is argued, without any proof being alleged, that all these insolubles are rendered soluble by certain stomachic juices. If so, how absurd is it for the believers in this dictum not to give the soluble form in preference to the insoluble.

The dogma is supposed to be proved by asking the question, How can any drug get into the system except by the blood, and how can it get into this without being sufficiently soluble to pass through the walls of the blood-vessels?

This argument passes for nothing as soon as it is ascertained that insoluble materials *do* enter the system. They mingle mechanically with the tissues, and are passed on from one part to another by molecular interchange rather than by circulation; and as the former is necessarily a slower mode of diffusion than the latter, it follows that insoluble materials are more slow in their operation than the soluble.

We see no more reason to doubt that an atom of calomel undissolved may enter the solid tissues, than that granular carbon can become fixed in the lungs and thoracic lymphatic

glands from the inhalation of a smoky atmosphere ; and that it can be so experience abundantly proves.

Amongst the insoluble materials constantly used and much lauded by practitioners are—oxysulphuret of antimony—James's powder—oxide of silver—nitrate of bismuth—carbonate and oxide of iron—blue pill, &c.—black and yellow wash—cinnabar, &c.—calomel—iodide and biniodide of mercury—oxide of zinc—iodide of lead, and the acetate of that metal, which the stomach converts into carbonate.

Surely we must conclude either that the dogma is wrong which says these must be necessarily inactive, because insoluble, or the practice must be faulty which adopts them in preference to the soluble salts of the same metals. No ingenuity of reasoning helps us out of this dilemma.

To resume : a part which is permeated by a poison is, we say, under the influence of two forces, one chemical, the other vital, and the effects produced vary with the relative *amount*, or intensity of the chemical force and the *affinities* of the poison, *e. g.* a little arsenic will do less mischief than a great deal ; and while the salts of this metal will produce simple erythematous inflammation when applied to the skin, those of antimony will produce a pustular, croton oil a vesicular, cantharides a bullous, and the stinging-nettle an urticarious, eruption.

But the words, “a little will do less than a great deal,” are so vague that they require an explanation.

We used them with that intention, as we wished to show that they must always be vague and relative terms. If the two forces, chemical and vital, were definite and unchangeable, precision might be obtained ; but as one only is definite—the chemical one—and the vital force is subject to many unknown changes, no certainty is possible.

For example, let us estimate the force of a definite dose

of laudanum at 10, and the vital power at 100, a certain result follows its use, and death does not ensue ; but if the vital power is reduced to 50, the effect of the laudanum will be doubled, and death may positively take place.

In other words, we believe that a man when strong can bear a dose of poison which would kill him if he were weak.

Anything, therefore, which depresses the vital power during the time an individual is under the influence of a poison, makes him more susceptible to it.

We shall see the importance of this consideration when we advert to the treatment of diseases of poison origin.

C. Bernard makes some very interesting remarks upon this subject, which show that the above proposition is not universally true.

Thus, he injected woorari poison into the veins of a fasting rabbit and a full one, and remarked, "To poison the fasting animal, a dose larger by one-third was required than had been found sufficient to destroy the other."

"But," he goes on to say, "while the animal is in some measure preserved from the noxious influence of certain poisons it becomes obnoxious to the action of morbid influences of a totally different character. It even appears to me that in our nosological classifications this peculiar liability of the system might be turned to account as regards the etiology of disease. To adduce a characteristic instance of this, when frogs have been kept for a long space of time in captivity, their health declines and ulcerations arise around the nose and mouth ; the nervous system being in this case considerably depressed, the animal is, of course, found to resist much longer the influence of strychnia, while parasitical affections spread with fearful rapidity. . . . If a healthy frog be placed in a jar containing others with parasitical affections, the new comer sets contagion at defiance ; while if another frog,

affected with ulcerations in the vicinity of the natural orifices, is introduced into the jar, the parasitical vegetation covers it at once. The itch, a disease which frequently prevails among horses and sheep, is scarcely ever found to attack animals in good condition ; and in man, the lower classes are known to be a prey to vermin, especially in childhood and old age ; while persons who live under more favourable circumstances are scarcely ever affected with this inconvenience, except towards the latter end of long and painful diseases, for it is generally in such cases that the *morbus pedicularis* has been observed. The decrease of nervous power equally constitutes a predisposition to putrid, contagious, and virulent affections. The fact is well known to veterinary surgeons." After a few remarks, intended to explain this apparent discrepancy, he concludes, "If therefore, an animal being given, it is our purpose to preserve it from the action of woorari, or similar poisons, we must lower its forces. If, on the contrary, we intend to preserve it from contagious diseases, we must increase the forces by all possible means."

If we now turn to the operation of those poisons whose existence we cannot demonstrate chemically, we shall see that they affect the body much in the same way as those we have already described, *i. e.* each has definite powers and peculiar affinities.

There is good reason to believe that marsh miasms have greater affinity for the spleen, liver, and colon, than for other parts ; that small-pox is chiefly concentrated in the skin ; scarlatina in the skin, throat, and kidney ; measles in the skin and bronchi ; gout in the feet and hands ; syphilis in the skin, throat, and bones ; gonorrhœa in the urethra and joints ; cholera in the intestines and liver. The poison of glanders affects chiefly the nasal passages ; that of the

plague, the axillary and inguinal glands, in preference to others; and the tubercular leprosy selects the skin. If diphtheria and croup are of miasmatic origin, we must presume the poison has peculiar affinities to the mouth, nostrils, and air-passages; while typhus and general erysipelas have but few well-marked affinities.

We conclude, that the poisons producing the diseases in question are as distinct from each other, both in force and affinity, as are arsenic and antimony.

The small-pox poison, combined with the tissue of the skin, produces, like antimony under similar circumstances, a pustular eruption, but the course of the eruption shows that the poisons are not identical. Scarlatina poison in the throat produces ulceration; on the skin erythema simply; and in the kidneys hæmorrhage. Syphilis in one man gives rise to nodes, in another to sore throat, in another to rupia. Measles produces a specific rash, and the eruption of erysipelas is equally characteristic. The effects of typhus are as definite as those of the influenza, and the symptoms of hydrophobia are as certain, in man, as are the effects of alcohol. But the symptoms of hydrophobia in a dog differ from those presented by man; we infer, therefore, the poison being a "constant quantity," that the vital attributes in a dog differ from those of a man—an almost self-evident proposition.

Still further we note, that though poisons have definite affinities, the limits of the definition are extensive. Thus syphilis may produce lepra, eczema, ecthyma, psoriasis, rupia, nodes on certain bones, ulceration of the throat, caries of bones, &c. The poison in each case is the same, but its effects are modified by individual constitutions (as hydrophobia in dog and man). But, on the other hand, we never see syphilis producing the phenomena of ague, or of dysentery, or of

gonorrhœa, nor do we see it influence the constitution as do rheumatism and gout. In like manner there is reason to believe that the variolous poison has extensive limits; whether it ever produces a vesicular eruption, as in varicella, may be a matter of doubt, but of its being modified into the vaccine vesicle seems fairly to have been established.

If we once allow that two powers or forces are concerned in the production of the symptoms in these diseases—viz., the *poison* (as we presume a non-vital) *force* and *vitality*—our next inquiry must be, Which is most concerned when the intensity of the disease appears to be great? We may put the question in the following form—Does small-pox become confluent because the dose of the poison taken is excessively large? or because the person is excessively weak? or because the two conditions are combined?

I think that we may fairly answer thus—In inoculation for cow-pox or small-pox the dose introduced may be assumed to be a “constant quantity,” but the eruption following is extensive or limited according to the recipient’s bodily health at the time and subsequently.

If for small-pox we substitute the word typhus or ague, we have less hesitation in answering more fully, for experience fully proves—1. That if many individuals are exposed to the same sources of contagion, it is the weakest only who suffer. 2. That if the dose of the poison is excessive, the strongest will succumb. 3. That by using strengthening means or tonic remedies, *e. g.* quinine, the weak may enjoy the immunity of the strong.*

A person becomes affected, then, by the poison force being greater than the resisting or vital power, and this rule holds good during the whole time the former is present.

* For further observations on this subject, *vide* page 81 *et seq.*

The subject, however, is not in reality so simple as we have hitherto represented it, for there is an element to be taken into consideration to which we have hitherto barely referred,—viz., *adaptability to altered circumstances*. Its exact position in the science of life it is difficult to determine. It is certain that it exists in plants and all animals equally with man. A few illustrations will point out its nature. To begin with plants. It is affirmed that wheat matures much earlier in the northern regions than in the southern, and it has been found that the same wheat, when brought to the temperate or warm zones, adapts itself to the altered circumstances, and takes the same time to mature as the wheat natural to the soil. Again, there are plants which close during the night, but by the use of strong artificial light the habit is overcome, and the leaves or flowers, as the case may be, continue open in the night. This habit is then continued for a certain period.

Again, in aquatic animals we see the same sort of thing: the salmon at one time is living in fresh water exclusively, at another in salt; an instant transition from the one to the other is, I understand, fatal; but in the gradual change effected by passing up a tidal river, the system has time to adapt itself to the altered circumstances. Whether this fact be reliable or not as respects the salmon, the same observations may be depended upon as regards shrimps, prawns, and other creatures upon which definite experiments have been made.

To test this, I took a lively minnow from the fresh water aquarium and placed it in the salt water. The first change noted was, that the creature was constantly trying to reach the bottom of the tank, but as it was of lower specific gravity than the water, it as constantly rose to the surface. In five minutes this difficulty seemed to be over, and the motions of

the fish became less energetic ; in two minutes more, however, they became apparently spasmodic, and in two more the creature was gasping on its side. On replacing it now in the fresh water, it sank like a stone and lay quite still, moving only its gills, but in the course of a few minutes it was lively again.

The transition of a salt water fish to the fresh water, was only followed by perfect quiescence.

On varying these experiments, I found that a minnow died in fifteen minutes if transferred to pure salt water, in twenty if removed to equal parts of salt and fresh, and thirty if the water were two parts salt and one fresh ; and when the mixture was much further diluted, I saw no mischief done in two hours.

Adaptability to altered circumstances is still further manifested in the higher animals—carnivora will, under certain circumstances, live on vegetable diet, and graminivora upon an animal regimen. Thus the dog will thrive upon biscuit food, and the horse will be sustained by beefsteaks placed round “the bit” for him to champ at.

But more especially is this to be noticed in man. The tobacco-smoker at his first pipe, and sometimes for a long period thereafter, has nausea and intense prostration produced by the luxury ; and the same may be said of the “chewer ;” but after a certain period no such effects occur. On the contrary, tobacco, in some instances of shipwreck, seems to those accustomed to its use, to have had a definite power in sustaining the vital force. In the majority of cases, however, if a smoker indulges in the weed when his strength is much reduced, he will experience much the same effects as at first.

Snuff, however, affords a more apt illustration. The first “pinch,” as a general rule, produces sneezing and a copious

secretion of nasal mucus ; but after a time the nostril becomes comparatively insensible to its presence, and no sternutation follows the most copious supply, nor is the nasal mucus much, if at all, increased.

All of us are familiar with the rapidity with which we get accustomed to smells which once annoyed us—how completely the butcher, druggist, tallow-chandler, cheese-factor, and others, become insensible to the smell of the shop ; and how, in our student days, the diligent ones became insensible to the once sickening smell of the dissecting room.*

* It is an interesting subject for inquiry how far nauseous smells are really prejudicial to health. We have long been accustomed to believe they are so, but an investigation I was called upon recently to make leads me to doubt the absolute truth of the doctrine.

Amongst the nasty odours which are rife amongst us, the emanations from pigs is pre-eminent ; yet pig-drivers are a sound lot. To some the smell from sheep is intolerable ; yet shepherds are healthy. In hot climates, the scent from the negro skin is horrible ; yet the blacks carry neither fever nor pestilence in their train. In all our towns there are gas works, and around about them the air reeks with nastiness ; yet the inhabitants living within this range are as healthy as their neighbours. The poor wretches who gain a precarious living amongst the sewers, are not consequently the prey to fever—even the scent of diluted sulphuretted hydrogen is not deadly, for the nymphs of the Harrogate and other sulphurous springs have as blooming complexions, and as good health and constitutions, as their neighbours. Recent inquiries in London have demonstrated that the stinking Thames is not so deadly as the newspapers prophesied it would be. Sextons, nightsoilmen, fish-manure makers, gluc-boilers, labourers in abattoirs, curriers, dissecting-room porters, and tallow-chandlers—all are daily exposed to nauseous smells, yet their duration of life and general condition is an average one.

Nor are there wanting some instances to show that nasty emanations may be even serviceable to life. Thus, a merchant, upon whose testimony I can entirely rely, told me that he had a ship laden, amongst other things, with hides (and the smell from these is horrible) coming from South America. Part of the crew were living in the close proxi-

Workmen become accustomed to the fumes of chlorine, and are enabled to endure, after long practice, an atmosphere which would once have been unbearable to them.

The captain of the "Beagle," H. M. surveying ship, informs us, that the native Australians about the gulf of Carpentaria have accustomed themselves to drink salt water, almost habitually, as they have rarely any other supply in that arid region, and Livingstone mentions certain African tribes who can only get salt water for a beverage. The native dog has adopted the same habit.

So in like manner negroes and aborigines of various climes live and multiply in an atmosphere sufficiently pestiferous to kill a new comer, or themselves, if they return to it after residence in more salubrious parts.

Some voyagers are enabled to bear the heaving of the sea without nausea, while others can never get over the fearful sickness it produces, however long the voyage is protracted.

mity of this stuff, and their cabins were filled with the effluvia from it. Yellow fever of a severe type broke out on board shortly after they left port; many died, *but all those who slept in the stinking cabins escaped the disease.*

In all the cases we have referred to, the smell produces, in the first instance, nausea, vomiting, anorexia, &c., but in a short time the nose becomes unconscious of the odour, and the system adapts itself to the condition it is placed in. But even here it is to be remarked that if the constitution of an individual is weak when he is first exposed to these nauseous influences, he does not become insensible to the smell, nor is his constitution adapted to the circumstances.

I lately attended the widow of a publican, æt. 40, who had been accustomed to the smell of the bar for upwards of twenty years, and who, during the greater part of that period, was totally insensible to the emanations from the ales and spirits. She became, however, affected with general debility, and ultimately died of pure decline. When her illness commenced, she was so distressingly affected by the odours from the bar, and so much nausea was induced thereby, that she was obliged to leave her business and her house.

The healthy and strong always suffer less than the weak, and are the first to tolerate the motion of the ship.

Some accustom themselves to gorge the stomach to an extent which would kill many, and others subsist on a diet close upon starvation. Most of us, by perseverance, can digest food which was at one time nauseous and repugnant; and I am informed by some patients, who at first have loathed cod-liver oil, or Harrogate water, that they have become insensible to the smell at the end of a week, and then after have enjoyed thoroughly their daily doses.

All medical men are familiar with the "tolerance" shown by most people for large doses of antimony and opium, and some other drugs, provided they are begun in small quantities.

We have all remarked the different sensations we experience when we are dressing in our own bedroom in a morning, and when we enter it again after a few minutes' absence, and how, while smoking, we become insensible to an atmosphere of tobacco which at first almost stifled us.

Mr. Lewes, quoting Claude Bernard, records some interesting experiments illustrating this power of adaptability. The experimenter placed a healthy bird under a bell-glass, and, depriving it of fresh air, noted that it died in three hours. He then took another and placed it under similar circumstances, but took it out at the end of two hours (when its expectation of life was still one hour), and replaced it by another bird—this died instantly. He varied these experiments, but the results were the same; and he thus was able to demonstrate, that if an atmosphere were slowly deteriorated, an individual could be brought to bear a condition of things which would have been absolutely fatal had the introduction to it been sudden.

Still further it is shown, that if the bird be taken out at the end of two hours and allowed to respire pure air, so as

to revive it perfectly, and be then replaced in the atmosphere it has previously vitiated, it will die at once; although it would have lived for an hour if it had not been taken out of the foul atmosphere. Again, one sparrow is confined in a bell-glass for ninety minutes, and then a second is introduced: this dies in ten minutes, the other remaining lively. In another observation it is shown that the slower the deterioration of the atmosphere, the longer it can be borne. Thus one bird confined in a bell-glass lives for three hours, but two birds similarly confined only live one hour and a quarter, instead of an hour and a half. (Physiology of Common Life, vol. i. p. 374.)

In this way we can understand how those going into an unhealthy district are more liable to be affected with its diseases than those who have become acclimatized or were born therein.

The following observation, communicated to me by Mr. Nisbet of Egremont, who was for a long period House Surgeon to the Fever Hospital in Paisley, is of great interest, as illustrating the power of adaptability in the human body. The nurses, he told me, always had an attack of fever when first they came to the hospital, but after that they continued their duties without again being laid up with it; but if from any cause they left the establishment and came back to it again after a long absence, they were as certain to have the fever as any new comer.

As long as they remained in the house, they were, like C. Bernard's bird, breathing an infected atmosphere with impunity; but when, like it, they had escaped from the cage into the fresh air, a return to the wards was fatal.

As a general rule, however, it must be added, that delicate and feeble individuals have not the same "adaptability" as the healthy—the strumous, for example, who work amongst

phosphorous matches, have earies of the lower jaw, while the healthy workpeople escape.

The influence of health upon adaptability is well shown during pregnancy in the female. Some there are who pass through the whole of that trying time without any suffering ; the body adapts itself to the new state of things without any difficulty. But with the majority of townswomen it is not so : they suffer from malaise, sickness, and distressing pains in the back and abdomen ; their system cannot adapt itself to their changed circumstances. Put now, however, these very ladies into a good condition, give them a pure air by removing them to the country, give them rest from fatigue and care, and a good diet ; and we find in the course of a few days, sometimes even in a few hours, that the sickness leaves them, and with it all their pains and aches ; the system can then adapt itself to the growing uterus, with as much ease as it does in a sheep or cow. I have repeatedly seen these effects produced by change of air, but they are unfortunately too often succeeded by a return of the vomiting, &c., as soon as the individual comes again under town influences.

But there are some things to which the system cannot adapt itself. Thus the stomach never becomes tolerant of ipecacuan, belladonna, colchicum, sulphate of copper and zinc, aconite, or arsenic ; some very few tolerate mercury, but the majority, sooner or later, are affected by it ; the same may be said of lead and other poisons.

When we consider the bearing which these facts have upon medicine, we recognise their importance.

We will begin with mercury, respecting which there are plenty of facts at hand. We find that it produces its specific effect more readily in the weak than in the strong ; that weakness promotes the occurrence of salivation ;* that in a

* “ Emetics and blood-letting are useful (in promoting salivation).

strong man the system will adapt itself to, and no visible effect will be produced by, an amount which would cause formidable sloughing in a patient with Bright's disease.*

The same with seasickness—the strong “adapt” themselves to the altered physical condition; the weak cannot: but if by champagne or brandy-and-water they can raise themselves for a time to a high standard, they may “adapt” themselves too.

We have seen that persons may imbibe for a long period the pestiferous air of fever wards, and yet be apparently healthy; but if by any chance their strength is materially reduced, other conditions remaining the same, the adapta-

as they promote absorption. Tartar emetic is the best vomit, since it is the most powerful nauseant.”—*Pereira*, vol. i. page 824.

“Mercury given to sailors upon scanty and salt meat diet produces sloughing ulcers of the gums and cheeks.”—*Dr. Nottingham, Southern Hospital, Liverpool*.

“A lady, æt. 40, had anasarca, and I ordered her one night four grains of blue pill. It produced a most distressing salivation; a physician was called in, and he ordered bichloride of mercury, and the patient died in a very short period.”—*John Cooper, Consulting Surgeon, Liverpool Royal Infirmary*.

* This observation is both interesting and important when taken into connexion with the remarks quoted from C. Bernard, p. 69, as it shows the great difficulties with which the whole subject of “the influence of poisons upon life” is surrounded. C. B. shows that the debility induced by prolonged fasting positively makes an animal less likely to be influenced by woorari poison; yet other experiences show us that debility increases the susceptibility to alcohol, mercury, arsenic, &c. The fasting man is helplessly drunk by a bottle of wine, a quantity which, when taken after dinner, would only make him “jolly;” and Fowler's solution is tolerated easily by a full stomach, when an empty one would reject it with violence. This prevents us from generalizing so much as we might otherwise be induced to do, and demonstrates the necessity for much patient inquiry ere we can classify poisons or drugs; a subject we shall have to revert to hereafter.

bility ceases, and they become infected. Such people may be compared to the opium-eater or tobacco-smoker. They daily take a poison, but the system is inured to it. But it is *inured* to it only because health has insured adaptability ;—diminish the vital power, and the habit is no longer innocuous. In every fever hospital some attendants remain for years exposed to the fever, and never take it, while others succumb at once. The latter are those who are constitutionally weak ; the former are the constitutionally strong.

There is something important to be learned from noticing the effect of tobacco on the same individuals at various times. I have myself some acquaintances who were at one time habitual smokers, and who never experienced the slightest ill effect from it while they were young ; but as age has advanced, and the cares and business of life have diminished their powers of life, they have been compelled to diminish the luxury, and in some instances to abandon it altogether. Some very interesting cases bearing upon this will be found in Ranking's Abstract, vol. i. page 73, quoted from an American author.

Nor is it uninteresting to note the influence of quinine in fever and similar cases. Thus I have known individuals stricken down with typhus—the poison, in ordinary parlance, has taken hold on them ; in more learned terms, we might say the poison has overcome the vital force, and has modified its ordinary manifestations. Quinine in large doses has been given, and in twenty-four hours the fever has gone. Within this period I have seen a thick coat of fur completely removed from the tongue, and headache and prostration pass away. The patient was well. Why ? Because the vital powers had been improved by the medicine, and being thus reinforced, they could adapt themselves

to the presence of the poison beneath which, unaided, they had succumbed. That the poison was not destroyed or eliminated was apparent, because in one instance the patient relapsed, on giving up the quinine and debilitating himself by over-work.

Take again Dr. T. R. H. Thomson's experience in the Niger Expedition, and that of many other African observers. They remarked that quinine was sufficient to ward off malarious fevers. In the expedition first referred to all hands were exposed to the same malaria, and all who did not take quinine in large doses daily suffered from it severely: but Dr. T. took quina daily in five-grain doses and escaped. Why? Because the vital powers were enabled to tolerate the poison. That it was not destroyed was clear; for the Doctor had an attack of ague on his return to England, without any recognisable fresh exposure to malaria.*

Throughout his experience there was no proof that any poison he imbibed was *eliminated*; nor in cases of healthy individuals attending on typhus, erysipelas, puerperal peritonitis, plague, cholera, scarlatina, measles, small-pox, or other diseases of infectious nature, is there the smallest evidence of an elimination of the poison from their system, and yet they escape the disease. Why? Not because they drive out or destroy the poison as rapidly as it enters, but because they have vital power enough to tolerate its presence. A yet more striking exemplification of this toleration or adaptability of the system to a poison, may be seen in those remarkable cases recorded in Williams's "Morbid Poisons," in which mothers have been delivered of infants affected with

* Dr. Clarke, late of Cape Coast, tells me that he has always found that the addition of tincture of sesquichloride of iron greatly augments the value of quinine in malarious districts.

small-pox, themselves being free from any symptom of the disease, although the poison must have pervaded their system.

To these we may add the poison of syphilis. Many an individual becomes impregnated (as is generally believed) with this poison without his system manifesting its presence, by any marked sign, for a period varying from a few days to twenty years; yet when anything occurs to pull down the vital powers, the original taint shows itself unmistakably.

Thus my friend and colleague, Mr. Long, an indefatigable observer and "case recorder," informs me that he has had patients who have been cured of chaneres, in whom no symptom of secondary syphilis has been present until they have been shipwrecked or undergone excessive privation twenty years afterwards. He has had others who have not been aware of the presence of primary or secondary symptoms in their own persons, and in whom the sole suspicious signs have been a slight sealiness in the palms of the hands, so long as they have remained unmarried. No sooner, however, has their constitutional power been lowered from excessive concubial indulgence, than they have not only themselves had general syphilitic eruptions, but have in like manner infected the wife, and subsequently the offspring.

The disease which has been tolerated during high health, flares out during debility. A similar observation is true respecting the ague poison, the paroxysms being occasionally suspended for many years, and coming on again after shipwreck, exposure to privation, or after any exhausting disease.

This being so, it is evident that when we desire to prevent the spread of infection or to cure the victim of it, we must fix our attention on the vital powers, and seek to bring about

tolerance of the poison, rather than bring those powers low by attempts to evacuate the poison by aperients, diuretics, and diaphoretics, under the idea that by that plan we encourage *elimination*.*

* Claude Bernard remarks :—"Not only abstinence but cold and various other causes modify the conditions of life. . . . Under a low temperature cold-blooded animals grow less sensible to the action of certain poisons—a larger dose of strychnia is required to kill a frog in winter than in summer. But chloroform, ether, and mere ordinary inebriation produce similar results, and in America it appears to be generally understood that intoxication is a preservative against the bite of the rattlesnake."—*Medical Times and Gazette*, Feb. 4, 1860. In India, too, it appears that the only way to keep people from dying from the bite of the cobra is to endeavour to keep them alive by such stimulants as brandy and ammonia. We do not doubt the facts, but we do demur to the explanation C. B. offers of them. His argument runs thus, the weaker the animal the less he is influenced by poisons. This arises, first, because the absorbing power is reduced; or, second, because the nervous system is not so sensitive. It is illustrated thus: a dose of strychnia will kill a full dog when it will scarcely influence a fasting one. Brandy affects a typhus patient less than it does a man in health.

We will not say that C. B.'s observations are not correct, but experience has taught us that a bottle of wine will make a fasting man "drunk," a full one only "jolly"—that tobacco-smoking on an empty stomach will produce nausea and prostration, while on a full one it simply produces a pleasant feeling of repose.

The remarks he makes (*Medical Times and Gazette*, February 4, 1860), however, are so important and ingenious that we append them.

"It is," he says, "a well-ascertained fact that medicines do not act on sick people in the same manner as they do on persons in the full enjoyment of health. Now, the biological conditions superinduced by disease evidently lie at the root of these irregularities. To adduce a well-known instance of this, wine, brandy, and ardent spirits, so freely used by certain American physicians in the treatment of low fevers, remain apparently without effect on the patient, even when administered in quantities which in a state of health would inevitably produce intoxication. A two-fold explanation of the fact

The doctrine of *elimination* is, however, so popular and generally received, that it is necessary for us to enter into it fully; we shall best do so by considering the method in

suggests itself: firstly, the process of absorption is almost entirely suspended; secondly, the nervous system is strongly depressed. . . . In cases of typhoid fever the absorbent powers lie dormant for a time, a fact established by the following experiment:—If small quantities of prussiate of potash are dissolved in the patient's drinks, no vestige of this substance is discovered in the urine or in any other secretion.”

We confess ourselves astonished by the foregoing remarks. Ere C. B. is justified in drawing the first conclusion, he must prove that the alcohol and the fluid of the patient's drinks are voided by stool. The fact he mentions respecting the prussiate of potash simply demonstrates either that it is not absorbed, or if absorbed is changed ere it reaches the excreting organs.

For the second conclusion he has warrant, for without stimuli we have seen patients dying, with them they have revived. What then becomes of the doctrine of non-absorption?

We do not deny that absorption is interfered with in the conditions before mentioned, but we do deny that it is almost entirely suspended. Persons dying from hæmorrhage, are kept alive by large doses of brandy and water, but such draughts do not make them “drunk;” that absorption goes on, and very rapidly too, is clear, but the usual results of brandy are not seen, because the amount given is only enough to counterbalance the depressing effects of loss of blood.

So in fever the patient absorbs the stimulant, but it does not produce intoxication, because its stimulating influence is counterbalanced by the depressing influence of the poison.

It is, however, quite true, that there is deficiency of absorption in some cases of disease; thus in acute tetanus immense doses of opium have been given to patients, and subsequently found undissolved (and necessarily unabsorbed) in the stomach and bowels, but such patients do absorb wines and other fluids to a great extent.

This subject is of infinite importance; for if, in consequence of deficient absorption, the physician should increase proportionally the magnitude of his doses, it is clear that the time may come when the

which the known poisons are removed from the body, by inquiring how far this process can be copied, encouraged, or adopted; and, on the other hand, how far it is to be deprecated. We shall positively find, in prosecuting this subject, that it involves the principles of homœopathy and allopathy, and that, under another name, many of our distinguished physicians have been advocating the former, *i. e.* under the idea of imitating nature, they have administered medicines which produce the same effects as the disease; *e. g.* diaphoretics in rheumatism, aperients in cholera and diarrhœa, and rubefacients in measles and irregular gout.

How do the known poisons leave the body when they have been introduced? In answering this question, the first thing that strikes us is, that all poisons do *not* leave the body: some are fugacious, others permanent; and those which are the latter, produce effects precisely analogous to those produced by the former.

Thus syphilis, a force or poison which appears in many instances never to leave the body, and which even descends to the next generation, produces ulceration of the throat, just as scarlatina does, and eruptions of the skin, of a roseolar, papular, vesicular, pustular, or squamous character, just in the same way as erysipelas, measles, chicken-pox, small-pox, or iodide of potassium would. When these phenomena occur in the one case, they are attributed to the simple influence of the poison force modifying the healthy

absorbing power will return, and then the large amount previously given will be taken up into the system, and the patient will be in danger of death from our drugging. It is quite possible to explain in this manner the death of those who, having resisted for a long time (whether from delirium tremens or mania) the influence of gradually increased doses of opium, sleep at last and wake no more.

state ; but when they occur in the other, they are spoken of as *efforts of nature* to remove the poison !

This idea of the effects of a poison being due to an effort of nature, to remove the offending material is one of great antiquity, yet it is not therefore true. It implies that "nature," whatever that may be, *knows* what is, and what is not prejudicial to life and health, and what is the best way to remove it. But if we attribute this amount of knowledge to nature, we ought also to attribute to her the further knowledge whether the thing can be removed. This she clearly does not possess, for she salivates a person equally, whether they have taken mercury or have been bitten by a dog, and gives them a sore throat whether they have syphilis, diphtheria, or scarlatina.

As this style of reasoning is clearly inconclusive, we must seek after some other which will be more tenable.

We have already stated our opinion, that poisons do not operate while they remain within the walls of the blood-vessels ; that the blood acts simply as a common carrier ; and that the poisons operate when they come in contact, or rather mingle, with the solid tissues. (In using this term, I speak of the blood as a "fluid," the parts nourished as "solids.") Now, supposing that the amount of poison introduced into the solids is not sufficiently large to overcome their vitality, there is *à priori* reason to believe that it will be expelled in the same way as the "effete" parts of the natural tissues are. We have strong reasons for the belief that the ordinary course of nutrition is this : the arteries convey renovating blood, consequently the solids in their vicinity are the newest ; as they are gradually pushed forward towards the veins and lymphatics they become "effete," and pass away either as secretions or excretions, or as carbonic acid, fibrin, or other material, into the venous blood, in that to be again

changed in the lungs. But if a poison incapable of change, *e. g.* iodide of potassium or arsenic, be introduced into the blood, circulation through the lungs does not diminish its quantity ; the material, therefore, whatever it may be, passes necessarily through the following course :—it is taken into the blood ; it permeates the solids ; a portion passes away from certain organs with their usual secretions ; the rest reaches the veins, passes through the lungs, and again pursues the old course in the arteries ; another medium is then given off as secretion ; the rest reaches the veins, and so the circuit continues until the whole of the foreign matter is expelled.

This view, though incapable of physical demonstration, may be taken as the basis of our illustrations.

Assuming it to be true, we say that all poisons do not operate in the same way : some never leave the organism, some leave it readily, and others leave it very slowly ; thus we believe that lead, when once it enters the solids, remains in them for an indefinite length of time, just as the “tattoo” marks are permanent on a sailor’s arm under ordinary circumstances ; but even these may be removed by vesication, &c., promoting a rapid *ab intra ad extra* development ; and so may lead be removed by an analogous plan, or by rendering the lead sufficiently fluid to permeate the tissues, and thus to reach secreting surfaces. Other poisons of a very soluble nature, such as iodide of potassium, when once in the solids, exercise a stimulating influence over them ; and while they attract a larger quantity of blood to various parts, they provoke or encourage an unusual amount of secretion, and thus it happens that a great quantity of the poison is removed. A considerable residuum, however, reaches the veins, and ultimately the arteries ; but the blood current is so rapid (the whole

blood traversing the heart, &c., about 300 times a day) that the poison gets soon expelled by the activity of secretion.

In other instances, as in small-pox, the "poison" is not so readily expelled, even though it "stimulates" many organs more actively than does iodide of potassium; and in the present state of our knowledge it is difficult to say whether it is ultimately "eliminated" from or "destroyed in" the system.

We may here, very appropriately, introduce some remarks of Bernard on this point. After speaking of the effects of ligature of the arteries of the kidneys, or the removal of these organs, he remarks:—"What takes place in a case like this? Let us endeavour to explain it. During the first period the urea, which can be no longer eliminated by the kidneys, is expelled by the intestines. It is found together with the salts of ammonia in the animal's excrements, and even in the gastric juice. If this new mode of elimination could be prolonged indefinitely, the animal would not become diseased, it would not die; but very soon the mucous membrane of the intestines, irritated by the constant contact with the ammoniacal salts, gives rise to morbid changes. On the other hand, so long as the urea is eliminated by the intestines, it does not find its way into the blood [does not accumulate there, I presume, is meant]. Now at a later period, when the mucous lining of the intestines refuses to continue this function which is foreign to it, the urea finds its way into the blood [accumulates there?], and the animal soon expires, comatose and convulsed." — *Medical Times and Gazette*, January 21, 1860.

This quotation distinctly shows that the urea and ammoniacal salts act as an irritant to the bowel, and that the irritation will go on to absolute inflammation and total

suspension of function. Can this fairly be called an effort of nature? Before we answer, let us imagine a case. A woman has a stricture in the lower part of the rectum, effectually closing the gut; for a time she does not suffer, because simultancously with the stricture a process of ulceration has taken place between the gut and the upper portion of the vagina, and the fæcal matter passes through this opening; surely no one would designate this as an effort of nature to compensate for the loss of the natural passage.

The phenomcna witnessed in all these cases are the *direct effects* of the poison, and they can never with philological propriety be designated as "efforts of nature;" they are the results of non-vital force modifying vitality, and nothing more. The sequel sometimes leads to the belief that these effects are salutary, and in consequence we find many persons holding as a rule for guidance in all diseases of poison origin—that the excretions are to be cultivated, so that as large an amount of poison shall be taken from the system as is possible.

We do not deny, that by encouraging or forcing secretion, we may in some few instances diminish the amount of poison in the system; but it is very doubtful whether, by the process, the individual is not rendered more susceptible to the amount which remains behind.

It is, however, to be borne in mind, that we cannot diminish the amount of poison present, unless it is of that class which passes readily away from the tissues. No amount of salivation, purging, or sweating will convey from the body the poison of hydrophobia or syphilis; nor can we reasonably expect to get rid of gout by diuretics, of acute rheumatism by diaphoretics, or cholera by purgatives. No

method yet adopted has enabled the system to rid itself of the ague poison, or that which gives rise to dysentery.

In like manner experience has shown us, that we cannot indefinitely force the expulsion of arsenic, opium, or typhus, nor can we in any manner promote the discharge of the small-pox or scarlatina poison: a certain definite time is required for each separate poison, and this we cannot accelerate, unless the substance is very soluble in water.

In the absence then of all proof that we can promote the discharge of an animal miasm from the system, reason would dictate, that we should as far as possible enable the vital power to accommodate itself to the new state of things, *i. e.* to tolerate the presence of the poison.

Practically, this view is taken even by the staunchest supporters of the eliminant theory, and they recognise the importance of supporting the strength.

It is alleged, in answer to the foregoing considerations, that it admits of proof that a certain amount of poison is evolved from certain surfaces during disease, and that the system is relieved thereby.

To support the former statement, scarlatina, typhus, measles, and other diseases are named, in which the secretions contain a sufficient amount of the poison to produce in others a similar disease.

To support the latter, small-pox is pointed to, in which the fever remits when the eruption occurs; and this, it is said, is proof that the poison is eliminated in or with the pustules.

A few considerations show how untenable this argument is. A marsh, like a typhus patient, evolves a poison; but none would speak of this as an active and salutary effort of nature for the health of the ground. We think that a

sufficient distinction has not been drawn between the words evolution or emanation and elimination. The first implies the simple fact of a miasm passing off, and involves no particular theory. The second implies not only that a poison is passing off from the body, but that it is doing so in consequence of a definite process, which is set up with the distinct intention of diminishing the quantity remaining behind.

A single example will make the distinction apparent. A patient has small-pox, and a near approach to him produces the disease in another person. This is held to be a proof of *elimination* by many.

If this were so, however, it is clear that the elimination would cease at death—when nature, exhausted with her efforts, had ceased to work. But it does not so cease—the corpse of a variolous patient being almost as dangerous as it was during life. This being so, we hold that the generation of a poisonous miasm by a human body can only be considered as emanation or evolution, and not as elimination in the sense above indicated.

Ague miasm emanates from a marsh, and a stink from a dead dog, without doing any good to the reeking mass from which they come, or diminishing its amount. In like manner the urethra of man, and the vagina of woman, may evolve a vast amount of gonorrhœal poison, yet as much as ever remains behind. So also, a chancre emits a contagious virus without the smallest benefit to itself; and I have seen a patient with secondary syphilis have a fearful eruption of rupia, which of itself contained a syphilitic virus, without the smallest appreciable diminution of the poison left behind. On the contrary, the sore throat, co-existent with the eruption, became perceptibly worse.

With respect to the value of the argument drawn from

the remission of the fever on the appearance of the eruption, we have to remark—1st. That small-pox is the only eruptive disease in which the phenomenon occurs. 2nd. That the explanation is faulty—(a) because the remission is more or less marked according to the sparseness of the eruption rather than its abundance; (b) that encouraging the eruption aggravates the symptoms; (c) that the fever becomes intensified again at the period of maturation without any proofs of fresh absorption; (d) that there is a total absence of evidence that the body contains a less poison after the eruption than before.

Compare this with the case of rupia above, and the force of this objection will be seen.

Another argument in favour of the doctrine of “elimination” is, that many diseases, *e. g.* measles, gout, &c., are the most dangerous when the eruption on the surface is faint, or recedes after being fairly out on the skin; and that internal diseases, such as jaundice, apoplexy, purgation, dyspepsia, alternate with such cutaneous affections as eczema, or eethyma; and that hæmaturia will follow the application of cold to the skin in scarlatina. But this is a false fact, as any one may ascertain by reading “Currie on Cold Affusion.” In that book he will see that cold to the skin in scarlatina is frequently most beneficial, and this, too, when the fever is at its height!

It is averred that improvement in constitutional symptoms is invariably associated in these cases with a reappearance of the rash; consequently it is argued that revulsives are certain to do good.

To a great extent these statements are correct; but a close examination of details shows that they form no support for the plan of endeavouring to restore elimination—*e. g.* an eruption fades because from some cause or other there is

failure of constitutional power ; consequently, organs which could previously tolerate the presence of the poison can do so no longer. *It is not that more poison is thrown on them ; it is that they have less vital force to resist what is there.* Then, if the eruption is brought out again by the use of general stimulants, the rash reappears, and the internal symptoms diminish from the opposite cause—*i. e.* an increase of propulsive vigour in the heart, and increased tolerance in all organs.

If revulsion is attempted by cutaneous irritants solely, more harm than good ensues.

A close attention to the course of scarlatina will demonstrate—1. That the skin after the occurrence of dropsy is in the same condition as it was before that came on ; 2. That dropsy will come on entirely irrespective of cold to the surface—*i. e.* when children are confined to bed ; 3. That when children are exposed to cold, a very small per-centage only suffer from dropsy ; 4. That swelling of the cervical glands is quite as common a sequel of scarlatina as dropsy. There is no proof of a transference of poison in either one case or another.

But there is yet another argument which remains to be noticed, which is urged strongly by the supporters of the eliminant plan, viz., that fevers and other diseases of poison origin often pass off with some critical discharge. The fact is certain : the explanation, however, is doubtful ; for pneumonia frequently passes off in the same way, and symptoms of grave import pass off in women as soon as the catamenial discharge is established or restored, and in men severe headache and prostration, resembling the incubation of fevers, will instantly disappear when epistaxis occurs. A fit of hysteria often passes away with profuse secretion of peculiar urine, and an ague fit with copious perspiration.

In none of these instances, however, can we say that any poison has been eliminated; consequently, we believe that the occurrences have been contemporary with some vital change whose nature we do not yet fully understand.

In the same light we are bound to consider similar phenomena which occur in fever, &c., unless we can demonstrate that in the critical discharges there is a greater amount of the fever poison than was eliminated before. Thus a typhus patient evolves a certain amount of poison day by day, but gets worse nevertheless; when at his worst, he contains and evolves more than at any subsequent time. He suddenly perspires profusely and is convalescent. Now if that sweat carried away all the poison left behind, there would be in it a far greater amount of infection than ever existed before; whereas we find that such perspiration, if not absolutely innocuous, is less a source of contagion than the previous dry skin.

Nor have we any greater right to say, that a critical discharge of lithates is a proof of the elimination of the gouty poison, inasmuch as a similar discharge occurs in recovery from disease of the liver, from typhus, bronchitis, rheumatism, and many other complaints, and is even common in apparent health.

Taking all these things into consideration, we conclude that the homœopathic treatment of the diseases of poison origin is radically wrong, both in principle and detail; we believe that acute rheumatism is not to be alleviated by increasing the perspiration, nor gout in one foot to be improved by inflaming a second toe; diabetes insipidus is not to be cured by diuretics, diarrhœa or dysentery by purgatives, nor vomiting by emetics; nor if urica produces irritation of the

bowels and purging, do we consider it ought to be encouraged by the use of aperients. In a subsequent chapter it will be shown that *excessive* secretions are evidence of deficient vital force in the various organs producing them.

Nor are we without practical proofs that the treatment founded on the eliminant theory is prejudicial. In days gone by, it is to be hoped for ever, physicians believed that the eruption of small-pox was a proof of the elimination of the poison; and they carried those views out to their natural termination, viz., that the greater the elimination the more probable would be the cure. With this view they encouraged the eruption by warmth, and we believe made many a case of "discrete" prove one of confluent small-pox.

So also in bilious, yellow, or remittent fevers, the existence of a poison was naturally assumed; the bilious discharges were supposed to be proofs of its being eliminated by the liver, &c., and calomel was ordered in heroic doses to promote this discharge. Experience, however, has shown, that quina, which enables the system to tolerate the miasm, does far more good.

In epidemic influenza, a vigorous and unsparing use of stimulants enables the patient to be almost insensible to its influence, while a contrary plan involves too frequently a prolonged recovery, if not a fatal termination.

We see the same principle in every disease of a humoral origin. The victim of gout knows well that it did not attack him in the heyday of his youth, or the prime of his manhood, but when his once vigorous forces were on the wane, and the circulation became languishing with age. It is not the robust who are its martyrs, but the delicate and weakly; and few there are who do not know how much more intractable is the asthenic than the sthenic variety. And what is the

first sign of improvement?—a critical discharge, or a return of constitutional power? The latter undoubtedly.

In the formidable glanders, we find Dr. Williams remarking, “that the recovery of the patient has appeared rather to be owing to the excellency of his constitution, than to any powerful effect produced by general or local treatment.”

Speaking of the plague, the same author says:—“In selecting its victims, this poison follows the law of most other morbid poisons; attacking the poor rather than the rich; women rather than men; patients labouring under disease, rather than healthy individuals; persons constitutionally feeble, rather than the robust; and those who are addicted to intemperance, or other excess, than those who follow more strictly the precepts of Mohammed.”—P. 273.

The influence of this strengthening plan of treatment is particularly evident in the prevention of diseases arising from the paludal poison. In dysentery, for example, it was found that in some malarious districts the mortality amongst the officers was only 2 per cent. per annum, whilst amongst the men it had been 20 per cent.; whereas in other districts the mortality was equal. On tracing out the cause of this, it was found that the mortality in the various stations was diminished in proportion as fresh meat rations were used instead of salt. The rule thus pointed out was adopted; the army, in unhealthy districts, has been put upon a good nutritious diet, and the general mortality from diseases of the stomach and bowels has been reduced from 5 to $\frac{1}{2}$ per cent. When the disease has once fastened on a victim, his chief hope of safety is in migration to some climate where healthy influences will recruit his strength, and enable the nutritive powers to escape from the opposing force of the poison.

Erysipelas forms another illustration of the importance of attending to the constitution, rather than to the miasm. We know that when the erysipelatous poison is rife in any locality, its influence is often resisted until some part is weakened, and when that occurs the effect of the poison is at once apparent. But when the attack has supervened, it may be arrested by artificially strengthening the part by collodion. And when a large surface is affected, we know that the recovery is quick in proportion to the success with which we try to support the constitution, and restore the skin to its normal condition.

We find Claude Bernard ignoring these facts in a curious manner. Thus, he says, "We learn, however, from daily experience, that whatever their general effects may be, the causes of disease are far from acting with equal intensity upon the various individuals who are exposed to their influence. Cold, hunger, thirst, fatigue, and moral suffering, —are not these the constantly recurring causes of sickness? —and are they not, in some measure, the lot of the whole species? How, then, does it occur, amongst those who daily undergo their action, that certain individuals are found to give way while others resist; and when epidemics are raging in given localities, how does it occur that some persons only are affected with the prevailing distemper, while others, who live in constant communication with the victims, escape unharmed? To the mysterious *power* [the italics are our own] which thus modifies in each particular case the influence of external agents, we give the name of idiosyncrasy."—*Medical Times and Gazette*, Feb. 4, 1860.

C. B. here falls into the common error of calling the expression of a fact a *power*. Idiosyncrasy is simply a word expressing the fact that individuals have individuality (*idios* peculiar, *σύν* with, *κρᾶσις* temperament). It is "a term

for peculiarity of constitution or temperament, the disposition or habit of body peculiar to an individual" (*Mayne's Dictionary*), to express the fact that each man is not one of a mass of men as one grain of sand is of a sandhill. The cause of the so-called idiosyncrasy it is left to the reader to infer; and to this cause, as indicated by C. B., we shall have to refer in subsequent notes.

Another consideration still more strongly and practically points to the same conclusion. Patients in small-pox, typhus, erysipelas, gout, acute rheumatism, and other diseases of poison origin, have systematically been bled, purged, sweated, and the like; a certain amount of the poison has thus been removed, but the patients have had their condition fatally deteriorated; while those not so treated recover in large proportion and in a short time. I have myself seen a girl with renal dropsy of eight months' standing, and who had, during that time, been treated with purgatives, improve in every way as soon as the purging was arrested, and a tonic plan adopted in lieu of an eliminant.

Again, it is to be noted, that if a fit of gout is an eliminative effort, we ought to be able to draw the corollary—the longer the fit the more complete the elimination, yet the very contrary is the fact.

Still further, we have tolerably distinct proofs to those who read nature closely, that the average duration of an attack of acute rheumatism is in proportion to the intensity of the inflammation and the activity with which such eliminants are used, as mercury, purgatives, venesection, diaphoretics, &c.

I have long been accustomed to treat this disease with lime-juice and nothing else (save an occasional dose of opium to insure a good night's rest); no perceptible effects are produced by the medicine, nor is there any proof either that

the "poison" is destroyed or eliminated, yet the patients thus treated get well far more rapidly and with fewer accidents than those treated upon the older plans. An instance will be given further on where a man was cured by steel after lime-juice had failed. It checked the perspiration steadily, and the man *pari passu* improved.

Since that occurred I have had a still more striking case. A man, æt. 24, broad-shouldered and strong-looking, but very pale, with a broad tongue and moist skin, came into the Liverpool Royal Infirmary, with acute rheumatic fever, of fourteen days' standing. The heart was unaffected, but the hands were much swollen, very painful, with their joints marked by the usual inflammatory blush. Abundance of lime-juice was ordered, but it did no good. Steel was then *added* to the lime-juice, and a small improvement was perceptible. As the progress towards health did not satisfy me I now added glycerine (whose virtues as a tonic I shall revert to hereafter) to the mixture, and in a few days more the patient was well. Three weeks after his admission the man was strong enough to go about his usual business, and left the house accordingly.*

In all instances we consider it more judicious to counteract the effect of a poison, and to enable the system to tolerate its presence, than to encourage its expulsion by imitating its effect; and we are surprised that a profession so intolerant of the followers of Hahnemann should, for so long a period, have promoted the dogma he sought to establish—*similia similibus curantur*.

We consider that the effects of a poison are due to its force, modifying the healthy natural or vital powers. They

* Since then I have had another case, in which no improvement was apparent until wine was added to the lime-juice.

are, so to speak, passive results, and we cannot see how it is possible for us to believe that they are "efforts of nature," or that health is to be restored by imitating or exaggerating the force which produced the disease ; we may sum up the subject in the following words :—

We hold—

1. That the processes by which poisons are expelled from the body are passive rather than active.

2. That evacuations, emanations, or eliminations are not to be considered as "salutary efforts of nature" to cure, but as symptoms of the normal nutrition being modified by a new force.

3. That it is dangerous in diseases of a humoral origin to act upon an eliminant plan of treatment principally.

4. That the correct plan of treating diseases depending on the presence of poison, is to improve the constitutional power as far as practicable, and thus enable the system in general, or any organ in particular, to resist the action or tolerate the presence of the miasm.

5. That anything which depresses the vital powers makes an individual more susceptible of foreign influences.

The following remarks upon this point by Mr. Hunt* are so apposite to this, that I cannot forbear quoting them—premisng solely that while my opinions have been based on an inductive theory from a few cases, his have been formed from a mass of facts, quite independent of any theory. He writes thus : "It often happens that syphilitic symptoms will yield under a course of mercury up to a certain point ; *the disease will then become stationary, and if the medicine is persevered in the symptoms will become aggravated* [the

* "Hunt on Specific Eruptions," 3rd edition, p. 35. (Richards, 37, Great Queen Street.)

italies are Mr. Hunt's]; sores which were healing will again ulcerate, dissipated eruptions will reappear, and the patient may even fall into a worse condition than before. And yet the disease is as purely syphilitic as ever it was, and as ready to yield to mercury if rightly administered; but the system being for a time deranged by excessive doses, the *vis medicatrix nature* is paralysed for the time, and the disease is triumphant."

It is not simply a pure condition of the blood that is necessary to health; for a man may have the most healthy blood possible, and yet die of cold; while those whose blood is vitiated by tuberculosis, cancer, the paludal or gouty poison, may appear to enjoy perfect health for a lengthened period, if not for the ordinary duration of life. No medicine, therefore, whose sole aim is to purify the blood, and no plan of treatment simply eliminative, can be expected to have more than temporary or accidental success.

There is, however, one plan for the elimination of all poisons with which we feel bound to concur. It is that which places the patient in the midst of pure air and lovely scenery; which takes him from the turmoil and wearing activity of business, and gives him mental repose; which supplies him with nutritious diet and abundance of the finest water; which procures sound rest at night, without any other opiate than healthful exercise; and which does not scour out the bowels by a daily purge.

In this way, we believe, health may be regained, and most poisons be expelled; for there is in every living being a necessity for a constant renovation; old materials are daily being replaced by new; and when the increments are all healthy, and all foreign materials are being expelled, it is a necessary consequence that the body should have as sound a constitution as it is possible to attain.

CHAPTER V.

DURATION OF VITAL FORCE.

What becomes of the vital force at death?—Renewed inquiry into the laws governing its duration—Reasons for believing it a transitory force—Vital force compared to the mainspring of a watch—Comparison between death and a watch stopping—Fast life—Death from mainspring running down; from the machinery going wrong—If death is threatened by injury to any organ, advisable to put that right—Comparison between individual in illness and a trader on the verge of bankruptcy—Bearing of this on practice—Illustrations.

IN our endeavour to gain some insight into the nature of vital force, we must take into consideration what becomes of it at or after death. We have hitherto compared man to some flower which blooms, blossoms, matures, produces seed, and dies; to a fire which continues to burn as long as fuel is given to feed it, but which at last dies out, in spite of all combustibles. At one time we compare him to a watch, which may stop, either because the machinery is disordered, or the mainspring has been broken, or has simply run down. At another time to a peg-top, spun by a schoolboy, whose duration of spinning is modified by the strength of the arm that launched it, by the nature of the ground, and the accidents which befall it. Similar ideas pervade society: in our intercourse with each other we speak of one man being so fragile that a breath almost suffices to kill him; of another

as having an iron constitution, which seems to resist all the accidents of life. One dies from the prick of a needle ; another survives who has a crowbar driven through his brain. All, however, die at last ; and what then becomes of the vital force they possessed ?

Force is, as we have said, as indestructible as matter ; we can neither make nor destroy it ; but as one form of matter may be converted into another, so may one form of force be changed into another. Is vital force so changed ? Does it become converted into chemical or any other force, or is it simply expended, gone, run down ? A question so difficult as this it is impossible to answer categorically ; this, however, we may say, that it is quite consonant with our knowledge to affirm that any part of our bodies may be given up to the laws of chemistry by disease or accident, and yet the individual retain his vital power ; that the whole body is constantly undergoing change : and consequently, that all which our bodies contain to-day will be entirely removed in the course of months or years, without our vital force being destroyed ; and that when death ensues, no change occurs as far as we can tell, beyond what takes place in all animal products when separated from the body. If a limb be amputated, its vitality is soon gone, and then certain chemical changes ensue ; now, as we do not consider here that vital force was simply converted into chemical, so we do not consider, when the whole body dies, that there is simply a conversion of vital into non-vital force.

If not a conversion, there must then, we conclude, be an expenditure of such force as was available ; and death, we infer, is produced by the vital mainspring having snapped asunder, or run down.

This necessarily involves the belief adverted to in an earlier chapter, that vital force is a distinct power, having definite

tendencies dependent on certain conditions, and having a definite duration. To this belief the specific duration of life in each genus irresistibly tends. There is no reason why the life of the silkworm shall not extend beyond a few months, the dog a few years; and if we are to believe oft-told tales, the toad a few centuries; and why one plant shall be annual, another biennial, and another perennial, beyond the will of the Creator. He who gave the power of living, fixed the duration of that power. With all our knowledge, we are not in advance of Solomon in this matter, who said of death—"Then shall the dust return to the earth as it was, and the spirit shall return unto God who gave it." (Ecclesiastes xii. 7.) We do not wish, of course, to enter into theology in this place; but it is advisable to state our belief that there is a very wide distinction between the vital power possessed alike by man and beast, and that higher attribute of man—the soul, which we all believe to be imperishable.

Now, if the vital force under ordinary circumstances must be regarded as one having definite powers and duration, it becomes necessary for us to consider in what way and how far its expenditure may become accelerated, &c.

To return to our comparison of the mainspring: it is clear that a watch will run down, under any circumstances, within a definite period. By the interposition of a balance-wheel of longer or shorter swing, that period may be increased or diminished within certain limits; by disconnecting that wheel, the spring runs down at once. But the watch may be equally stopped by accidents to the machinery preventing the mainspring driving it on, and the future usefulness of the time-piece then depends upon the possibility of the damage being repaired or otherwise.

Such is life: one man husband his strength in every possible way—he lives "slowly;" another goes along at an

ordinary rate ; while a third throws off the balance-wheel, and lives a life so "fast" that it is soon expended. Another, with all his powers of life strong within him, dies from some accident to the vital machine : he dies for want of air, of drink, of food, from loss of blood, from pestilence or poison. Vitality cannot exist without a certain condition of the body and its organs ; life may therefore be prematurely cut short from accidental causes.

The physician turns this knowledge to practical account, by distinguishing, in severe illness, between the tendency to death from one or other of these causes.

If there is a tendency to death from deficient vital force principally, he does everything his knowledge teaches him to keep up those vital powers to the "life point." If, on the other hand, there is danger simply from the requisite machinery going wrong, he tries to set it right. In doing this he often appears to violate the principles we have before laid down. He may take blood, give calomel, antimony, and the like, all of which have a direct tendency to diminish the vital force ; but he uses them for a short time only—and if by the use of them he is enabled to restore the normal condition of any organ, the disease of which threatened to cut short life, they become converted into direct conservators. We may in this respect compare the body to a merchant who has become embarrassed in his circumstances ; he may be so from reckless trading, or from steady loss of capital, or by accidental circumstances, such as a money panic, &c. If from the first cause, bankruptcy is inevitable without fresh funds ; in the last case, there are funds, but these are not available without a sacrifice. To save himself from commercial ruin, the trader sacrifices a portion of his capital, and thereby saves the remainder and his credit. So it is with life.

But—and the qualification is an important one—no trader

would continue to sacrifice capital after his difficulties were over. He would, after that, husband all the resources he had left, and try to augment them.

In like manner, the physician who enjoins the sacrifice of one part of vital capital to save his client from bankruptcy, must ever remember that such sacrifice ought to be arrested at the earliest possible moment ; and that as soon as the desired end is attained, everything must be done to encourage the powers which remain.

One or two illustrations will enable us readily to understand the truth of these propositions. Thus, a man may be suddenly affected with a pneumonia, so intense as to threaten instant dissolution ; or he may have such symptoms as lead us to the belief that he is suffering from congestive apoplexy. In these cases we recognise the fact that the danger of death arises, not from a "running down" of the vital mainspring, but by an injury to the works ; and although we are fully aware that venesection and copious bleeding will reduce the powers, we do not scruple to employ them, under the hope that by reducing the local injury the general danger will be averted.

Again, an individual may be threatened with death by coma, arising from one cause or another : to obviate that, the physician prescribes blisters, local bleeding, &c. ; and if an injury has caused the symptom, the surgeon resorts to operation ; all of these are in themselves prejudicial to vital force, yet, under the circumstances, are the best means for averting death and prolonging life.

Again, it is occasionally though rarely found, that venesection will arrest pulmonary hæmorrhage, and many authorities concur in stating, that hard purging is the best remedy for melæna.

With the same view calomel and antimony have been

administered in fevers and certain inflammations, and in many instances with marked advantage in the early stages ; but the continuance beyond a certain time of these remedies is directly prejudicial, as they tend to deteriorate the reparative forces of the system.*

We shall have to return again to this subject in a subsequent chapter.

* The following remarks made by Dr. Radclyffe Hall, in his Address to the British Medical Association, at Torquay, August 1860, are so apposite, that I feel pride in appending them here. His contrast between "exclusiveness" and "common sense" is a happy one, and fortunate would it be for the profession if every member of it dared to take the latter for their exclusive guide:—"Take, for instance, the fashionable resuscitation of a part of the Brunonian theory now in vogue. All disease is weakness. Granted ; a machine out of order is less strong for its proper work than a machine in order. In every disease the aim must be to restore strength. Granted ; but how ? Oh ! always in the same way, says the exclusive, by strong meat and alcohol. No ! never in the same way, says common-sense, excepting when the influential circumstances are similar. That is the true strengthening plan, and those are the really strengthening remedies, whatever they be, whether brandy and quinine, or cold water and abstinence, by which the machine is quickest restored to order."

CHAPTER VI.

DEFICIENCY OF VITAL FORCE.

How is deficiency of vital power to be recognised?—Debility of an organ produces impairment of function—As each organ has a special function, so debility in any organ has special manifestations—Physiological knowledge must precede medical—Incipient death—Digression upon the phenomena of dying and death—Phenomena attending death of the man—Phenomena attending the death of an isolated portion of the body—Death by hunger and thirst—Sufferings severe—Mortification from various causes—Early symptoms—Deductions—Illustrations.

THE next inquiry we undertake is of considerable importance to the physician, viz., How or by what signs can we recognise deficiency of vital power in the body or any one of its organs? The answer is both simple and complex—simple generically, extremely complex in detail.

As in health there is no disease, so the presence of disease indicates deficient health, and deficient health necessarily implies deterioration of vital power. We answer, therefore, that we can recognise deficient vital force in every disorder of the body.

But such a truism as this is of little service to us; we must therefore expand it and put the same consideration in a different way.

In health every organ of the body has a particular physical

condition and a distinct function to perform, and it does this in a definite manner.

In health every part of the body is undergoing *change*; but new material takes the place of old with such steady regularity, that no alteration whatever is apparent in the shape, colour, consistency, or composition of any part, beyond such as is proper to growth and decay, such as the development of the testes in birds during spring, and their diminution during autumn and winter, and the same in man at puberty, and the development of the uterus and mammae during pregnancy, &c.

In other words, every organ is perpetually renovated during health, and a certain, definite, standard condition is habitually sustained.

But when an individual is out of health, and the vital power is impaired, we cannot expect that the functions will be performed normally, or the renovation keep up to the standard. The departure from the healthy standard may be so small as to be inappreciable, or so great as to be incompatible with life. Between these extremes we have an infinity of degrees.

Shortly, then, we say, deficient vital power manifests itself by *disorder of function* and *altered nutrition* in all our organs.

Theoretically, it is difficult to believe that either of these can exist without the other; practically, however, we recognise the fact, that disorder of function may be far more prominent than alteration of structure; and, on the contrary, that there may be great alteration of structure without marked alteration of function. This last probably arises from that arrangement of Providence which has given to every part of the body a larger amount of material than is absolutely necessary to conserve life. Thus we can do with

one eye if the other be lost, with one ear, one hand, one testis, &c. ; we may even lose one lung, and yet keep in apparent health. So, in like manner, a portion of the liver may be rendered useless by abscess, &c., without the secretion of the bile being materially interfered with ; and an ulcer, or even a cancer, may exist in one portion of the stomach, and yet digestion will go on in the other parts.

Now it must be noted that every part of the body has a structure more or less peculiar to itself, and a function almost absolutely definite ; we must, therefore, necessarily anticipate that disorders, whether of nutrition or of function, in different parts, will have different manifestations. Thus, the eye being a peculiar organ, we shall have changes in it which cannot occur in others, such as cataract, opacity of cornea, &c., and an alteration of function inimitable elsewhere. A diseased eye involves some diminution of visual power—a diseased lung some diminution of respiratory power.

Each organ, then, has diseases peculiar to itself—that is to say, when any organ is diseased, the disease manifests itself by symptoms which can only be produced by that organ.

Whether any organ can be affected without the whole system suffering is another question, as is also whether the system can be affected without every organ being affected too. Theoretically, we are obliged to look upon the body as a whole, but practically we may consider its component parts separately ; just as we can describe either the general features of any country, or the produce of each of its fields.

The division between general diseases, such as fevers, scurvy, and the like, and local diseases, such as pneumonia, has been long recognised.

The former we must for a time pass by, and examine into the latter.

We say that deficient vital power shows itself in any organ by disorder of function or alteration of structure, or both.

Consequently, it is necessary to have a clear and accurate knowledge of the function and healthy physical condition of each organ, before we can thoroughly understand its diseases.

Correct physiological knowledge and accurate pathological information are therefore necessary for the accomplished physician, and a review of the functions of any organ ought always to precede an account of its diseases.

It would swell our subject to an unnecessary length, were we to take for illustration all the organs of the body; we shall therefore confine ourselves to the most important. Our business will be to inquire, 1. How does deficient vital power affect (*a*) the functions of the nervous system—(*b*) the structure of the brain? 2. How does deficient vital power affect the respiratory organs (*a*) functionally—(*b*) organically or structurally? 3. How does deficient vital power affect the heart (*a*) functionally—(*b*) structurally? 4. How does deficient vital power affect the stomach (*a*) functionally—(*b*) structurally? How does deficient vital power affect the muscles? How does deficient vital power affect other organs?

Ere we enter upon these special points, it is desirable to discuss the subject of *incipient death*. It is one of such importance that it would demand a chapter to itself if it were not so entirely digressional.

We must say a few words upon the meaning of the term, "incipient death of a part." It is used to signify a state in which a part is in a dying condition, yet not absolutely dead. A frost-bitten hand is in such a condition,

and a man dying with hunger is the same ; the part is not entirely withdrawn from vital influences in the first case, although it soon may be—and in the second the man, though certainly in a dying state, may be restored to perfect health by appropriate food. So we may consider a portion of the brain as beginning to die, yet being within the influence of the vital powers and capable of restoration.* In fine, we mean by the term that state of things which intervenes between perfect health and absolute death, and which may terminate either in one or the other, according to circumstances. This state may be described in other ways, as by the words, deficiency of vital power, debility, exhaustion, and others allied to them in meaning.

DIGRESSION.

What are the phenomena of dying ? What the phenomena of death ? special reference being made to the four chief organs of the body.

As a general rule, we have failing mental powers : (*a*) weakness simply, *i. e.* diminished power to think ; (*b*) thinking wrongly, or delirium ; (*c*) total loss of all thinking power ; (*d*) disorders of sensations, special and common, *e. g.* ocular spectra, aural delusions, increased sensibility, or com-

* We may take an illustration of our meaning from Kussmaul and Tenner on Convulsions (New Sydenham Society's Translation, chapter v.) It is there shown that certain definite effects follow as soon as the whole flow of blood passing into the brain is arrested. The brain has then, we may say, begun to die—for if the condition were long kept up it would die completely ; but if the blood be again allowed to flow after an interval of less than two minutes, the brain recovers its powers completely. The important bearing of this observation will be seen when we speak of "the threatenings of apoplexy," &c.

plete anæsthesia ; (e) disorders of the muscles, twitching spasm, general convulsions, cramp or paralysis ; (f) disorders of nutrition, vomiting, generation of flatus, black or otherwise depraved bile, stinking urine. All these, and many other symptoms of a similar kind, we attribute to the brain being in a dying condition ; with them is associated diminished respiratory power, the chest is not so fully inflated, nor are the respiratory movements so regular as in health, the blood is not so completely aërated as usual, and as a consequence the body becomes cool, then cold, the lips purple, the face livid ; at the same time, a tolerably copious secretion takes place from the bronchi, which seems to be the analogue of the cold sweat, which is so commonly noticed on the skin ; and this, as a mechanical impediment, prevents still more the access of air to the blood, which is already venous by failure of the power of the respiratory muscles. Simultaneously with this state of things, the heart performs its duties in an irregular and enfeebled manner ; warm blood now no longer courses through the vessels in every part, a cooler fluid is now passing and in a much diminished stream. The distant vessels are barely distended at every pulsation, the radial artery can scarcely be detected, or it is only recognised when the failing heart makes a spasmodic effort to do its duty well ; and with the weak pulsation, there is an irregular or intermittent beat, until at last the heart ceases to propel the blood at all. The stomach during this period, as it is scarcely wanted for the habitual sustentation of life, does not give rise to any peculiar symptom beyond total want of digestive power, and the occasional generation of flatus, or some curious secretion of a deep brown colour, vomiting, &c. &c. All these phenomena continue for a period of greater or less duration, and terminate at last in death. But during the same period another change has been taking

place in the body and all its organs, which consists essentially in a loss of vital power ; that is to say, every part is becoming less and less under the influence of vital or organic force, and more and more under that of inorganic and non-vital force. This may be readily recognised in the secretions of urine and fæces, which decompose rapidly or otherwise according to the nearness of dissolution. Still more clearly may it be recognised in the occurrence of mortification from pressure, or after very trifling violence, as well as in the half-putrid odour which emanates from the body and is perceptible in the breath.

After death has taken place, the ulterior changes depend on the suddenness of the decease and atmospheric condition. When a man has been struck down in the midst of health, we know that vitality lingers in the corpse for a long period : the muscles remain contractile and the brain firm, until the anatomist has time to examine their condition. But if the individual has been dying slowly, vitality departs almost at the moment of death, and the flesh and brain have lost many of their attributes ere their condition can with decency be investigated. On making "post-mortems" in such cases, we find the heart flabby ; the lungs friable, and generally engorged, posteriorly, with blood ; the brain soft, pulpy, or even diffluent ; the stomach distended with gas and fluid, and its mucous membrane excessively soft.

Such being the condition of things immediately after death, is it not a fair deduction to draw that there must have been a somewhat analogous condition shortly before death ensued ? If the brain, the lungs, the heart, the liver, the spleen, &c., of patients who have been long ill, are found habitually, twelve hours after death, to be softer than those who have been killed suddenly in the midst of rude health, every other circumstance being equal, are we not justified in the belief,

that even during life the brain, &c., of the former has less firmness and consistency than that of the latter? And if this deduction be correct, are we not justified in drawing a corollary from it, that *softening of healthy tissue is an indication that it is nearer death than it is in health?* We shall recognise the importance of this corollary when we investigate the subject of Ramollissement of the brain. It is well known that the first sign of failing health in young children is a want of firmness in their muscles, &c.

But there are other phenomena connected with dying upon which we have not touched as yet, *i. e.* the death of some isolated part, the rest of the body remaining entire, or the death of the whole from privation of food and drink.

Respecting the fearful sufferings produced by hunger and thirst, we have many narratives; but each individual dwells so much more upon general suffering than the particular forms it assumes, that there is some difficulty in arriving at certitude. On turning over a book of shipwrecks and disasters at sea, we find the following:—

Captain Bligh, speaking of his crew during their wonderful open-boat voyage, when all were upon a miserably small allowance of food and drink, says—“The general complaints of disease amongst us were giddiness of the head, great weakness of the joints, and violent constipation, which in some had continued for thirty days. I had constantly a severe *pain* in my stomach.” Later on he speaks of extreme weakness, swelled legs, with debility of understanding; and when at last relieved, he writes, “Our bodies are skin and bone, our limbs full of sores.” In the account of the loss of the “Pandora,” we read of “pareling thirst producing excruciating *tortures*, and one man went mad and died. Old people suffered more than young.” In a similar account of the wreck of the “Juno,” the reporter says, “Though my sensa-

tions, particularly of thirst, were exquisitely *painful*, they were not so violent as what I had read of in similar cases. Two persons died of want ; one went off suddenly, the other languished for some hours *in great agony*, having been seized with violent *retchings* and *convulsions*." The captain became delirious. The reporter refrained from drinking salt water, until he was unable to endure the parching *heat* of his stomach and bowels ; he then drank two quarts, and was revived both in strength and spirit.* He slept soundly, but was subsequently purged and griped. Many of his com-

* We have before stated that the natives about the gulf of Carpentaria are commonly obliged to use salt water largely, for want of fresh, and that they do so with apparent impunity. We have often been struck by the frequency with which we read in fearful shipwrecks of madness coming on after drinking salt water, or eating the flesh of some poor comrade. The idea writers wish to convey is clearly this, that the madness depends upon, or is accelerated by, indulgence in the terrible luxuries before referred to. But this is clearly wrong. The cannibals who eat human flesh habitually, experience no harm from it ; nor when, as a boy, I was compelled, with the rest of our family on our annual visit to the sea-coast, to drink a large amount of salt water daily, can I remember that it had any perceptible effect beyond acting as an aperient the first day.

It is still further to be noted that many poor fellows die mad during privation, even though they never take human food or drink salt water.

Putting all these considerations together, we conclude, that where delirium and death ensue after these things have been taken, it is because the individuals have suffered more intensely than their neighbours from the result of privation, or else they would not have adopted the loathsome food the rest abstained from. They do not die from the diet, but from the terrible famine which compelled them to adopt it. The delirium, &c., thus becomes a simple coincidence, not an effect.

That this conclusion is true, we may infer from the fact that this same diet does in reality serve to save the lives of many sufferers, and that an abstinence from it does not prevent others from dying "raging mad."

panions subsequently died delirious—one broke out in ulcers. His sensation of hunger became lost in weakness. Some struggled hard and died in great agony, but it was not always those whose strength was most impaired that died the easiest, though in some cases it might be so.

Another writer, reporting an escape from a burning ship, says—"We were never hungry, though our thirst was extreme. On the seventh day our throats and tongues were swelled to such a degree that we conveyed our meaning by signs. Sixteen died on that day, and almost the whole people became silly and began to die laughing. Twenty persons died the next day, all mad." He was the sole survivor on the ninth day, when he reached land.

In another tale of hardship we read, "Want of water made them suffer severely; the glands of their throats and mouths were swollen, the torments of thirst became dreadful, and their faculties were impaired in such a manner that they could hardly hear or see. Some were blind and nearly reduced to idiocy."

In almost all accounts of shipwrecks, there are notices of many of the crews, &c., dying lunatic; while others, like poor Captain Gardiner, famishing at Patagonia, retained their senses to the last.

Longet (quoted by Lewes in *Hunger and Thirst*. *Blackwood*, January, 1858) remarks, "The bodies of those who have perished by thirst show a general dryness of the tissues, a thickening of the humours, a certain degree of coagulation of the blood, and numberless indications of *inflammation* and sometimes of gangrene of the principal viscera."

In the same paper from which I have extracted the above, it is remarked that hunger, after a time, produces positive

pain in the stomach, which speedily becomes acute, the sensation being as if that organ were being torn with pincers; a state, he adds, of general exhaustion, feverishness, headache, light-headedness, often flaming into madness, follows, &c. &c. It has been ascertained, that in fasting horses, the blood contains nearly double its ordinary quantity of fibrin. The same author subsequently remarks that the observation seems to me to be one of extreme practical importance, "Tobacco, opium, and even inorganic substances, introduced into the stomach, will remove the sensation of hunger"—a fact the full significance of which we shall advert to hereafter.

The symptoms of scurvy, the swelled gums, racking cramps, ecchymoses, diarrhœa, debility, ulcerations, are too well known to need prolonged notice.

The following description of the effects of defective nutrition is extracted from Dr. Williams's Principles of Medicine:—"In the extreme case of absolute privation of food, the cravings of hunger alternate with nausea and a sense of sinking; then follow extreme depression, transient fever, delirium, general disorder, both of body and mind, increased feebleness, and an inability to maintain animal heat. It is a curious fact, that in this stage the stomach becomes *inflamed*. Even in the slightest degrees of abstinence, enjoined by the physician in the treatment of disease, symptoms of vascular and nervous irritation often arise in the midst of general weakness. Deficiency of food causes waste of all the tissues, but least of those of the nervous system. The blood becomes thin and easily extravasated, the gums spongy and bleeding, the legs become œdematous, diarrhœa often occurs, ulcers appear in the cornea, there is a fetid breath, and a fetid effluvia exhales from the body. The lowered vitality of

the tissues renders them little able to resist the tendency to decomposition, and hence there is ready decay and interstitial absorption."

There is another sensation to which we must allude, which, in many instances, appears to be the precursor of pain, and often runs into it if the cause be prolonged, viz. *heat*.

We can experience this for ourselves if we hold one of our hands high above the head for a long period, so as to blanch it completely; when thus deprived of blood, it begins to feel hot to our ideas; and a sensation of coolness is produced by a return of the blood.

In a limb whose main artery has been tied, a sensation of heat precedes the pain of approaching gangrene.

The sensation of heat is fallacious, for it is accompanied usually by an actual diminution of temperature.

I have elsewhere called attention to the fact, that the pain complained of by those who are suffering from prolonged stretching of a fibrous tissue is generally described as *hot* or *burning*.

This is conspicuously the case in death by cholera, in which complaints of intolerable heat are very common, and demands for ice and cold water urgent, even though the body is as cold as in death, and the breath is like the chill current from a freshly-opened vault.*

* Though not strictly *à propos* to the subject, I will record here one of the most curious cases I have happened to see:—H. C., æt. 48, a stout, well-to-do publican, and not addicted to intemperance, got into some personal trouble, and became the defendant in a court of law,—the suit ending in his having to pay somewhat heavy damages. This had a very depressing effect on his mind, and he gradually lost all appetite, all interest in his business, and, as his wife said, all heart. A medical man was now consulted, who treated him with tonics, &c.,

I have known similar phenomena in death from consumption and other exhausting diseases: and when all healthy bystanders have been shivering in the icy blasts of a Pro-

yet still the man continued to sink, and at the end of three months was entirely confined to bed. I was now called in consultation, and I found him abundantly covered with fat, but pale as white wax, and almost as cold as marble, though there was a fire in the room and the weather was warm. I could detect no disease in any organ, and the functions seemed to be carried on satisfactorily. He was quite sensible, but it seemed as if his brain was a long way from his ears and tongue,—a considerable interval always elapsing between a question and his answer. The breath was not at this time cold. The heart's action was somewhat feeble, but the pulse was fair and 100 in the minute. The appetite and digestion seemed to be good, and he was living chiefly upon milk. Everything was now ordered to be given to him hot, and abundance of alcohol was prescribed. In three days, however, the man was colder than ever, and every breath he expired was cold and uncomfortable as a mountain-mist, and it was clear that the strength was fast departing. Nevertheless, we were shown an enormous fecal evacuation which the man had passed sitting on the night-stool, all the time without any semblance of fainting. The motion was a healthy-looking one. On the next day the man was warmer and the pulse was fuller, but he was evidently worse in other respects. The day after, his whole body was very warm and of a redder tint, and the pulse still felt full; indeed, if it had not been evident that the patient was dying, it might have been thought that fever was present. He was, however, still sensible, though very dull. The heat continued on the increase until night, when he ceased to breathe.

The only death which at all resembles this that I ever witnessed was that of the gentleman whose case is given at page 54. In him there was the same apparent distance between the brain and the ear and tongue; the same diminution of animal heat; in both there was no difference between the pulse in the recumbent and semi-erect posture; and in both the last was the position chosen,—the difference was, that one died slowly at the end of about thirteen weeks, the other in twenty-four hours; the latter died cold, the former died hot.

On examining into the literature of the subject and making inquiries from friends, I find that it is not uncommon for cholera patients who

vençal mistral in spite of their warmest wraps, I have seen a lady, apparently dying with phthisis, beg for abundance of air to cool her heated blood, her skin at the time being as cold as the air.

This sensation of heat is not always general ; it may be local. What, for example, is more common than for weakly and delicate females or men, to complain of flushings of heat in the face, head, or palms of the hands, although the thermometer shows that the actual temperature is lower than usual ?

As far as my observation goes, this symptom is so characteristic of debility that its occurrence at once leads me to the investigation of the cause of weakness.

The sensation is quite distinct from "rushings of blood," as a sudden local distension of the vessels in any one part is called.

From the preceding observations it will be apparent that in a great number of instances the gradual death of the individual is a very *painful* process. The amount of suffering

have been cold as marble, to become warm, and sometimes even hot, before their death, and this not from the secondary fever. Mr. Lewes says ("Physiology of Common Life," p. 444), "Dr. Livingstone mentions a case which came under his own eye, of a Portuguese lady who died of fever at 3 o'clock in the morning of the 26th of April. The heat of the body continued unabated till six, when I was called in, and I found her bosom as warm as ever I did in a living case of fever. This continued for three hours more." "Mr. George Redford informed me of a case which he had under his own eye ; a soldier given to drink died, and next day the body was still warm. Dr. Dowler, of New Orleans, has observed that in many cases the temperature *rises* after death ; thus, where the highest temperature during life was 104° under the arm-pit, it rose to 109° in ten minutes after death, and fifteen minutes afterwards it was 113° in an incision in the thigh, and in one hundred minutes it was 109° in the heart. Three hours after all the viscera had been removed, an incision in the thigh showed the temperature to be 110°."

and the symptoms generally are by no means perfectly uniform, yet in all there are sensations spoken of as pangs, and torments, or tortures—words only used to betoken an extremity of distress. We next inquire whether the process of dying in an isolated spot, the rest of the body remaining comparatively sound, is as painful as death by hunger, *i. e.* whether the death of a part is similar to the death of the whole body.

By the words “process of dying,” we wish to describe that state of things which immediately precedes absolute death—the intermediate condition between the period when a part is living and in health, and when it is dead and a foreign body, and which we have before spoken of as incipient death.

Under what circumstances is any isolated portion of the body destroyed? We will enumerate a few.

It may be destroyed by direct pressure, whether acting gradually, as by the pad of a tourniquet, or suddenly, as in severe contusion, or by the influence of intense or prolonged heat or cold; by chemical agents, acting as caustics; by sudden and excessive stretching, incision, or laceration. It may be destroyed as a result of such natural processes as inflammation, &c., or it may be destroyed simply by want of blood.

If we specially inquire into the sensations complained of by individuals suffering under any of these causes, we are struck with the fact, that almost all complain of *pain* of one kind or another. The patient who has a pad applied to an artery for the cure of aneurism, soon finds the pressure so intolerably painful, that he cannot bear its continuance; and should any one with Stoic firmness endure the agony beyond a certain period, the pain will cease, for the part affected has mortified. Another, who from constant pressure upon the

sacrum has a bed-sore, experiences little pain, perhaps, yet he has, as Druitt remarks, "a sense of pricking, as if there were crumbs of salt in the bed." With the severe pain attending sudden contusion all are more or less familiar. Of the pain and even agony of stretching the fibrous tissues suddenly we have ample evidence. Many are personally acquainted with the acute suffering produced by a sprained or even a twisted ankle, involving, as it does, a sudden stretching, both of skin and tendon, sometimes even so bad as to produce actual death in either one or both structures.

The description given us of the "rack" as an instrument of torture, and the still more terrible torture of strappado, indicate the same facts. In the former the victim was tied by the wrists and ankles to two windlasses, fixed in a strong frame, and the ropes were tightened by the use of long capstan bars, the effect being to stretch all the joints of the limbs with terrific force. In strappado the individual had his hands tied behind him, and a hook being inserted between the cords, he was raised to a considerable height, and heavy weights attached to his feet; severe as was the strain upon the strong ligament of the shoulder-joint thus produced, it was scarcely cruel enough for the purpose. The torture was therefore increased in intensity, by allowing the victim to drop through some space, and then arresting suddenly his descent; and the agony of this is spoken of as being fearful.

The pain produced by heat is well known, and many are cognisant of all the grades of suffering, from that which may be called temporary roasting—that is, holding the hand for a short period over a candle or close to a hot fire—to actual scalding, scorching, and destruction; and we may note, that the pain is proportionate to the incompleteness of the death of the part. Thus, the pain from a scald exceeds that from

a red hot iron, and that again the pain arising from white hot iron or molten lead ; the pain ceases when the destruction is complete.

The same may be said of cold : we can all of us probably remember the time when the painful coldness of our hands forced unwilling tears from our eyes ; we are often reminded of the fact, during cold winters, by seeing the suffering of the poor in our streets, and remembering the penance we endure when driving in an open vehicle against a cutting north-east wind.

Our reading has made us familiar with the pains of frost-bite, and we may have occasionally wondered how it was that when a part had become almost absolutely dead, that the individual was unconscious of the fact, and why there was then no pain felt. All of us, too, are probably acquainted with the hot-ache ; the pain, that is, which accompanies the return of circulation through the benumbed part, and may have speculated upon its cause.

If we examine the effects of caustics, we see essentially the same phenomena : a pain is produced by their use which continues with increasing severity until the part affected is absolutely dead, after which all pain ceases.

The same may be said of mortification, arising from other causes. In all, sensations of heat, pricking, or tingling pains are complained of, in varying intensity, and they continue from the period of incipient death up to the moment of absolute mortification.

These considerations suggest to us the very important deductions, that *pain is in very many instances due to a condition of a part which can only be considered as one of incipient death, and that debility promotes sensibility.*

This last deduction is amply borne out by experience. It tells us that the weakly suffer far more severely from pain than

the strong ; that a carious tooth will be borne without discomfort while an individual is in health, but that it will be the seat of pain when debility is present, and it will become painless once again under the influence of tonic medicines, &c. It tells us that abundance of alcohol or chloroform will diminish the sense of suffering. "They have beaten me, but I felt it not," are the words Solomon puts into the mouth of the man overcome by drink. We know that "tie" is more common in the delicate than in the strong ; that it is best cured by tonics ; and a prolonged observation of myalgia has convinced me that the pain and soreness arising from muscular exertion carried beyond the patient's power is intense or otherwise according to the debility or strength of the sufferer. The ache which is produced in a strong man by such exertion will pass away in a day or two ; whereas, in another reduced by weakness, the same exertion will produce severe and long-continued suffering.

The following case illustrates this :—Mary S., æt. 20, a delicate girl, a housemaid, never eating flesh meat, and one who had recently grown very tall, complained one morning of most exquisite pain in the lower part of the abdomen. The slightest touch was agonizing ; she lay in bed with the thighs semiflexed, and she dare not move them. The other symptoms were insignificant. My informant was much puzzled with the case ; for though he felt sure that the pain was myalgia, there was nothing to account for it. After the girl had been upwards of a week in bed, he heard accidentally that, being out beyond her time, she had run about two or three miles home on the evening prior to her attack, and that the pain began after she had been sitting down a few minutes.

It is tolerably certain that such a run would not affect strong men or women in this severe manner, and it is a fair

inference to draw that the pain was severe in her case because she was weak.

In the same way, we may remark, that after "flooding" in women, all forms of sensibility are aggravated until they become painful; the eye is *pained* by light, the ear by sounds, the nose by odours, and a touch on the skin is equal to a galvanic shock.

It is, however, here to be remarked, these results do not always attend impaired vitality; consequently, although it is true to say that "*debility exalts sensibility*," it is not right to say that it does so *invariably*.

Some experiences lead us to believe that impaired vitality may absolutely deaden sensibility. Thus, I remember an instance in which a man had both legs taken off by a railway engine; he was not brought into hospital till six hours had passed, and was then in a state of comparative collapse. No one can doubt that his vital power must have been very low at the time, yet when amputation was performed by the surgeon, the man was totally insensible to pain. He was perfectly conscious, though he seemed somnolent. Next day he remembered all about the operation, and said that it did not hurt him at all; in fact, from the time of the accident, which proved a "stunlike" feeling, until the next morning, he seemed to have lost all common sensation.

Again, we know that under the influence of intense terror, during delirium tremens, mania, and other forms of insanity, when the vital powers are very low, there is occasionally an absolute immunity from suffering, even though injuries are inflicted such as would produce intense pain in healthy people. Thus I have known a man escaping from a burning sugar-house, come "hand over hand" down a steam-pipe to the ground, quite unconscious of the scalding pain. We

have read of Dr. Livingstone, when shaken by the lion, being conscious of events, yet insensible of suffering ; and we cannot fail to recall to our memories, instances of conflagration, slaughter, and siege, in which wretched beings half dead with fright have been totally insensible to the most serious injuries.

We know, too, that impaired vitality will influence *special*, much in the same way as *ordinary*, sensation ; and that while one person, from flooding, has the eye, the ear, and the nose painfully sensitive, another from the same cause may have amaurosis, deafness, and loss of smell.

A very natural inquiry here suggests itself, viz., How is it that impaired vitality in one instance gives rise to pain, at another to increased secretion ? A man dying of consumption does not theoretically differ from another dying of hunger ; yet one perspires profusely, and though eating nothing experiences none of the pangs of starvation, or the pain of approaching mortification, while the other, dying far more rapidly, experiences agonizing pains and has no perspiration. Practically, then, there is a great difference between them. How can it be accounted for ? At first sight we are disposed to say, "The more slowly vitality departs the less is the amount of pain ;" in other words, "The ruder the severance between life and the body, the more severe the suffering ;" but a second glance at the subject shows this idea to be untenable, for a white hot iron used in cautery is less painful than the scalding of boiling water, and the sudden eraunch of a railway engine amputates with less pain than the more slowly-acting knife of the surgeon.

We are then obliged to conclude what experience abundantly confirms, that the vital power of every man and its manifestations are peculiar to himself. Some things he may have in common with all the human race ; others are as

personal to the individual as are his mind, memory, and consciousness ; consequently, that each individual ought to be separately studied, when as a result of defective health he falls into the doctor's hands.

Our next inquiry is into the part the nervous system plays in the phenomena we have referred to. Is the exalted sensibility due to the impressions made upon the sentient extremities of the nerves being more profound than usual ? or are they more susceptible of receiving impressions ? or does the brain interpret to the mind *as a pain*, an impression that it was not cognizant of before as such ? In other words, is the cause of the pain in the active brain, or in the passive nerve ? (I call the nerve *passive*, because it simply transmits an impression, which is not a *sensation* until recognised by the mind.)

The answer to this is perplexing in the extreme, for when we look around us for instances in which the greatest amount of pain is experienced, we naturally revert to the days when "torture" was frequently resorted to, and we find that the most severe ones implied a forcible stretching and disruption of white fibrous tissues. A small experiment, now, will convince any one of the excessive pain produced by stretching the popliteal fascia. Experience in myalgia and spinal irritation shows that the most common seat of pain is the spot where tendon is inserted into bone, or where the muscle is tendinous. The observation of surgeons must have demonstrated to them that the ligature of the arterics, after amputation, is extremely painful to the patient. The accoucheur knows how intense is the suffering produced in the sacrosciatic ligaments during parturition, and there are few who do not practically know the pain attending a sprain. Yet, although so much agony is produced by stretching white fibrous tissues and tying arterics, *we cannot demon-*

strate the presence of nerves in them! That we may infer they exist I grant at once; but *inference* is not *proof* of a fact; and further consideration will even shake the value of the inference. Let us take a tooth for a text. Microscopic physiologists justly rejoice in being able to show the termination of nerves on the pulp membrane, and to prove that no nerves exist in the "dentine" or "cement" of teeth; yet, under certain circumstances, both these parts are exquisitely sensitive, *i. e.* we refer the sensation of pain to a part absolutely devoid of nerves!

To this it is answered that the pain ceases if the nerve be destroyed. Unquestionably; for if there be no communication with the brain, the latter gets no impression to interpret as pain or otherwise.

Even here, however, there is some difficulty, as our next observation will show:—

A man, whose case I reported in the *British and Medical Journal*, had anæsthesia as far as the waist; he had so little common sensation, that he could not find anything in his pocket; he was insensible to the calls of nature, and only micturated, &c., according to rule, assisting to empty the bladder by his hand; yet, when its mucous membrane became inflamed (apparently under the influence of 1-12th grain dose of bichloride of mercury three times a day), the organ was the seat of the most terrible suffering; yet a post-mortem revealed a softening of the cord, as high up as the middle dorsal vertebra. What, then, conveyed the idea of pain?

Again, cancerous formations, which the microscope proves to be new growths, and in which no one can demonstrate, or even infer, the presence of newly-developed nerves, are, though often insensible to touch, the seats of severe and peculiar pain. It is to be noted, too, that no nerves can be

demonstrated in the cartilages covering the various joints, yet ulceration and other change in them is accompanied by "racking pain" in many instances.

There are not more sentient nerves in a muscle at one time than another, yet common contraction is not productive of any sensation, while cramp is often attended with acute suffering. Whence is this? Surely it cannot be that the nerve is more compressed or otherwise injured at one time than another, for there is practically no physical difference between spasmodic and natural contraction. May we not infer that there is a different vital condition in the muscle at one time and another, and corroborate the idea by reference to the fact, that cramp rarely comes on until the muscle has been greatly reduced in organic power by excessive use or other cause?

Still further, tendons and bones are, during health, absolutely insensible to such physical injury, as cutting, and appear destitute of sentient nerves, yet, when they are inflamed, they become acutely tender and painful. No one would affirm that inflammation develops nerves. Must we not infer then that it exalts sensibility, by bringing the parts near to death? These and other considerations lead us to the conclusion that pain in the parts we have named is due to their organic condition, and not exclusively, to some alteration in their nerves; nor can we think otherwise, if we regard the nerves as simple messengers, or transmitters, not originators, of "influences" or "impressions."

This idea receives corroboration from the effects of local agencies upon local sensations. Thus certain applications to a bad tooth will cure toothache, though the nerve is never touched, and we cannot believe that creosote will soak through the dentine, &c., to reach the pulp; heat will relieve the pain of rheumatism, pressure the pain of myalgia,

cancer, orchitis, &c. ; strapping relieves the pain of a sprain, and the agony of the rack ceased when the strain was relieved. This condition of the part must be considered as totally distinct from the state of the central organ, the brain.

This view seems to me to be important, for at the present day there is, amongst pathologists, a very strong disposition to put everything down to some particular organ, and to ignore the body as a whole. One sees in every disease something wrong in the blood, and if this can be purified everything is to go right ! In their eyes medicines seem to act as scavengers, emptying from the circulating mass extraneous filth, or as artificial filters, which shall cleanse the fluid from impurities. Another sees in all diseases nothing more than nerve disorder : languor, syncope, sleeplessness, somnolence, indigestion, vomiting, and jaundice, constipation and diarrhœa, menorrhagia and amenorrhœa ; profuse perspiration and excessive urination are explained by "neurolysis ;" and if a person is simply sore from riding, or a horse is stiff from a day's hunting, it is said that he is suffering from "nerve debility ;" others take the stomach under their protection, and attribute "every ill that flesh is heir to" to dyspepsia and errors in diet.

Such doctrines stunt the mental growth, and prevent comprehensive views of medicine.

It stands to reason that if any part is under the influence of impaired vitality others will be so too ; the same agency (unless purely local) that debilitates the nervous system debilitates in like manner the respiratory, circulatory, digestive, and other systems. Dyspepsia implies debility of the stomach, incapacity to discharge its functions healthily, and with that there will be impaired vital force in all other organs. Each organ presents its own peculiar symptoms,

and those, *plus* the indigestion, may have a common cause.

We may illustrate our meaning by an example : We see a man with a threadbare coat—its cut is faultless, and his manners those of a gentleman. From those two points we can draw a very fair deduction as to the state of his shirt, socks, shoes, and waistcoat ; we can sketch the condition of his lodgings, his purse, and his previous station ; but who would think of attributing the state of his hat to the darnings of his stockings, or the state of his purse to the holes in his boots ? We say that the condition of the whole of his wardrobe, including the coat, is due to diminished power of the purse ; and if we wish to cure the complaint we must ascertain as far as we can, upon what *that* depends, and how it is to be counteracted.

The function of the sentient nerves is to transmit impressions ; the active mind recognises them as sensations. Does it ever interpret them wrong ? If so, in what manner ? The answer, to a certain extent, is easy. For some individuals have what are called “delusions,” and hear or see things which have no existence ; and they may equally receive false impressions from things actually present to their senses. In typhus and many fevers similar events occur, and many a patient carries with him to his grave doubts as to the reality, or otherwise, of his feverish dreams. When the brain is overpowered by chloroform, alcohol, or opium, similar occurrences happen—a physical injury is inflicted, the patient’s actions show that the usual impression is sent to the brain, but it is not interpreted into a sensation—nothing is *felt*. The brain then (or the mind) can ignore a sensation ; can it, on the other hand, aggravate an impression (so to speak), or create a pain ?

Many physicians have answered this question in the

affirmative, and given what they call hysterical pain as an example. There is room, however, for very grave doubts upon this question. The idea of a person creating a pain by an effort of the mind,* seems to me as preposterous as the idea of a deaf and dumb man enjoying music by the strength or *weakness* of his will (and it is chiefly in *weak* women that pains are supposed to be created). I can only say, that I have made long and persevering attempts to bring a pain into my great toe by mental efforts, and when, from a tight boot and long walking, a pain has been present, I have made equal exertions to believe it was not there. By intensely occupying the mind on other subjects I can ignore the suffering for a time, but no such mental work will produce it.

We conceive, then, that there is evidence to show that pain attending an impairment of vitality is due to an alteration in the organic condition of the body and its various parts. That the idea of pain is due to the impression transmitted rather than to the condition of the recipient brain, and that the sensation of pain may be prevented, 1. by altering the vital condition of the part; 2. by preventing impressions being transmitted from it; 3. by making the mind insensible to those impressions.

Let us see how these conclusions square with facts, and how far they elucidate the influence of medicines. An individual is dying from hunger or loss of blood,—what most effectually relieves his pains (not including food and drink)? Opium. Another individual in a very debilitated condition has tic-doloureux, or myalgia, diseased cartilage, toothache, or other severe pain—what relieves it most? Opium.

But, if we could, we would give the hungry man food and drink, well knowing that it would relieve his pains,—if,

* For further observations on this subject, see the Author's treatise on "Myalgia," pp. 148 and 244.

then, the other pains we have referred to have anything in common with his, should we not give their victims plenty of good food too, whether we give them opium or not ?

The question naturally suggests itself, how does opium act ?—Does it simply stupify the mind, or does it alter the local condition on which the pain depends ? There is strong reason to believe that the drug operates in both ways at different times. Thus opium will so modify the condition of the brain that a patient may sleep and be unconscious of suffering, or conscious of a *sensation* which is not *pain* until the mind awakes ; on the other hand, it diminishes or suspends the idea of pain, while the brain may, nevertheless, be unclouded and active ; and the pain may, in some instances, be relieved by the local use of the remedy.

In these instances it can only modify the pain by its operation on the organic condition of the suffering part. Opium locally applied will not, however, relieve the pain arising from the use of potassa fusa, or other caustic, *i. e.* when the part is irremediably dying ; consequently, we believe that for it to operate beneficially it must modify the vital or organic condition of the pained part.

If this be so, it follows that it is a matter of indifference whether opium (or its salts) reach a part through the blood or by a more direct channel. Experience endorses this view.

We conclude, then, that where impending destruction of tissue is certain, opium will only relieve the pain when given in sufficient quantity to stupify the brain ; but where the destruction of tissue is only contingent, opium will relieve the pain, whether locally or generally applied, and more when both plans are combined than when used separately. We should be glad to refer here to the influence of opium in senile gangrene, but we have not a

sufficient amount of personal experience to speak of it at length.

The only experiments I know to have been made upon this point are some by Müller, who ascertained that the local use of opium paralysed the action of the nerves at the part to which it was applied, and that portions of the body saturated, so to speak, with that drug, seemed for a time to be incapable of being the seat of sensation ; but his experiments are not conclusive upon the point whether the drug operates upon the nervous system alone, or upon the parts generally.

Experiments upon vegetables, in whom sensation is impossible, lead us to infer that opium may operate upon the tissues quite independently of the nerves. The sensitive plant, the "*dionœa museipula*," and others which are "irritable," have that peculiarity temporarily destroyed by opium : they have no nervous system ; the sensibility, such as it is, must, therefore, be suspended by some other than simple nervous influence.

We hold, then, that opium locally applied for the relief of pain in man does not necessarily act through the nerves alone, but by modifying the general vital or organic condition in the seat of suffering.

Similar remarks apply to chloroform ; for it has been ascertained by experiment that the vapour of chloroform locally applied for a considerable period will so modify the condition of a part as to deaden its sensibility, and in some few instances the inhalation of the drug has produced such a change in the system, that sensibility has been deadened without the mind being stupified ; the individuals operated on are as conscious of being cut, as we should be if a tight-fitting glove were torn on our hands,—an impression is received by the mind, but no idea of pain is transmitted, or if transmitted is recognised as such.

Belladonna is a somewhat analogous drug, but it seems to be more efficacious in changing the condition of the part on which the pain depends, when used locally, than when used generally. Its physical influence on the iris we can see ; if pain were a thing we could measure, as we can the dilatation of the pupil, our knowledge of it would be far more precise.

Aconite and some other drugs act in a similar way.

Next to opium and narcotics, the most trustworthy agents for relieving pains associated with impairment of vital power, are glycerine, quinine, and steel. Under the influence of these, toothache, tic, and myalgia are rapidly cured. Thus one patient came to me suffering from severe toothache, which she had had for many days ; all the teeth were extensively decayed and all equally tender ; quinine in large doses was prescribed, and in thirty-six hours the pain had ceased entirely. Another had tic, and it was suspected to arise from a bad tooth, but nothing wrong could be seen, and the patient refused to have any extracted ; full doses of steel repeatedly cured the pain, but it invariably returned whenever she was weakened by anything ; after two years of occasional suffering the carious tooth was detected and extracted, after which the tic ceased. As in this and another similar case, galvanism and purely local means sufficed temporarily to cure the pain, we are justified in thinking it possible that the tonics operated upon the vital condition of the part affected more than upon the brain itself. They prevented the painful impression being transmitted to the sensorium, not a misinterpretation of such impression.

Nor is it uninteresting to note the influence of such medicines as are spoken of as "stimulants" upon pains characteristic of debility. Many a severe headache arising from weakness is for a time cured by porter, ale, or wine ; the footsore traveller finds wonderful ease from a hearty dinner, and many a neuralgic pain vanishes under the stimulus of

eantharidine. Stomaehic cramp is cured by brandy and assafœtida, and painful tympanitis and cholic are relieved by turpentine epithems.

But blisters or sinapisms rarely give relief to myalgic pains, and yet these are essentially evidences of impaired vitality ; we are, therefore, prevented from generalizing to any extent.

Enough has been said to show that our knowledge of pain as a symptom is not so precise as we could wish, and to indicate the way in which it may be extended.

It is, however, to be noted that in the instances we have brought forward, the part of the body affected has been more or less independent of the central vital organs, and, as a general rule, these organs are not liable to be the seats of pain. Yet they are occasionally. Anæmia, for example, gives rise sometimes to intense headæche ; and when the vital force of the brain is being overcome by such poison force as typhus or other miasm, the pain is equally intense. Intense pain is also experienced in the stomach, when oil of vitriol has been taken.

But gangrene will affect the brain, the lungs, the liver, and bowels, and yet there may be no *pain* experienced. If this sensation be absent, is there any other symptom to be noted ?

Progress into this inquiry is checked almost *in limine*, on account of the great difficulty attending upon the demonstration that such and such signs denote impending death of a whole or any part of an organ, and that certain others are proof that actual mortification has ensued. We have no difficulty in believing that pain preceding gangrene is produced during the process of dying, and that the intense itching that precedes a phlegmon has a similar origin ; but we cannot therefore deduce the conclusion, that all pain has the same cause. We can well believe that the giddiness,

pain, swimming of the head, &c., which precede softening, *i. e.* death of a portion of the brain, indicate that the portion is in a dying or very feeble condition; but we cannot therefore assume that such signs necessarily indicate such a state of things. All we can do, is to point out the close connexion existing between certain signs during life and certain phenomena after death; and to show that whenever there is reason to believe that the body is in a dying or a very enfeebled condition, symptoms occur precisely similar to those which occur prior to mortification elsewhere; and if we can show that these symptoms occur *chiefly* when the vitality of a part is very low, there is, at least, a fair ground for the inference, that whenever they are present they indicate a great want of power, locally or generally, or both.

What these signs and symptoms are it will now be our business to show.

CHAPTER VII.

DEFICIENCY OF VITAL POWER IN THE NERVOUS SYSTEM.

Deficiency of vital power in the nervous system—Functions during health—Mental, motor, sensitive, organic—Insanity, paralysis, convulsions, neuralgia, sleep—Physical changes occurring in the nervous masses—Softening, its significance—Explanations—Illustrations.

WE now proceed to investigate the manner in which the *Nervous System* is affected by a deficiency of vital power,—first, as regards its functions; secondly, as regards its structure.

Ere we can answer this question satisfactorily, we must ascertain the circumstances under which we may be certain that this deficiency exists.

We have already alluded to the fact, that the vital force in any part of the body is always being diminished through the common processes of life, but that it is, under ordinary circumstances, almost as incessantly repaired by food, and drink, and rest; that the expenditure of vital power is greater or less, according to the work or exercise an individual goes through; and that increased exertion of any organ requires increased nutrition for the healthy standard to be kept up. We know, too, that there must be a departure from the healthy standard, in all cases of fever or other diseases, where a steady waste or *consumption* of tissue is going on without a corresponding reparation; and we have

no difficulty in understanding that there must be a considerable reduction in vital power when an individual is dying a lingering death.

We may then fairly conclude, that anything which debilitates the body generally, diminishes the vital power of the nervous system, and with that deterioration there is impairment of function. A similar impairment may also be produced by excessive expenditure of nerve power, as in intense mental application or exhausting emotion, *e. g.* anxiety and fright. But the functions of the nervous system are not simple—they are, at least, *quadruple*; and using the word “brain” for the whole system, we may say that its duties are divisible under four heads—*mental, sensitive, muscular, and organic*. That is to say, one of the functions of the brain is to originate, superintend, or in some way or other suggest and control thought, perception, the intellect, &c. ; it has to receive those impressions made upon the various senses, and to interpret them to the intelligence as sensations ; it has to originate and direct the management of that mysterious something, which directs the muscles to act in obedience to the will, or in some instances, as in respiration, independent of it ; and it has still further to prepare and direct the distribution of that power which helps to keep every organ in a proper condition. It is a difficult question to decide, whether *sleep* is to be regarded as one of the *functions* of the brain ; but it is perfectly clear, that it is as necessary for the brain to have rest in sleep, as it is for a man to have rest from muscular exertion ; and it is equally certain, that an individual may be *too tired or too weak to sleep*.

The following cases are interesting in reference to this point :—

Miss B., æt. 27, a remarkably active young lady, and of great good sense, came with her mother in 1853 to consult

me on account of sleeplessness, with which she had been affected for the previous week. It was the second attack she had had of it,—the preceding one lasting three weeks, and passing away by change of air, &c. The most careful examination failed to elicit anything to account for the pervigilio, nor could I find that there was any organ that did not do its work properly. I knew, however, that the family were all delicate, and I suspected (what was then denied—but which has subsequently been allowed) that there was some concealed anxiety or grief.

Thinking the case a simple one, I ordered four pills, each containing five grains of extract of Indian hemp, and one-third of a grain of morphia, one of which was to be taken every hour till sleep occurred. At the same time I recommended the daily use of steel in full doses, as good a supper as could be taken, and some hot-spiced wine with it. Next day I found that all the pills had been taken and no effect whatever was to be detected from them,—the night had been a sleepless one. As too large a dose of an opiate would, I knew, sometimes prevent sleeping, I contented myself with recommending a continuance of the tonic plan of treatment and abundance of food. But the next night was as sleepless as the preceding, and the day following I found my patient in an almost alarming state of debility, and unable to walk about the room. Wine was now very freely used, to the extent, indeed, of two bottles of sherry in the twenty-four hours, with jellies, soups, &c.; but the wine might have been water, so small was its apparent effect. The young lady was now confined to bed from sheer debility, but every function still seemed to be healthy. On the fifth night of my attendance, a “whiff” of chloroform was given, and in ten minutes she was fast asleep. She slept seven hours, and next day seemed to be almost well. The next night, however, was

again a sleepless one, in spite of the chloroform, and two others were equally so. I now recommended a warm bath at about half-past ten, and the subsequent administration of a tumblerful of brandy-and-water, hot and strong; and to prevent any accidental noises from disturbing her, she was to stuff her ears with cotton wool. Four hours' sleep followed this, and from that period she steadily improved. As she increased in strength the quantity of wine was reduced, and solid food replaced liquid nourishment. At the end of another fortnight she was as well as usual, and up to the present time has been quite free from any return of pervigilio, though she has suffered occasionally from other forms of nervous debility.

Mrs. V., æt. 30, the wife of a medical man, came with her husband to consult me for disease of the heart and lungs. She was small, delicate-looking, with languid circulation, and a short, hard cough. For five years she had symptoms of angina pectoris, and disease of the heart was hereditary in her family. I need not detail all she complained of; it suffices to say that there were unequivocal marks of want of vital power in the lungs, the respiratory muscles, the stomach, the bowels, and the uterus, that there was profuse nocturnal perspiration, and almost habitual *want of sleep*. This sleeplessness had been treated by the profuse exhibition of opiates, but they seemed of no avail. The lady lay quiet in bed all night, without pain, without anxiety, without any special sensation to annoy her, yet totally unable to sleep.

I have had a very similar case in a clergyman, who has been entirely cured by taking a good supper an hour before bedtime.

The next case was far more easily managed.

Mr. H——, æt. 25, was bitten in the arm one day by an angry dog, and the fear of its being mad so completely took possession of him that he could neither eat nor sleep. At

the end of three days he was so weak and ill that he came to consult me. My first care was to examine the wound, which I found was a contusion only, consequently I calmed his fears of hydrophobia effectually, and to insure sleep I ordered a roast grouse for supper, with a due amount of bitter ale, and a tumblerful of whiskey punch afterwards. My patient next day reported that he had slept very soundly all night, and felt quite restored.

I do not consider the preceding case an important one for illustration, but it serves to introduce the remark that sleeplessness in children is best overcome by a tolerably good meal for supper, and if necessary a little sweet negus. Every nurse, whose observing powers are good, well knows that a light and early supper fosters wakefulness, fun, and excitement in the junior branches under her charge, and that bolstering matches occur at night instead of in the morning. She knows that the best way to send such children to sleep is to give them a good drink of milk and a slice of bread and butter; and she knows still further that a full supper of bread and milk taken just before undressing time is followed by quiet and early repose at night, and fun and excitement in the morning.

The number of instances in which I have had to recommend this plan leads me to believe that many consider that an empty stomach conduces to sound sleep, quite ignoring the propensity most of us have to sleep after dinner, and very soundly too.

I scarcely need stop to point out the importance of these considerations in cases of fever with insomnolence—how wild delirium and sleeplessness are produced by the lowering treatment adopted by Dr. Southwood Smith, and how *pervigilio* is arrested by judicious stimulation. I can well remember the sleepless nights I passed during the first week

of an attack of typhus, when I was dosing myself with aperients and fever medicine, and equally well can I remember the grateful effects of wine and jelly. Prior to their use the mind was full of all sorts of fearful things and gloomy thoughts, and if a few minutes of sleep occurred they were occupied by hideous dreams. After their use I can only remember that I awoke to have my wine or jelly, and went to sleep again, the sleep being as dreamless as is repose after bodily fatigue.

Some remarks on the influence of food and stimulants in cases of mania (which is always more or less attended with pervigilio) will be found a few pages further on. I may note, *en passant*, that dreaming is akin to insomnolence, and that dreams usually of a distressing kind are very common whenever the nutrition of the brain has been depressed by overwork or other cause. Hence night terrors in children have almost as great significance as pervigilio or sudden somnolence.

Although in the present state of our knowledge it is impossible to locate certain functions in any part of the brain, there is reason to believe that each has a definite seat; and it is certain that one function may be affected without the others participating; and that sometimes two, sometimes three, and sometimes all may be affected simultaneously or successively.

The *mental nervous system* is affected by deficient vital power in the brain in a great variety of ways. There may be simply an inability to think at all, a perfect apathy, a complete indifference to everything, or there may be an inability to think rightly, as we have seen in accounts of shipwrecks, where some die quietly, and others as maniacs; and, as we may daily see in disease, some die with the mind simply prostrated, others with more or less active delirium.

*The presence, then, of insanity IN ANY FORM, implies a deterioration of vital power or of the dynamic condition in the brain.**

If we pursue this subject by inquiring into the most common causes of insanity, we find strong corroboration of this important deduction. They may be thus enumerated : privation of food, misery, and starvation ; hereditary predisposition ; excessive anxiety, fright, or intense head-work ; overpowering emotions and the abuse of toxic agents, such as alcohol, and probably opium, &c. ; exhausting discharges, excessive venery, and the like, to which we may add actual cerebral disease.

Now the word *insanity* has a very wide signification in medicine, though not in law ; it includes not only those flagrant departures from reason which compel society to shut

* It is foreign to my present purpose to enter into dissertations upon particular diseases. I cannot, however, allow the above paragraph to pass without recording my belief that "hysteria" is in reality a disease of the brain more closely allied to insanity than to any other disorder. By this I do not mean to imply that an hysterical man or woman is, in the general acceptance of the word, "insane." By no means ; an individual may have a cough and not be consumptive, and so may a person be of disordered mind, and yet not lunatic.

I believe that many other medical men look upon hysteria in a similar manner ; at any rate, experience has amply convinced me that this disease may be most successfully treated by a modification of the plans most generally successful in the treatment of lunacy. Negatively, hysteria is no more "love of sympathy," "depraved imagination," and the like, than is suicidal mania, epilepsy or chorea. It is a disease of the nervous system, not of the mind ; the result of cerebral debility, not the effect of disordered fancy. The uterus (speaking generally) has no more to do with hysteria in the female than the testes have to do with gout in the man, and they have much to answer for who have taught that hysteria is chiefly due to unsatisfied passion and may be cured by indulgence.

up its victims, but all those mental manifestations which show that the mind is not in its healthy condition.

Using the word in this wide sense, we affirm that insanity can never be regarded as a proof of increased cerebral vigour.

It is somewhat difficult to understand this. When we see in mania proofs of great mental excitement, surely, it is argued, *that* must involve increased action—the proposition seems self-evident. But in reply we ask—What is excitement, what is increased action? Is it not a more than usually rapid expenditure of tissue and of power? Is it not expending in *one* day the material which would otherwise last *two*? and with this excess of expenditure over supply, can there be anything else than impairment of vitality and loss of power?

The importance of this consideration in the management of lunatics has only been recognised within the last few years; but since then the success attending treatment has been greatly augmented.

The following case is illustrative of the value of the principles we are contending for. Mrs. —, æt. about 40, came under my care under the following circumstances. When young she was said to have had phthisis, but this had left no traces of its presence. She had borne a large family. When the infants were female she had always had good recoveries after confinement, but when they were males severe mental disorders had rapidly ensued. She had, however, been free from such illness during the last six or seven years. At the time I saw her she was pregnant, as she thought, for about seven months, and her husband feared an attack was imminent. She had been capricious in manner for four or five months, and after a few weeks of great and overpowering drowsiness, she began to suffer from total want of sleep. She

was apparently in a state of good bodily health, for the functions of all the organs seemed to be properly performed except that of the brain. The treatment adopted was the following :—Opium and Indian hemp were used the first night to procure sleep, but, proving useless, narcotics were abandoned. The patient was directed to have a warm bath daily, and during the time of immersion to keep the head cold by a large sponge. Half-draehm doses of tincture of the sesquichloride of iron were given three times a day. An hour's walk was prescribed as well as carriage exercise, a good diet, and as complete mental repose as possible. In less than a fortnight she was perfectly well, far better indeed than she had been for years. After confinement she continued well, though the infant was a boy ; and she had no return of the mental disorder for two or three years. It then came on in consequence of prolonged lactation, but with returning bodily health came a restoration of mental vigour.

Mr. M., *æt.* 25, a surgeon to a dispensary, whose duties were very heavy, came to consult me for some symptoms which had long preyed upon his mind ; they turned out to be purely myalgic, and this knowledge gave him mental relief. But with this relief no repose came : on the contrary, he was now threatened with insanity. The mind chiefly gave way after the day's work was over, and the evenings were miserable, the nights sleepless, and fearful thoughts, propensities, or horrible dreams harassed him perpetually. I recommended as generous a diet as his purse could buy, steel and cod oil for tonics, and an opiate at night. In six weeks he recovered perfectly.*

* In cases of mania, it astonishes us to see what an amount of food is required to prevent the patient dying of exhaustion, and to note the calming effect produced by abundance of generous diet. Though

The influence of debility on the mental nervous system may readily be recognised in old age, in chorea, in typhus and other fevers, and, we may add, in hysteria.

The way in which the *sensitive nervous system* is affected by diminished vital power in the brain is extremely interesting. We will take a few examples.

From over-lactation the sight becomes impaired, and in some instances completely lost. A similar result occasionally follows from loss of blood, excessive venery or other exhausting discharges, and penury.

From simple debility an individual has other affections of the sight, less severe than total blindness, such as *muscæ volitantes*, or the idea of a bar across the visual organ, cutting off the upper or lower, right or left, half of everything looked at. One patient of mine, who had been much exhausted by nursing a dying brother, used to have this

Dr. Conolly has already called attention to this, I venture to give the substance of a conversation I had lately with a non-medical proprietor of a Lunatic Asylum, whose memory carries him nearly fifty years back. "When first we had these cases" (mania), said he, "the medical plan used to be, to prescribe venesection, tartar emetic, and low diet, to calm the excitement; but the patients got worse instead of better, and died suddenly from exhaustion. Then opium alone was tried in large doses, but it did more harm than good. We now treat our maniacal cases with abundance of food, six or seven meals a day of mutton-chops, beef-steaks, porter, wine, &c., and it generally sends them to sleep in thirty-six hours or two days. They can't stand out against the food: it regularly knocks them down, it calms them completely, and we rarely now lose a case."

I was at the time attending a patient in the establishment, and noticed that the symptoms were aggravated whenever the intermission between meals was of two hours' duration instead of one, or the stomach rejected the supply. In spite of the amount of food administered (it was all liquid), the patient became thinner and weaker; and when he died, at the end of a fortnight, he was emaciated to an extreme degree.

symptom whenever she was faint and low, and it was immediately dissipated by a glass of wine.

Sometimes the seeing power is entirely depraved, the patient being unable to see what is really before his eyes, and thinking that he sees something entirely different. This phenomenon is evidently present in those cases where ocular spectra are seen ; and it is to be noted, that ocular spectra are very frequently attended with aural delusions.

Sometimes, though rarely, the sense of smell is affected, and that of taste in the same way. The hearing is affected more frequently than the preceding, and the patient complains of ringing, buzzing, singing, or other noises in the ears ; or it may be that he is simply deaf ; or, as very commonly happens, the hearing is preternaturally acute, and sounds which once were pleasant to the ears become painful in the extreme.

Common sensation also comes in for variation, as well as the special senses. The patient has sensations rarely felt before, and these are spoken of as being itching, stinging, gnawing, tearing, stabbing, creeping ; or they are described as numbness, weakness, heat, fidgets, uncomfortableness, or even pain. In some individuals in whom the vital powers are very low, as in coma, common sensation and all the special senses seem to be absolutely gone. The patient is unconscious, not only of what takes place around him, but of those calls of nature, which, under ordinary circumstances, are too imperative to be neglected. The urine accumulates in the bladder without provoking it to contract upon its contents, and the feces pass through the sphincter ani without the smallest opposition.

The influence of weakness on the *muscular nervous system* is one of vast importance ; the more so, inasmuch as what

are in reality marks of debility have been regarded in a very different manner.

Without recapitulating what we have said about the circumstances under which debility is certain to be present, we may shortly say, that it shows itself in infants and young children by false croup, convulsions, or infantile paralysis; in elder children by chorea, twitching, muscular rigidity; both in children and in adults by epilepsy* or epileptiform attacks; in women by globus hystericus, hemiplegia, paraplegia, local palsies, &c.; in the wounded by tetanus; in the aged by paralysis agitans; in the dying by subsultus tendinum, irregular pulse, and frequently by general convulsions.

Convulsions commonly attend sudden losses of blood, and tetanoid spasm is seen where there is softening of the brain.

The *organic nervous system* is also influenced by debility; but we cannot so well demonstrate the fact, as we do not know accurately how far any organ can act in a living man

* "I suspect that in all cases of epilepsy produced by intemperance, the nutrition of the brain is first profoundly impaired by the protracted operation of the poison; just as in cases of Bright's disease of the kidney, and of poisoning by lead, the epileptic convulsions do not usually happen until, in the advanced stage of the disease, the nutrition of the brain has been considerably lowered. In some cases this condition of the brain acts only as a predisposing cause of epilepsy, exposing the organ to suffer from any occasional irritation propagated from remote organs. Dr. G. Johnson (Lectures before the College of Physicians—*Medical Times*, 1853) states that an epileptic fit occasioned by fright almost always returns. Of eleven cases of which he had notes, in one only had the fit been single. And whoever has watched the effect produced upon the brain by prolonged anxiety, by cachexia, or by habitual excess in fermented liquors, must have learned how very hard it is to raise that organ above the depraved standard of nutrition, which has become to it almost a second nature."—Dr. RUSSELL, *Brit. Med. Journal*, July 14, 1860.

independent entirely of the nerves. Thus we say that the brain influences the heart's action ; daily experience proves that it is so, and yet the heart will go on beating in the lower animals for a long period after it is separated from the body. Without then daring to speak in any other way than suggestively, we say that organic nervous debility is shown in excessive and uncontrollable lachrymation ; in enfeebled respiration, palpitation of the heart irrespective of exercise ; in a vitiated condition of secretions of milk, gastric juice, bile, and urine ; in the ready sloughing so common in typhus ; in the production of jaundice, hæmaturia, enuresis, abortion, impotency, palpitation, and the formation of poisonous milk under the influence of anxiety of mind, fright, and the like. We may also adduce the frequency with which disease of the brain induces vomiting in children, and how giddiness from revolving, or from the tossing of the sea, will produce the same effect.

But as we stated at the commencement of this chapter, these divisions of the nervous system are only arbitrary ones, and we may therefore reasonably expect to have more than one division affected at the same time. We see this well exemplified in insanity—a disease in which all the nervous functions are affected more or less, in which with impaired mental power we have ocular spectra, aural delusions, vitiations of taste and smell, epilepsy, convulsions, palsy, secretion of ropy saliva, fetid breath, curious port-wine-coloured urine, peculiar bile or fæces, and the like.

The same is seen to a more limited extent in hysteria. The mind is weak, wayward, and even diseased ; there are disorders of common and special sensations ; there are disorders of motion ; and the skin, the throat, the salivary glands, liver, kidneys, and uterus are all more or less deranged.

In epilepsy continued for many years, we have indications

of disordered intellect and sensation. In chorea we have at times a mental prostration, amounting almost to idiocy; while in hydrophobia it is difficult to say whether the mental, motor, sensitive, or organic nervous systems are most conspicuously diseased.

Respecting the influence which debility has over sleep, we need only say that it has long been a recognised fact, that exhaustion prevents sleep, but that it may, in some instances, especially with children, be attended with excessive drowsiness, even, as Dr. Gooch has remarked, amounting to coma.

This remarkable difference in effects, produced by the same causes, should never be lost sight of in medicine. We are far too apt to reason that phenomena which are essentially opposite in their character, must necessarily have an opposite cause—an argument the fallacy of which it only requires a careful attention to nature to refute. Thus, under the influence of hunger and privation, we have seen some individuals die quietly, as lime breaks down in water; while others die with a fierce storm of madness, which may be compared to the cooling of red-hot iron in the same liquid. Four persons in one ward may have mania, intense dyspnoea, fainting, and drowsiness, respectively, and yet all be suffering simply from pericarditis. In another ward one individual may be wandering about, growling strangely the vaguest threats; another lying in bed, muttering words of unintelligible import; another may complain of intense headache; while another lies supine, heedless of everything, too weak even to speak aloud. How different their symptoms; yet all are alike suffering from typhus. We need not multiply examples.

2. What are the physical alterations which take place in the brain from deficient vitality?

In answering this question, we naturally turn first to the

condition of the brain after death, or under other circumstances, where there can be no doubt that the vitality of this organ is gone, or is in a very low state.

If an individual has died suddenly in the midst of rude good health, his brain, as far as we can find, undergoes no physical change for at least twelve hours; with the exception of the circulation through it being gone, it has the same appearance as when, after an accident which has bared it, it is seen during life. This firm, healthy condition, however, does not remain long, for the mass soon *softens*, and at last becomes almost *diffluent*. When from any cause the brain becomes gangrenous, it is equally softened. *Case*.—A lad, 12 years of age, was struck on the head by one of the sails of a windmill; the parietal bones were smashed, but not driven in; the fragments were removed, and the lad lived about a week. At his death the whole of one hemisphere was in a green, fetid, gangrenous condition, and so soft as to be all washed away by a stream of water. The other hemisphere was very soft too.

Post-mortem softening, as is well known to anatomists, comes on much earlier in summer than in winter, a phenomenon accounted for by saying that general decomposition of the body is promoted by hot weather. In persons dying from accident, or in the midst of comparative health, the time when the *post-mortem* softening begins is pretty constant. We will, for the sake of our argument, assume that the period when the softening begins is twenty-four hours, when the weather is cool and temperate. But we sometimes find in an individual examined twelve hours after death, that the brain is already in a very soft condition, and in some the same occurrence is noted even after a lapse of eight hours. Can we draw any other conclusion in these cases, than that the brain was from some cause or other in an *enfeebled* con-

dition prior to death, and consequently it could not resist decomposition for so long a period? If this conclusion be true, we shall find this condition of brain common in those intense African and other fevers, where the vital powers seem to be completely prostrate. Practically we do so: we read in Dr. Robert Williams's account of the paludal poison—"The substance of the brain, especially in the dropsical cases, is so soft as hardly to bear the knife." Another observer, quoted by him, notices—"Some have found the brain and spinal marrow more soft than natural."

Similar observations apply equally to the plague, to putrid and adynamic fevers generally. Such simple softening is common in strumous children, in whom the brain is to a certain degree dropsical; also in those dying with general dropsy, phthisis, diabetes, bronchitis, or any other exhausting illness.

In speaking of this, Dr. Copland remarks—"In pulmonary consumption and in chronic bronchitis the brain is very commonly found softer than natural throughout, and this softness is the more marked the more chronic the pulmonary affection has been, and the more complete the emaciation. May not this state be considered as analogous to emaciation of other parts, the molecules of matter removed by interstitial absorption of the texture of this organ being replaced by a serous effusion? In such a case the density of the brain is actually diminished."

Nor is it uninteresting, in connexion with what has gone before, to find him quoting six different authorities to show that the brain is unusually soft in fatuous persons, epileptics, and epileptic maniacs, and remarking that the brains of condemned felons are extremely soft, owing to inactivity, confinement, low diet, and possibly mental depression.

If, then, we find that the brain is unusually soft in those

dying of exhausting diseases, and the softness is proportionate to the duration and gravity of the illness, have we not *primò facie* reason for asserting that the disease called *ramollissement* is, in reality, analogous to a dying or dead condition of that part of the brain affected by it?

We shall see by inquiry into the circumstances which produce this disease, that this assumption is borne out by experience.

It is clear that the vitality of the brain may be impaired by other causes than those operating upon the whole of the body. Thus, for example, we know that the brain, like any other organ, will have its vitality impaired if the quantity of blood reaching it is materially diminished, *e. g.* by ligature of a large artery, such as the common carotid or the *arteria innominata*. A similar result would follow if any artery became plugged up by a clot of fibrin, dislodged by an aneurism, by an atheromatous fragment, dislodged from the aorta, or by some vegetations torn from diseased cardiac valves.

All these accidents have occurred repeatedly; and observers note as one of the most prominent of the results, a complete softening of that portion of the brain supplied by the injured vessel.

But there is another way in which any portion of the body or of the brain can be deprived of its vitality, *viz.*, by a change in the minute vessels, which may so modify their permeability as to prevent the due nutrition of the parts through which those capillaries run.

This change has only arrested attention during the last few years. Its essential nature consists in a degeneration and thickening of the wall of the capillaries, and at the same time a diminution of their calibre, so that the quantity of blood flowing through them is necessarily diminished, at

the same time that the liquor sanguinis has greater difficulty in permeating their walls.

This change is not confined to the brain, but is common in the lower extremities, where it is occasionally the cause of senile gangrene. This diseased condition of the capillary vessels is generally associated with weak or fatty heart, atheroma in the aorta, and more or less calcification and brittleness in the cerebral arteries generally.

As this state of things is one generally attending upon advanced age, so we shall find that softening of the brain is far more common in the old than in the young. It is a matter, however, of considerable interest to know, that a similar condition of the capillaries of the brain is not unusual in phthisis, and consequently that "*ramollissement*" is very common in that complaint.

These things being taken into consideration, there is no difficulty in concluding that softening of the brain is an evidence of diminished vitality, of incipient, approaching, or even present death of the portion affected.

It has, however, been objected to this view of the case, that *ramollissement* is of two kinds—red, and grey or white; and that while the latter indicates loss of power, the former indicates the reverse. It is well to examine the point.

At one time a general belief seems to have been entertained, that the presence of inflammation indicated an *excess of power*. Of late years, however, a new idea has gained ground, *i. e.* that inflammation is a process of unusually rapid nutrition without commensurate supply, and consequently that any part affected by it must necessarily be in an *enfeebled condition*. If this be true, and we have no doubt that it is, the presence of softening of the brain as a result of inflammation is at once accounted for, inasmuch as inflammation may deteriorate its vitality quite as much as

ligature of one of its principal arteries. The effect is practically the same, though brought about by divers means.

Whatever be the amount of the softening, whether small or so great that the portion resembles cream, it is to be noted that the softened portion consists of true brain tissue without the admixture of pus, and that the tubes of neurine have their walls so soft and distensible that they will bear an unlimited amount of distension without rupture.

We have now arrived at the conclusion that softening of the brain indicates a deficient amount of vitality. In other words, we cannot have softening without there being impaired vital force generally or locally, or both.

The question next arises—and it is one of the utmost importance—Can the vitality be *restored* to the softened brain? and if so, by what means can it be effected? We answer the first question in the affirmative for the following reasons:—If it be true that *ramollissement* attends severe fevers and exhausting diseases, as a general rule, and if it be true that individuals with these complaints do frequently get perfectly well, surely we can come to no other conclusion than that the brain, although dying, may yet survive and regain its ordinary condition. When, however, the death of the cerebral matter is complete, we can no more hope for its recovery than we can hope to resuscitate a dead man, or restore vitality to a “slough.” There is a period within which the use of appropriate means may restore life and animation to a man apparently dead by drowning; but when once that period has passed, nothing avails.

But if the brain is to recover itself, in what way is it to do so? The means at our disposal are few; they consist solely in the administration of such things as we know are stimulating or exhilarating in their effects, such as alcohol, ammonia, and the like, and the attempt to stimulate locally

by the application of large cantharidine blisters to the shaved scalp. It is by these means that cases of fever apparently hopeless are frequently brought round.

There is, however, one point in the treatment of the earliest stages of softening to which we must call attention, and which necessitates some preface.

We have already remarked that excessive use of any organ debilitates it, unless its nutrition is constantly equal to its expenditure.

Excessive mental emotion, then, or any other excess of brain work, has a distinct tendency to produce softening whenever the cerebral nutrition fails. Nutrition is notoriously impaired in the aged and the ill-fed, in those who are phthisical, in those under the influence of mercury, in those suffering from loss of blood, from privation, or loss of rest. We conclude, therefore, that excessive mental emotion, &c., will in certain individuals have a direct tendency to produce softening; and if so, *mental repose* must form a necessary part of the treatment of *ramollissement*, whenever it is presumed to exist.

But simple softening is not the only condition of the brain arising from deficient vitality. The same state of things which, when operating on the *tissues* principally, brings about their softening, when it operates chiefly upon the *walls of the vessels* themselves, brings on the loss of elasticity, brittleness, or softness; and thus there is tendency to rupture from trifling causes, and consequent effusion of blood. The intimate connexion between cerebral hæmorrhage and softening has long been surmised, but their mutual dependence upon the same set of causes has only been recently demonstrated. One may precede the other, or either may occur alone.

There are other evidences of deficient vital power in the

brain besides those we have enumerated, such as the existenee of tubercles in some form or other, the replacement of healthy brain by serum, either internally or on the outside.

Now we have already called attention to the very interesting fact, that the process of dying is in many instances a very *painful* one, and we have been attempting to show that softening of the brain, &c., was an evidence of its death ; we naturally, therefore, inquire, Whether *ramollissement* and other marks of a dying condition of the brain are preceded by *pain* ? There is great difficulty in answering the question absolutely, on account of our limited knowledge ; but this we do know from experience, that those fevers in which the brain is found much softened after death are commonly ushered in with intense headache ; that headache, in a very severe form, is a common accompaniment of great debility and loss of blood ; that severe headache often precedes both cerebral hæmorrhage and softening ; that *fasting* will produce a headache which *food* will cure ; that intense mental exertion is commonly followed by pain in the head ; and I may add, that the most violent and long-continued attacks of headache which I have met with, were, (1) In a case of simple softening of portions of grey matter on symmetrical spots on each side of the brain ; (2 and 3) In two cases of phthisis, in which after death the brain was found much shrunken, and the cerebral matter was replaced by serum. These considerations lead us to believe that *headache may arise from incipient death of the brain*, and so be analogous to the pain following the local use of caustic. Nevertheless it is equally true that *ramollissement* of the brain may exist and yet so little pain be present, that neither the doctor or the patient has his attention called to it. That headache has many other causes there is no reason to doubt.

At any rate, may we not draw the conclusion, that head-

ache, with symptoms of softening, or as they are sometimes designated, premonitory signs of apoplexy, do not necessarily imply the presence of unusual or dangerous quantity of blood in the brain, or the existence of inflammation, and that they may, and we may add generally do, imply only that a part is beginning to die and is not yet dead ; a result, however, which may happen should the supply of blood continue to be inadequate, and its vitality continue to be low ?

CHAPTER VIII.

DEGENERATION OF CEREBRAL VESSELS.

Degeneration of cerebral vessels—Its significance—It implies debility—Effects of degeneration—Deductions—Cases in point—Water in the head—Its victims—Deductions—Cases in point.

IT cannot fail to have been noticed that the word *degeneration* has been used by us ; the same word is equally used by other authors who have spoken of the changes in the blood-vessels of the brain and of the brain itself in cases of cerebral hæmorrhage and softening. Few can doubt that the word has been selected because it expresses distinctly the fact, that the alteration is attended with decay of physical attributes and physiological functions. The quality of the new material is in every way *inferior* to that which it replaces. *Degeneration, then, necessarily implies diminution of constitutional or systematic vigour* ; for it is clear that imperfect vital products cannot proceed from perfect vital power. *Degeneration is the result of constitutional, local, or acquired debility.* Assuming, as we have every right to do, that this proposition is unassailable, flanked as it is by the whole history of struma, tubercle, Bright's disease of the kidney, fatty liver, fatty heart, &c., let us examine the influence it would have upon practice.

It is clear that if degeneration be the result of debility, it will be accelerated in its march by anything which reduces still further the vital power. It is equally clear that if the progress of degeneration in cerebral suffering is to be arrested,

it can only be done by sustaining the constitution ; and that if anything can be effected in cerebral hæmorrhage to promote a return to a healthy state, it can be effected solely through the instrumentality of the systemic forces. These points once established, it follows that the plan of treatment often resorted to with a curative intention, is the one of all others the most calculated to increase the gravity of cerebral disease. If we look over the once standard work of Dr. Abercrombie on the Diseases of the Brain, we can find out many a case in which the threatenings of apoplexy have been converted into the real disease by blood-letting. A case is recorded by Dr. Watson, in his *Præctice of Medicine*, to illustrate how a *clot* may be the precursor of cerebral softening, but he makes no note of the possibility that the latter was produced or accelerated by the profuse bleeding which had been adopted for the cure of the original apoplectic attack.

The following case, communicated by a medical friend, will, in addition to those I give subsequently, well illustrate the difference between a philosophical and routine treatment. An elderly lady had an attack which she feared indicated an impending fit of apoplexy. The signs were unmistakeable to the surgeon who saw her for the first time. But she was pale, weak, and badly nourished. He argued—"If I am to do any good here, it will be by giving the patient strength, not by abstracting it." He gave a mild alterative at night, and tonics the next day, and recommended a generous diet. His plan was eminently successful ; the patient was perfectly well in a week. On a subsequent occasion she had a similar attack, and an old practitioner was called in, whose talents and experience were considered first-rate. He, too, read the symptoms as threatening an attack of apoplexy, and, in accordance with established rule, he abstracted blood by leeches, and administered purgatives. In two days his

patient was dead of the very disease his treatment was intended to avert!

Dr. Watson's lecture on this subject gives an instance in which apoplexy was supposed to be induced by cupping; but though he does not agree with the deduction, any one who reads his remarks with due reference to the foregoing observations, will see that the conclusions of the patient were, in reality, more logical than those of the physician.

If the ideas we have started be true, we should anticipate finding a close relationship between debility, phthisis, cerebral hæmorrhage and softening, atheroma, and other cachectic diseases. Practically we do so.

If we turn to Andral's "Clinique Médicale," we find twenty-seven cases recorded of softening of the brain. Six of them appear to have been simple cases of debility, with head symptoms, consequent on a deficient circulation. They were treated with general and local bleeding, blisters, and purging, and the rapid result was paralysis and death. In nine cases no history is given. In four there were tubercles elsewhere, in ten extreme debility, in four disease of the heart. Seven cases out of the twenty-seven were in persons over seventy years of age,—in which the occurrence of atheroma is pretty constant.

In five fatal cases of cerebral congestion, three had phthisis, two atheroma and disease of the heart. In two instances the fatal result seems to have been brought about by bleeding, leeches, and purging.

In sixteen fatal cases of cerebral hæmorrhage there was no history with two; in eight cases there was disease of the heart and strong analogical proofs of atheroma; in the other six there was great debility, anthrax, carcinoma, &c.; five of the cases were bled profusely: and *in all the bleeding seemed to accelerate the fatal result.*

On referring to the notes I have of twenty-five fatal cases taken some years ago, I find that seven had phthisis, five cachexia, three disease of the heart or arteries; the rest had gout, rheumatism, flooding, Bright's disease, and bronchitis; two had delirium tremens, one gangrene, one typhus treated by bleeding and mercury, and one excessive venery.

The following is a good illustration of the influence of the depressing effect of purgatives in diminishing the vitality of the brain, and augmenting the degeneration of which we have spoken:—

Case I.—Mrs. N., æt. 45, occasionally addicted to spirituous potations, and of a stout but bloated appearance, suffered occasionally from attacks of giddiness and confusion of the head. This was attributed either to the liver or the stomach, and she was in the habit of taking freely of aperient medicines. She frequently suffered from flatulency. One day her bowels had been unusually purged; she had had a considerable amount of exertion; had taken a somewhat flatulent dinner; after tea she went out to walk, and was seized suddenly with all the signs of profound apoplexy. Her husband, who was with her, administered brandy-and-water, and she soon revived. I saw her in consultation the next day; she was free from paralysis, from headache, or any other remains of the attack than an indefinite dread of another. There were abundant proofs of a fatty or otherwise debilitated heart. I strongly urged the necessity for a tonic plan of treatment, but was assured that the patient was so fidgety about the bowels, that if aperients did not form part of the treatment, they would certainly be privately adopted, and our advice be slighted. I reluctantly consented to the plan, and compound infusion of senna was given, with a large proportion of infusion and tincture of gentian. I did not see the patient again; but I was told that the medicine

operated every day five or six times, and that about a fortnight afterwards the patient had another and a fatal attack of her disease. There can be little reasonable doubt that the depressing effect of the purgatives hastened materially the degeneration of the cerebral vessels, and brought about the very disease they had been employed to ward off.

Several of the following cases show the importance of a tonic plan of treatment, both in warding off apoplexy and encouraging the cure of hemiplegia when present :—

Case II.—Mrs. J., aged 45, stout and florid, and a tolerably large feeder, complained of pain in the head, confusion, temporary loss of sight and power, and frequent attacks of vertigo. These came on from walking uphill, or upstairs, from suddenly turning the head, or moving round a corner. She had never fainted. The bowels were costive ; the tongue clean ; pulse 80, natural. Quiet and tonics were recommended, and nothing more. Twenty years have since elapsed, and she has had a great many repetitions of the same set of symptoms ; but experience has shown that the attacks result from mental agitation only, favoured by debility. She is now in perfect health.

Case III.—Mr. B., aged 40, of short, stout build, and florid complexion, consulted me respecting threatenings of apoplexy, from which he had suffered some months. I ascertained that both his father and grandfather had died of that disease at an early age—45 and 50 ; that he himself was subject to vertigo, confusion of the head, and double vision ; and that occasionally the room in which he was lying appeared to be turning round always in the same direction. He frequently had headache, bilious vomiting, and transient loss of memory. His pulse was regular, 70, but rather feeble. The tongue was curiously clapped, and its mucous membrane thickened. The bowels were regular ; the appetite was

indifferent, and digestion imperfect. I ascertained that he was in an exciting business ; that he was unable to eat much at breakfast, but was in the habit of taking stimulants from time to time subsequently to enable him to get through the day till dinner. He then ate sparingly, and took very little wine. His attacks came on usually in the afternoon, but were commonly relieved by lying down, by vomiting of bile or by brandy-and-water. At the time of my visit he had had a more severe one than usual ; he was unable to sit up without vertigo, and even when lying down the room seemed to be turning. The pupils of the eye were large ; and a close attention detected both eyeballs in constant circular motion on their axis—a movement of which the patient was unconscious. The sounds of the heart were natural, but very feeble. I considered the case to be one of mental agitation and worry, combined with a weak and possibly a fatty heart. I recommended tonics and a generous diet, and had the satisfaction of soon recognising a great improvement. A week or two afterwards, a relative of his informed me that he had suspended payment, which fully accounted for the symptoms which I had attributed to mental emotion.

Case IV.—Miss B., aged 30, came under my care for extremely disagreeable symptoms, which led her to anticipate a more serious attack. She suffered from distressing vertigo, and had on several occasions nearly fallen down stairs ; she had, when mounting them, frequently to stay and rest for support on the banisters. She had singing noises in her ears, confusion of head, and loss of memory occasionally ; but what gave her most trouble was, that when reading, writing, or drawing, she would suddenly lose her vision. She could see the first half of a word, but not the last ; half a picture, but not the whole. This would last for an hour, and then go away. The animal functions were all correct. She was

extremely active, and of strong good sense ; but she had exhausted herself by nursing for five weeks with unremitting attention, both by day and night, her mother, to whom she was devotedly attached. Her rest had been of course greatly curtailed, and her appetite had failed entirely. Fortunately, her charge had now improved in health, and her anxieties diminished. I readily induced her to take some quinine, and at least three glasses of wine daily ; and was soon gratified to find that all her troublesome symptoms had left her. But it was not without interest that I learned that on one occasion she had gone shopping without taking wine or other refreshment. She was out for a long time, and when she returned home, and mounted the stairs to her own room, she had the sensation of an opaque bar placed right across the eye. This went away as soon as she had lunched and had her wine. Singularly enough, her mother, whom she had been nursing so long, complained of a similar symptom the first day she ventured out for a drive—the exertion proving to be beyond her strength.

Case V.—Mr. C., aged 47, of red, bloated countenance, and weighing nearly twenty stone, with harsh, husky voice, was supposed to be threatened with apoplexy. He was very drowsy, slept heavily, and snored almost as if comatose. There was mental confusion and headache. For the last week he had been on low diet and had taken aperients, but was steadily getting worse. The pulse was feeble ; the heart's action weak. He was ordered a generous diet and full doses of liquor potassæ. He felt relief in half an hour after the medicine, and was as well as usual in four days.

Case VI.—Mrs. B., aged 65, of pallid complexion and spare frame, consulted me for confusion and dizziness in the head, which had come on suddenly, and such an amount of thickness of speech that it was with difficulty I could under-

stand her. She could not protrude the tongue, but there was no other sign of paralysis; the pulse was quiet, about 80, and the bowels were regular. She was strictly temperate. As this was her first attack, and she had a great dread of apoplexy, it unnerved her considerably. I prescribed quiet and a stimulating tonic. She soon recovered. Since then she has had many similar seizures, but is always able to trace them to mental emotion or bodily fatigue. She has recently borne a severe illness, in which she has taken large quantities of brandy, opium, and wine, without any recurrence of the cerebral symptoms.

Case VII.—Mr. I., aged 56, complained of pain and confusion in the head, pain in the right fore-arm, and inability to read or write more than a few lines without all the letters appearing to run into one. He had previously had two attacks of regular gout, the last of which had been very severe and protracted. He was of stout build and great activity, and lived freely, but the complexion was pallid. The pulse was 60; the appetite indifferent; the bowels were regular; his sleep was disturbed. I ascertained that he was much harassed by business, peculiarly distressing to his feelings, and that he was depressed in consequence. I found out accidentally that the confusion in reading or writing was due to the want of spectacles. The pain in the right arm I could not explain. The treatment was as strengthening as possible; and as the mental emotion diminished the symptoms subsided too. Ten years elapsed without any return. He then died from pure debility.

Case VIII.—John S., aged 45, a seaman, of robust appearance, was admitted into the Liverpool Northern Hospital with hemiplegia. He was unable to articulate more than one or two words, but seemed to understand what was said to him. The face was drawn slightly; but the loss of power

in the arm and leg was complete. He was treated simply by a solution of chloric ether as a gentle stimulant, and full diet. No other medicine was given. He rapidly and steadily recovered; in a week he was able to converse and move the leg; in a month he could walk and move the finger; and at the end of six months he could raise his arm above his head, and walk with an almost imperceptible limp. He told us that prior to his attack he had had pain in the head for six weeks; that he had been taken suddenly by the fit, and had been perfectly unconscious for nearly two days. There was no disease of the heart. From the first day after his admission, improvement was perceptible and continuous. Nor have I ever seen a bad case in which it was so rapid and complete. He subsequently left the hospital for the workhouse: the diet there being less generous, he lost power in the arm to a great extent in less than a month.

Case IX.—James S., aged 35, a seaman, was admitted into the hospital with hemiplegia and loss of speech. We got no history with him, beyond that he had just come from sea and had been ill some time. He looked very much "out of condition." He was ordered aperients every three or four days, and five grains of quinine three times a day, with a generous diet and wine. In four days he was able to tell us that he had been much exposed to cold and wet, and had had very insufficient food. The attack had come on suddenly; but he had not been insensible at any time. In ten days the paralysis had left him, and he was able to walk about the wards. In a few days more he went away of his own accord. There was no cardiac disease.

Case X.—A German seaman was brought into the hospital, with whom I was unable to converse. The junior house surgeon, who spoke German, informed me that the man

could only say a few words, with which he answered all questions. He seemed a strong, burly man, with a coarse deep red face, aged about 45 or 50. He was hemiplegic, but his face was not drawn. The pulse was natural. He looked, however, as if he had met with much hard usage, and I ordered him quinine and occasional aperients, as in the former case, and full diet, with wine. In a few days he spoke intelligibly; and at the end of the week was able to walk about the ward. In three weeks from his admission he was discharged cured.

Case XI.—William J., aged 35, an engineer, was admitted with incomplete hemiplegia. He was a strong-built, large-boned man, but had a pallid complexion and dilated pupil. His account of himself was, that he had been working much amongst machinery, and had been exposed for hours together to cold wind, chiefly on the affected side—the left. The attack had commenced a fortnight ago, with a feeling of numbness running up the arm; and when he awoke the next day, he found himself unable to stand, or to move the left hand. The heart was healthy, and the pulse natural. From deference to “authorities,” I commenced the treatment with a grain of calomel, and one quarter of a grain of opium every six hours, and I gave strict directions to the house surgeon to administer quinine if the medicine should seem to have a depressing effect. In two days I found the first indications of improvement. The mercury (a grain of calomel) had acted strongly on the bowels and depressed him considerably, and the dose administered was then reduced to half a grain twice a day; quinine had at once been adopted. The mercurial was still further diminished the next day; the quinine continued and wine prescribed; in two days more the mouth was faintly sore, and motion had returned to the hand. Up to this time, about five grains only of calomel,

combined with opium, had been taken. It was now entirely suspended, and in three days more the gripe of the left hand was nearly as strong as that of the right. The tonics were continued, and in a few days more he was able to leave the house.

On comparing this with other cases, we must, I think, attribute more to the quinine than to the calomel.

Case XII.—John C., aged 40, labourer, addicted much to intoxication, was admitted into the Northern Hospital, on November 1st, under the care of one of my colleagues, with a stab-wound at the outer angle of the scapula. It had penetrated through the bone and wounded the lung. There was considerable external bleeding, and a little hæmoptysis. Next day he was found to have lost the use of the arm on the same side. As it was clear that the wound could not have injured any nerves supplying the arm, the paralysis was attributed to loss of blood. No treatment was adopted specially directed to the loss of power, as there was no indication to point out the condition of the nervous system on which the phenomena depended. In two days sufficient strength had returned to the arm to enable him to move the fingers close to the hand and flex the arm. At this period he began to perspire freely, and to have other appearances common to men who have drunk hard and lost their usual stimulus. There were no signs of delirium tremens from the first. Alcoholic stimulants were now used, and the patient steadily recovered.

Case XIII.—Mrs. Y., a hale old lady, with a rubicund countenance, applied to me for advice, five years ago, under the following circumstances :—She had experienced a paralytic attack six months previously, which left her right side weak. Since that she had suffered from headache, with after excitement, confusion of ideas, vertigo, occasionally loss of the

articulating power, transient blindness, &c. The heart's sounds were healthy but feeble, and the circulation, as tested by the pulse, was languid; the bowels were regular; the digestion good. She had recently been travelling, and was then on a visit to some relatives; and I learned incidentally that she seemed as young in energy and spirits as she was old in years. She was perfectly temperate. Her symptoms had been aggravated since her journey, and she felt obliged to be accompanied by an attendant lest she should fall in the streets. She naturally feared another apoplectic seizure. A careful inquiry elicited that she was always better after dinner than before; that a glass of wine revived her; that the recumbent posture relieved her; and that she was always worse after fasting, low diet, and purgatives. I recommended quiet as far as possible, quinine for a few days, and as generous a diet as was compatible with comfort. She followed my directions closely, and I had the satisfaction of ascertaining, a few weeks ago, that the anticipated fit had not come on. She was, however, liable to a threatening whenever she was unusually tired—after diarrhœa—after any anxiety of mind, or any other depressing agency.

Case XIV.—C. R., aged 48, seaman, who had led a very dissipated life, was admitted into the Northern Hospital with phthisis. He was emaciated, pale, and exsanguine, and had a considerable cavity at the apex of the right lung. Shortly after his admission he complained of headache, referred to the left parietal region, and a curious sensation down the left arm. He slept indifferently, and had no appetite for food. The pulse was 80, and very weak. He appeared to benefit for a time under the use of tonics; but the headache gradually increased in severity and precluded sleep entirely. At the end of a fortnight paralysis of the left side of the face was noticed, and next day of the arm; but

as the man was very deaf, we had great difficulty in ascertaining the extent of the mischief. Two days after a moaning coma set in, and terminated fatally in a few hours. *Post-mortem*.—Head alone allowed to be examined. Brain contained less blood than usual. A considerable amount of serum existed on the surface of the brain, lying between the convolutions. The ventricles were large, full of serum, and their floors marked by large veins, which were full of blood. A small cyst, about the size of a kidney bean, was attached to the posterior part of the falx. It was found to be of a fibrous structure, and contained many small fragments of a bony matter, which were formed in honeycomb-like cells on the inner surface of the cyst. The arterics were almost universally degenerate, the brittle degeneration being more common than the atheromatous. On turning the cerebrum so as to examine the base, we saw at a glance that one crus cerebri, the right, was softened. The softening extended to the upper surface of the locus niger. The left crus cerebri was very firm, and the rest of the brain, though soft, was healthy.

Case XV.—John T., æt. 45, had phthisis; became delirious at an early stage, and died comatose on the fourth or fifth day of the cerebral attack. The optic thalami and corpora striata were found softened.

Case XVI.—Mary S., æt. 20, had signs of incipient phthisis; she died after a few days' illness from cerebral symptoms. The lungs were everywhere studded with miliary tubercles. The corpus striatum on one side was diffuent, and the optic thalamus softened.

Case XVII.—Mr. J., æt. 30, a clerk in an office, of consumptive parentage, had syphilis; took much mercury, and was obliged by his pecuniary circumstances to live low; he had an attack of imperfect hemiplegia. Everything was now

done to improve his health, and in about three months the side was well. He then returned to his abstemious mode of living, and the other side became partially hemiplegic, sensation being chiefly affected as at first: a return to his tonics brought him round again.

Case XVIII.—Mr. B., *æt.* 58, merchant, short, stout, florid, and very healthy-looking, complained of weakness in one leg and thigh, numbness in the arm, confusion in the head, with loss of memory and thickness of speech. He had had an apoplectic attack twelve years before. His apparent fulness of blood at first suggested to me the propriety of bleeding him, and using low diet; but on ascertaining that he had been “worried,” and anxious in business, had lost his appetite, and been purged, I recommended, instead of the antiphlogistic regimen, steel, quiet, and generous diet. He got no worse,—soon improved,—but six weeks elapsed ere the weakness left the side. He remained perfectly well for nine months; then had diarrhœa, which was speedily followed by an attack of apoplexy, fatal in four hours.

Case XIX.—Mr. G., *æt.* 58, always temperate, and constantly out of doors, began one winter to complain of cramps in the legs, cold feet, languor, loss of appetite, and debility. After a day’s exposure to cold he became suddenly hemiplegic. For this he was purged every two days, and kept low, as his appearance and pulse seemed to indicate fulness of blood. He seemed better on the second day, but then got steadily worse; I then saw him for the first time. Considering that the vital powers were at a very low ebb, the most vigorous efforts were made to restore them, by administering as much tonic medicine and stimulants as could be borne. The improvement was rapid at first, and has steadily gone on, though he can scarcely yet, eighteen months after the attack, move the arm freely.

Case XX.—Joshua B., æt. 56, coachman, a large burly man, and strictly temperate, almost a teetotaller, had a sudden attack of apoplexy, in which he remained insensible for some hours. He was seen by two surgeons in succession: the first cupped him without any advantage, the second bled him from the arm; and while the blood was flowing, the senses returned. He then found that he had totally lost the power of the right side, and of speech. In this condition he remained for six weeks without a shadow of improvement. I was then requested to see him. I recommended steel, and other tonics, and gave him alcoholic and other stimuli; the man began to mend in a week, and in three months could walk, talk, and use his hand and arm.

Case XXI.—Mary S., housemaid, æt. 28, of consumptive parents, and always delicate, had an attack of small-pox, which left her unusually weak, and her pecuniary means being low, she lived very indifferently, and became very feeble. Six weeks after the small-pox, she had an attack of hemiplegia, involving the face and the whole of the left side of the body. She now came into the Liverpool Northern Hospital. She was treated with tonics, and immediately began to improve; but no medicine had a perceptibly good effect for longer than ten days, and a constant change was therefore requisite. I used in succession steel, quina, cod oil, bitter tincture, aromatic tincture, and carbonate of ammonia. She went out well at the end of three months.

Case XXII.—Miss K., æt. 45, short, of very florid complexion, inclined to stoutness, but strictly temperate, and of very active habits, consulted me for ringing in the ears, giddiness, a strange fulness about the upper part of the throat, and numbness and loss of power down the right side. She was afraid of apoplexy, as an elder brother had had an attack, and still suffered from fits; there was occasional headache,

and sleep was irregular, and there was occasionally mental excitability. The animal functions were all correct. The propensity to cerebral hæmorrhage or softening was tolerably well marked in this case, and the countenance might well have seemed to warrant bleeding or aperients. But the lady's sisters were all delicate ; she herself was conscious of debility, and was always comfortable when on the sofa. A tonic plan was adopted, but for a long period no improvement was visible. Change of air was resorted to with immediate benefit, and in three months the patient had recovered perfectly.

The following cases, which have been communicated to me by Mr. John Cooper, late surgeon to the Liverpool Royal Infirmary, are confirmatory of the points to which I have called attention, and they are the more valuable as they come from an essentially practical man.

"Whilst I was an apprentice in Manchester," he says, "I bled rather copiously a dragoon, and the man fell off his chair in a strong epileptic fit. Some years afterwards in the early part of my practice in Liverpool, I attended, with another practitioner, a man in a very severe and long-continued fit of epilepsy, and at last, believing that bleeding was our only resource, it was tried and proved *almost immediately fatal*.

"Shortly after this I was sent for to see an old thin milkman, æt. 70, who had apoplexy ; to the surprise of his family I would not bleed, but ordered half a pint of brandy to be given, mixed with warm water, in divided doses. This was late in the afternoon. Next morning I found my patient very busy sweeping the cow-house yard, and he continued in good health for many months after.

"A man, æt. 60, a foreman in an iron foundry, was seized with an apoplectic fit upon getting out of bed at four o'clock

one morning in June. I found him insensible, lying on the floor on his back, with strong stertorous breathing, and an oppressed slow pulse. A basin and tape were promptly brought, but I declined making the expected use of them, but ordered bottles of hot water to be applied to the feet and under the arm-pits, and as there was no brandy in the house some was sent for, and a feather dipped in brandy-and-water was from time to time passed between the lips, until the power of swallowing became evident. Two glasses of strong brandy-and-water were then given, and I took my leave. At eight o'clock I called again, and found my patient down stairs; he had breakfasted and taken two eggs. In all he had taken half a pint of brandy. Next day he went to his business, and continued well till August in next year, when he had another fit while returning home to dinner. The same treatment was repeated, and with like results. In twelve months' time he had a third attack, when a young surgeon was called in who *bled him*, and he died in a few hours."

But the observations we have hitherto made do not apply solely to cerebral hæmorrhage or softening—they are equally applicable to "water in the head;" a disease in which, from the history of the sufferer, there can be no doubt respecting the deterioration of his vital power.

When this was looked upon as indicating inflammation, and increased action, the plan of treatment was necessarily depressing, and antiphlogistics formed the staple resource. A very short experience, and reasoning from analogy, led me to believe that our ideas of the pathology of this disease were erroneous, and that the treatment based upon them was essentially wrong, and I was led to adopt a plan entirely of an invigorating character. The result has been well marked: instead of finding hydrocephalus now to be the

fearfully formidable disease it was once thought to be, I find it quite as tractable as any other serious strumous affection, and the mortality to be less than ten per cent.

This has been brought about, first, by recognising the threatenings of brain disease at an earlier stage of the complaint than was formerly considered possible; secondly, by paying strict attention to the smallest departure from health in strumous children; thirdly, by avoidance of all depressing remedies, especially purgatives; and, fourthly, by using steel, change of air, and other tonics.

The importance of these points may best be manifested by the history of a family that has come under my immediate care. The eldest boy had an attack of water in the head when about 3 years old; he was then extremely delicate, and change of air was prescribed. He greatly improved in consequence, and the cerebral symptoms left, but diarrhœa came on after a time, and he had in succession, tabes mesenterica, abscess in the metacarpal bones, and strumous ulcers of the skin. The second, æt. 2 years, a handsome lad, with a large cranium, died of water in the head, which came on so insidiously that it was not recognised till too late. The third, a fine girl, æt. 18 months, had the first signs in July, and continued slowly to get worse, in spite of treatment and change of air, until November, when the case was considered hopeless. She was then taken to London: no medicine was used; improvement began at once, and in six days she was well. On the seventh day, however, two glandular swellings appeared on each side of the neck; they suppurated, and other abscesses have followed, but head symptoms have not returned. The fourth and fifth children escaped the disease, but were very delicate.

By a careful attention to the preliminary signs, now readily recognised by the friends, when the sixth child, æt. 2 years,

was affected, not a day was lost ; previous experience had decided which was the best locality for the child to go to, and it was taken at once. In a week the symptoms disappeared, and a continuance at the sea-side seemed to re-establish her health.

On her return to town, however, she began to droop again ; and while suffering from smart diarrhœa, she was attacked in succession with vomiting, insensibility, and convulsions.

I found her with the head extremely hot, and the face and body quite cold ; she was insensible to external impressions, and in faint general convulsions. Taking the previous history into consideration, I simply applied cold water to the head and administered a "whiff" of chloroform every few minutes. In an hour she was able to swallow, and took wine-and-water with a relish—this was continued every hour. In twelve hours all the symptoms had left her, and she slept naturally. Next morning she appeared well but languid. Change of air was again resorted to, and she went to New Brighton. But she became worse during her stay, and began to scream with sudden headache ; she was then sent into another part of Cheshire in an almost hopeless condition. The air, however, suited her, and she rapidly and steadily improved. Two years have elapsed since the last change, and she has become much heavier in weight, firmer in flesh, and buoyant in spirits, and the head seems quite well. In this and all the other cases occurring in the family, dentition has had no connexion with the manifestation of the disease.

In another family, where the mother died of phthisis, one child, æt. 7, died of hydrocephalus after a few days' illness ; and both the others, now æt. 5 and 9, were affected slightly when about two or three years old ; attention, however, having been aroused to the first symptoms, they were speedily cured.

Though not strictly within the limits I proposed to myself, this subject is sufficiently interesting to justify its expansion ; I will therefore shortly sum up my experience of the complaint. The preliminary signs have at first to be ascertained ; they are these :—causeless (apparently) sickness, occasional nausea, *sudden* drowsiness, and as sudden awaking ; flashes of feverishness, loss of appetite, and such *malaise* as would lead a parent or doctor to say, “I can’t make out what ails the child,” fretfulness, and frequent tripping when walking or running. The head is occasionally hot and burning, and generally large. The parents, one or both, have some strumous or consumptive taint, or the child has had some depressing disease.

Analogy led me to consider the large head to be of similar origin to the large lip in struma. To test this, I measured the circumference of the heads of many patients at the commencement of the treatment : I found the head diminish in size as the child got well. The amount of the decrease in one case was one inch.

Amongst the poor, the plan of treatment was, at first, aperients and tonics, as I had been told that their combination ensured a good appetite and fair digestion ; but I soon found that purgatives,* even the mildest, lowered the patient’s strength, and did harm, and the following, therefore, became the routine plan. For the hot head, and hot skin, cold or tepid sponging was adopted till the feverish heat left, full doses of tincture of the sesquichloride of iron were given, a great deal of rest in bed was ordered, with bread-and-milk and cream for diet. Amongst the better classes, change of

* The fact that an acute attack of the disease is often determined by the occurrence of *diarrhœa*, ought of itself to indicate that it is unphilosophical to commence the treatment of hydrocephalus by calomel purges ; yet this is commonly done.

air was recommended, with inunction of oil through the skin, an opiate to relieve excessive irritability, and beef-tea, &c., in addition to milk—wine, ale, porter, or spirits and water sweetened with glycerine, if the child would take them. Since adopting this plan, I have only lost two cases, both of whom were far advanced in the disease before they came under my care; and I have had very many under treatment whose brothers and sisters have had the complaint, and succumbed under it.*

* While these sheets have been going through the press, I have been attending a case of hydrocephalus in which there was coma and constipation for a week. I have never seen a worse case recover. To me it seemed utterly hopeless. I treated it on the plan above laid down. Neither opening medicine or blisters were used; milk, cream and water, glycerine and steel, and brandy-and-water were used, as the mother could best manage to get the child (æ. 5) to take them. The little thing came out of her state of insensibility at the end of the week; had then a good appetite; the bowels acted naturally; and in four days more she was able to run about, and is now quite hearty.

CHAPTER IX.

DEFICIENCY OF VITAL POWER IN THE LUNGS.

Deficiency of vital power in the lungs, &c.—Functions during health—Respiration—Its mechanism—Rhythm—Spirometer—Effect of debility upon muscles of respiration—Upon lungs, physically; physiologically—Increased secretion.

OUR next subject for inquiry is—How does deficient vital force affect the lungs, or rather the organs of respiration generally?

1. Functionally; 2. Organically.

As it is difficult and almost impossible to take the lungs alone and ignore the mechanism by which respiration takes place, we must include the effects produced on the latter as well as on the former in our inquiry.

Inspiration is, as we know, effected by means of certain muscles, whose business it is to increase the size of the thorax in various ways. The idea of *muscular action* implies the idea of *exertion*; but few of us ever think that *exertion* is required to perform a movement of which we are almost unconscious, one which takes place habitually in our sleeping as well as in our waking hours; and it is not until we see some poor sufferer fighting for breath in asthma, pneumonia, croup, and other diseases, that we give any attention to the subject.

A short clinical experience will enable us to gain some

notion of the exertion put forth in ordinary respiration. Thus, if we place a man (or better still, a woman, because in the latter respiration is chiefly thoracic), who has had one lung destroyed by pleuritic effusion, on his sound side, we shall see that he raises his whole body at every inspiration, and this with little consciousness of discomfort, until the experiment has lasted some time. Taking the weight of the body thus moved at one hundred pounds only, it is tolerably clear, that the inspiratory effort is equal to raising one hundred pounds about the eighth part of an inch; and as twenty-four inspirations commonly take place in a minute, the exertion per minute is equal to that put forward in raising one hundred pounds three inches; and in twelve hours this exertion would equal that required to carry one hundred pounds up a tower sixty yards high.

This is the power required for ordinary quiet inspiration. When we come to consider the force expended in a very full inspiration, we find it estimated thus by Mr. Hutchinson, the inventor of the Spirometer:—"The introduction of seventy cubic inches of air into a chest of moderate capacity requires a force of 104 lbs.; when one hundred and ninety cubic inches are forced in, the elastic pressure to be overcome is 326 lbs.; when two hundred cubic inches are made to enter, the pressure rises to 452 lbs."—CARPENTER'S *Manual of Physiology*, 3rd edition, page 422.

So great an exertion of muscular power being necessary for inspiration, it is tolerably certain that deficient power in the muscles of respiration would show itself in some diminution in inspiratory power. Practically it does so. Thus, if any individual possessed of a spirometer will make a series of experiments upon his own person, and upon others whose habits he knows thoroughly, he will find that this instrument will give a most sensitive indication of the state of the

general health. T. I., æt. 40, *after* an early dinner, could drive the index to two hundred and sixty cubic inches; while, *before* the meal, he could not reach above two hundred and forty-five or fifty. The same man, after an attack of diarrhœa, could not reach above two hundred and thirty; and, after an attack of influenza, with complete anorexia, he could not reach above two hundred and twenty. Another individual—female—could reach one hundred and thirty easily in the morning after breakfast, but only one hundred and twenty at night after the day's fatigue; while during and after the catamenial period the index only reached one hundred and ten.

Mr. Hutchinson has himself called attention to the very low point attained by individuals in an early stage of phthisis, and he considers this an indication of an alteration in the physical condition of the lung; but as it can readily be ascertained that an almost equal reduction takes place in cases of *simple debility*, we are justified in attributing the low figure to *want of inflating power*, quite as much as to diminished capacity in the part to be inflated. Nor is it uninteresting to see the grades of departure from the healthy standard: taking one table, consisting of fourteen cases, we have the following in cubic inches:—14, 16, 32, 40, 44, 50, 52, 66, 70, 78, 114, 145, 150, less than the normal standard.

That the spirometer proves the amount of inflating power rather than the capacity of the lung simply, is a proposition that admits of easy proof. We have already adverted to the varying quantity of cubic inches expired by the same person under varying circumstances; we see the same result if an individual continues to exercise himself at the instrument for many minutes. At first the muscles are in good condition it may be, and the inspiratory effort and the expiratory one are prolonged to the utmost; but if the individual con-

tinues to try to blow up the receiver higher and higher, he will find that, instead of doing so, the standard reached is lower at every effort. Why? Not because his lungs are less distensible and healthy than they were before, but because the muscles, whose strength he has been taxing, have become exhausted.

Of the weakness of the muscular system generally, in people of consumptive tendencies, a close attention to the subject of myalgia has long convinced me.

Again, it must be borne in mind, that the action of the respiratory muscles is more or less *rhythmical*, and consequently we should anticipate that there would be some marked alteration in rhythm when their powers were failing. That it really is so is seen in the common phenomena of sighing and yawning. The first attends all diseases of debility to a greater or less degree. It is a marked symptom in those who have suffered from loss of blood, and almost invariably attends severe uterine or other hæmorrhage. Yawning is a phenomenon of a similar kind: it is produced by simple fatigue, by loss of blood, by want of food, by the use of such medicines as emetics, nauseants, and sometimes by mercurials.

Another marked deviation from the natural rhythm of respiration, is that known as hicough—a phenomenon depending upon irregular spasm of the diaphragm; but as this is due frequently to some derangement of the stomach alone, we will not consider it here.

These are not, however, the sole deviations from the natural rhythm. The number of respirations in a minute may be unusually augmented or reduced. Thus, in cases of low fever, some have the respirations as high as fifty in a minute; while in others they are as low as ten.

Nor is it without interest to stand by the bed of some

dying patient, and watch how, as dissolution approaches, the breathing becomes more and more hurried, until it reaches a climax ; how its rapidity then reduces, giving way to respirations long and deep, but occurring at irregular intervals ; how these intervals slowly are extended, until the vital flame is kept alive perhaps by one inspiration per minute ; and how, perhaps when all signs of life seem gone, one faint breath is taken after a long interval of quiescence—and then all is over.

Irregular breathing is, then, as much a sign of deficient vitality, as is sighing, yawning, and hiccoughing.

We have already adverted to the fact that inspiration is performed by the exercise of muscles of great associate power : this necessarily implies that they have a force to overcome. The physiologists tell us that a large portion of that force is made up of the elasticity of the substance of the lungs, and of the cartilages of the ribs ; and practically we know that as soon as the inspiratory effort is over, all muscular action ceases, and we infer thence that ordinary expiration is not the result of muscular contraction, but is, so to speak, an entirely passive phenomenon. Now, as there is strong reason to believe that it is the elasticity of the lung which is the main agent in expiration, we assume at once that any departure from the healthy standard of expiration is due to some change in the elastic condition of the lung. We find this is really the case : for in phthisis, where the lung is being replaced by tubercular matter, there is “prolonged expiration” as an early sign ; and in vesicular emphysema, where we find after death that the ordinary elasticity of the lungs is gone (as indicated by the non-collapse and sometimes even by the protrusion of the pulmonary organs when the thorax is opened), we have the patient often obliged to expire by a voluntary effort ; and in this we can readily see

one of the causes for the distressing respiration in cases of confirmed asthma.

In diseases of the lungs, it must be borne in mind, that efforts of coughing are necessary to keep them clear of the mucus, which would otherwise accumulate, and that deficient vitality in the muscles we employ in a forced expiration necessarily results in diminution of expulsive power, and consequent accumulation of secretion; and we draw as a corollary from this, that it is quite as important to pay attention in croup, pneumonia, and bronchitis, to the "coughing power," as to the condition of the lungs themselves.*

In a future chapter, we shall show that deficient vitality favours increased secretion in the lungs, as elsewhere; con-

* This observation seems to me to be of vast importance. In all the fatal cases of croup I have witnessed, the children have died of debility, and a want of adequate respiratory power. The trachea was pervious, but its calibre was diminished, and an unusual inspiratory force was required to get the necessary amount of air through it; but the lowering treatment adopted in the earlier stage of the disease had seriously diminished the power of the respiratory muscles, and when the demand came for increased exertion it could not be met. To speak metaphorically, the steam had been first "blown off," and when it was required to keep the machinery going, there was none available. In the same way patients with bronchitis die from deficient breathing and coughing power. Thus, A. B., æt. 45, a seaman, applied for admission into hospital for bronchitis. He had walked a mile up a gentle hill to the house. On his arrival he was sent up stairs. When he reached his ward, exhausted nature could do no more; he was too weak to breathe, and he died in two minutes.

I have seen other instances similar to this, some in phthisical patients, others in elderly people, and others in individuals treated by antimony.

This can be the more readily understood when we consider that with diminished respiratory power there must be decreased circulating force in the heart, &c.

sequently, we have, in many instances, deficient cough power simultaneously with increased necessity for it. This is very apparent in the bronchitis of the aged.*

The influence of deficient vitality upon the lungs themselves it is difficult to measure accurately. The first step in the inquiry is to ascertain the changes that take place in the majority of instances prior to dissolution, and the changes that are found after death; then to compare these with what evidence we can procure from the stethoscope during the lifetime of those who are slowly dying by asthenia, or are suffering from any debilitating disease.

In standing by the deathbed of a dying individual, no one can fail to be struck with the secretion of mucus which takes place in the larynx and trachea, and which continues to increase until death ensues. This secretion appears to be entirely independent of previous pulmonary disease, and may be aptly compared to the cold and clammy perspiration which is commonly noticed at the same time. The secretion takes place in death by asphyxia, as well as in death by asthenia; but it is rarely noticed when death follows syncope.

In examining bodies after death, in cases where that has been preceded by some very debilitating disease, and in cases where death has been produced by sudden or accidental causes, and comparing the lungs under these different circumstances together, we find in the former class that the pulmonary tissue is softer and much more permeated by fluid than in the latter, and that the quantity of blood contained in the posterior half is much greater than in the anterior half: and we infer, not only that the blood gravitates far

* I would note here in passing that croup has recently been very successfully treated in America by quinine, and by Dr. Richardson, of London, by chloroform inhalation; both of which plans keep the breathing and coughing power intact.

sooner in the corpses of the weakly than in those of the strong, but that in the former case it is attended with an exudation of its watery parts into the air-cells and small bronchi. We conclude, then, that in a dying lung there is an accumulation of blood in its most depending parts, and an effusion of blood, or serum, into its air-cells, and that the substance of the lungs is softer than natural.

Now as percussion and auscultation enable us to ascertain with considerable accuracy the presence of such a condition during life, we next inquire whether there is evidence of such a state of things in diseases attended with great diminution of the vital powers. We find that there is such evidence in fatal cases of croup and diphtheria, where the change can be noted from its first invasion up to dissolution, and similar evidence is met with in cases of typhus, erysipelas, Bright's disease, dropsy, scurvy, in severe cases of salivation by mercury, and the like.

If, then, there is evidence that deficient vitality evidences itself in the lungs by an increased secretion or formation of fluid in the air-cells and passages, and in diminished circulation through the whole lung, and in accumulation in its most depending parts, are we not justified in considering that the chronic bronchitis of old age or of weakly individuals is essentially non-inflammatory in its cause?

Another alteration to which we must refer is the degeneration of the pulmonary tissue into tubercular matter. This is so essentially due to deficient vital force that no proofs are required to establish the position. The same remarks apply to cancerous or other analogous degenerations, and in a limited degree to the change which occurs in vesicular emphysema.

From these considerations we may draw a deduction of the utmost importance—viz., whenever in diseases of the

chest the debility is great and the secretion excessive, there is *primâ facie* reason to believe that there is impaired vitality, and that the remedies indicated for the cure are those of a roborant, stimulating, or tonic character.

The beneficial influence of ammonia and other stimulants upon "bronchorrhœa," has long been recognised, and this forms another interesting and valuable example of a fact being ascertained long before any adequate explanation of it could be discovered.

As long as that observation stood alone, it was as an apparently isolated boulder on a vast plain ; but when, after long investigation, others of a similar kind were found, they led the philosopher to detect not only whence they came, but the powers that brought them there ; so now, when we recognise the principle above enunciated, we can recall hundreds of instances to our memory in which excessive lung or other secretions have been controlled within natural boundaries by medicinal, dietetic or climatic stimulation.

CHAPTER X.

DEFICIENCY OF VITAL POWER IN THE HEART.

Deficiency of vital power in the heart—Functions during health—
Debility produces impairment of function, in rhythm, in forcing
power, and physical change—Case—Deductions.

OUR next inquiry is—In what manner is the heart affected by deficient vitality ; or, in other words, what is the influence upon the heart of those debilitating diseases which terminate in death by asthenia, unless they are counteracted by medicinal or other remedies ?

We commence the investigation by ascertaining what the heart is during life and after death : what is its structure, and what are its functions.

During life the heart is a force-pump, whose strokes are steady and regular both in their power and frequency. It is composed of striped muscular fibre, as are the voluntary muscles : but it differs from them, inasmuch as its action is rhythmical and independent of the will. Its function consists in propelling the blood in an equable current through the pulmonary and systemic channels ; and, whenever any unusual exertion requires an unusual circulation of blood, its function is to carry on the extra circulation with the least possible discomfort.

After death the heart ceases to act at all, and is simply a fleshy bag. But it is to be noted, that if an animal is killed

in the midst of perfect health, and the heart is immediately separated from the body, it will continue to pulsate for a considerable period. We infer that it is the same in man. Now, if we examine a heart so circumstanced, and watch the gradual diminution of its beats, we shall find them *irregular* before they cease finally, and that, when they have apparently ceased entirely, they may be reproduced by direct irritation or stimulation. Hence we infer, that one of the phenomena attending the process of dying in the heart, is irregularity of its action ; and as we know that a dead heart cannot propel blood at all, so we have reason to believe that, during the gradual loss of its vitality, there must be a diminution in the force of its contraction.

The duration of time between the period when the heart is in full health, and when it is entirely dead, probably varies in different animals or individuals ; but, in the majority of instances, it is sufficiently long to enable us to prove that *loss of power* generally, if not universally, *precedes* irregularity of action ; and there is reason to believe, in many instances, that, when there is deficiency of cardiac power, the amount of the first irregularity is such as to be incompatible with continued life. Hence, in our own species, we not unfrequently have diminished circulating power, as the only sign shown by a dying or debilitated heart.

When irregularity of the heart's action is present, it manifests itself in a variety of forms. There may be simply an alteration in the force of certain beats ; the second, third, or tenth may be so feeble as to be imperceptible ; or there may be complete intermission of the fourth or other pulsation. These are occasionally found to be natural to the individual, and are not then to be considered as irregular.

Irregularity also shows itself by sudden and violent palpitation, by unusual rapidity of action, by the cardiac contrac-

tions being accompanied by pain, as if cramp were present ; and sometimes the irregularity is fatally shown by so complete a cessation of the heart's action, that death ensues ere the pulsations begin again. All are more or less familiar with these signs as indicating debility ; we have often prognosticated the near approach of death from an intermittent pulse, or have augured a restoration to health from a returning regularity. We have met with individuals whose pulse becomes irregular whenever they have catarrh, or other debilitating disease, and to whom the natural rhythm is restored by a glass or two of wine, or a few doses of quina.

The following case is an interesting one, as showing the connexion between irregular action of the heart and debility.

Mrs. J., æt. 64, was attacked suddenly one night after taking some indigestible food with intense stomachic pain, which lasted many hours, and was followed by jaundice. The pulse was very irregular, and there was a complete intermission every second or third beat. After a short time the health was partially restored, and the pulse became regular. For many weeks, however, too much talking, or even listening, would bring on the "fluttering." After the symptom had been absent for ten days, it was brought on again simply from the small exertion implied in getting from bed to a sofa, and it continued for three days. As the patient improved in strength, this went off again. One day I was summoned in great haste in consequence of a new and very distressing symptom, viz. intense pain in the pectoral muscles. This had come on suddenly at six o'clock in the morning, and was so severe that it almost precluded respiration. The absence of fever and other positive signs proved the pain to be purely "myalgic;" and on making special inquiries into its cause, I ascertained that the patient, when-

ever she wished to sit up in bed, had on the previous day invariably raised herself by the help of the curtains rather than be assisted by her attendants. The pain subsided in two days, and the patient once again ventured to get up, but the exertion, which was sufficient to produce myalgia, sufficed also to debilitate the system, and no sooner was the patient on the sofa, than the "flutterings of the heart" again came on distressingly, with irregular and difficult respiration, and three days elapsed ere the heart recovered its tone. Since then glycerine has been used internally, and the patient is now completely recovered, and has a perfectly regular pulse.

In my work on Myalgia, I have shown that the heart resembles other voluntary muscles in many respects; consequently, that like them it may become spasmodically affected by its work being greater than its power; hence, whenever general debility is present, the utmost attention must be paid to the heart, so that it may never be called upon for a sudden increase of exertion. Assuming the erect posture has before now killed men just convalescing from typhus, a run will destroy an aged person, and a walk uphill will produce "breast-pang" in the confirmed dyspeptic.

The following case is interesting, as it illustrates the connexion between angina pectoris, myalgia, and flatulence.

John S., æt. 60, labourer, came under my care at the Royal Infirmary, Liverpool, with angina pectoris. He was a well-made man, but he had distinct "arcus senilis" round both corneæ, and looked as if he had lived hard. The breathing was rapid and irregular, and the heart was beating tumultuously and irregularly. There was no sign of hypertrophy, nor any distinct bellows' sound, but there was a rushing sound along the aorta, which gave me the impression that atheroma was present. He complained much of flatulence and pain of the abdomen. The angina had existed for

a long time, but had latterly been very severe. He was directed to lie in bed and to take tonics. The result was, that the heart's action gradually became quiet, the breathing easy and natural, and he was free from all cardiac pain. But the flatulence continued to annoy him; for this he took various stimulants, and the stomach gradually recovered its tone. The sole complaint now left was abdominal pain. After close and repeated examination, I could come to no other conclusion than that this was myalgic. But all ordinary means of relief were used in vain. At last I adopted Dr. Wood's plan of injecting a solution of muriate of morphia into the pained parts, and the result was so satisfactory, that after a few repetitions the pain was no longer complained of, and the man went out after a residence of six weeks in the hospital. I cannot say he was cured, for any over-exertion will again bring on the angina, indigestion, and myalgia; yet if the man can keep quiet, he may not suffer again for years.

We have hitherto been considering the heart when dying, in the ordinary acceptation of the term—we may now consider it when "dying" in another acceptation. We have said that the heart consists of striped muscular tissue, that upon this its powers mainly depend: if, therefore, these muscles become gradually replaced by fat or other non-contractile material, until so large a change has been effected that the remainder is unable to carry on the circulation, the organ, during such a process, is dying as essentially as if it were dying on a plate, when separated from the body. In the one case contractions cease, because vitality has departed from the contractile substance; in the other, because the contractile substance has itself departed.

We shall, therefore, by closely observing the symptoms during life produced by a fatty or otherwise degenerate or

atrophied heart, approximate to those referrible to a dying or extremely feeble one.

Now the symptoms attending degeneration of the heart are by no means so uniform that we could draw from them, alone, any satisfactory corollary ; but they are at times so well marked, and their significance is so unmistakable, that they afford us most valuable assistance, as in the following case, which came under my care some years ago, and is still under notice:—

Miss C., æt. 28, of medium height, but of a weight approaching to fourteen stone, and of delicate constitution, began to complain of extreme fatigue after a walk of two or three miles. This was quite unusual, for, notwithstanding her size, she had been able to take a considerable amount of exercise. With the desire to keep down her bulk, she persevered in taking daily walks, until it was evident that she would be obliged to discontinue them, in consequence of the extreme faintness and dyspnœa which they produced ; and in about three months from the period when the symptoms were first noticed, she was totally unable to ascend a flight of a dozen stairs without an attack of dyspnœa and faintness of extreme severity ; and in a few days more she was even unable to walk across the room. The complaint increased in severity, in spite of treatment by steel, quina, potash, wine, and other tonics and stimulants, and at last reached such a pitch that even conversation was enough to bring on the paroxysms. At that time the following was her condition. As long as she lay quietly in bed, she was as comfortable, cheerful, and lively as in health : the breathing was easy, but the pulse small and feeble ; the heart's action regular, but feeble ; the appetite was moderate, the bowels regular, the catamenial functions sluggish ; the urine natural, and the sleep sound. To any casual observer she

seemed to be perfectly well. But if she merely turned round in bed twice together—or adjusted the bed-clothes twice in five minutes—or if she indulged for more than half an hour in conversation, she was seized with dyspnœa, the pulse could scarcely be felt, and she seemed to be in a state half way between syncope and orthopnœa—every moment seemed as if it would be the last. After all other means had failed to give her relief, cod-liver oil was resorted to, under which she immediately improved, and the improvement went on until she was able to take even more exercise than before.

The natural conclusion drawn was, that there had been deficient vitality in the heart, and consequently that it was unable to keep up the circulation whenever any increased demand was made upon its powers. This diagnosis has been confirmed by the further history of the case. Any depressing complaint is always attended with a return of the cardiac symptoms, and so unequivocal is the connexion between them and exhaustion, that on more than one occasion I have been able to trace the attacks to fatigue; and I noticed once, with no small interest, that a very severe paroxysm had been brought on *in the town*, by an amount of exercise she had been able to take with impunity *in the country*. In that attack she lay for nearly twenty-four hours, unable to speak or move, without a perceptible pulse at the wrist, and breathing in such a manner as to be unable even to swallow a draught of fluid. She recovered again when she returned to the country, and was able to walk four miles, and perform laborious household duties, without any distress. It was clear that the power of the heart to do its duty varied according to the patient's general health, and that a diminution of vital power was attended with diminution of the circulation through the lungs and body.

This case leads us to the suspicion that it is quite possible

that the symptoms characteristic of disease of the heart may have their origin in deficient vitality of that organ. But we are not justified in founding any theory upon a single case, and we therefore turn to those principles which are generally known and almost universally acknowledged.

Let us confine our attention principally to such physical diseases of the heart as can be recognised after death, and may commonly be diagnosed during life—viz. regurgitation through the mitral and aortic valves, with hypertrophy and dilatation, &c.

Experience has taught us that individuals having any of these diseases may live for years without even knowing that they have anything amiss with them. Many such cases have fallen under my own notice.* It has still further taught us that individuals suffering from such complaints may be so far relieved as to live for years in comfort; and we know that some persons have many recurrent attacks from which they recover. Now, as we cannot conceive that the ossified mitral valve or adherent pericardium can materially change their condition, we are driven to conclude that the varying condition of the patient depends upon the integrity or health-

* Mr. M., æt. 45.—Had a cardiac disease, occasioned (I infer) from an accident about fifteen years before I saw him. He was quite unconscious of it till I examined him for life assurance.

Mr. R., æt. 50, a civil engineer.—Had a very loud and rasping diastolic bellows' sound, best heard at the base of the heart, yet was apparently so well, that he had been passed by one physician as a healthy life, cardiac auscultation not being resorted to.

Mr. C., æt. 42.—Came to me, with a medical friend, in great indignation, because his life had been rejected at a certain office. He never had been ill, he said, and he looked in perfect health. Yet he had all the auscultatory signs of deficiency in the aortic valves.

Mr. D., æt. 45.—Had a continuous rasping sound, so loud that it could be heard at a little distance from him, yet he had never had an ailment, and seemed to be in perfect health.

fulness of the propelling power of the heart. If there be any truth in this idea, we shall expect to find that "cardiac symptoms" are far more common in the weak than in the strong, and that the most efficacious means for their relief are those which have a tendency to restore the vital power of the body generally, and of the heart in particular. Practically it is so. Angina pectoris is best treated by ferruginous or other tonics, and the best palliatives for cardiac asthma are ether, assafœtida, and other stimulants; while, on the other hand, it is well understood that purgatives and hydragogues cannot be pushed beyond a certain point for the relief of dropsy, unless they are associated with stimulants; and that those diuretics are the most efficient which are in themselves of a roborant nature; while digitalis, for long one of the most popular remedies in cardiac disease, requires to be most carefully watched lest the depression it produces should bring about sudden and fatal fainting.*

We are then justified in drawing these conclusions:—1. That very rapid or irregular action of the heart, as a general rule, is indicative of its failing powers. 2. That languor of the natural circulation, and an incapacity to carry on a sudden acceleration, is indicative of the same. 3. That these points have to be closely attended to in all cases of valvular disease.

After a close attention to the subject of disease of the heart, with especial reference to the cause of dropsy, of dyspnœa, of palpitation, of irregularity, and of sudden death,

* "I have witnessed a case in point. A young lady, æt. 21, had phthisis, and seemed to be greatly benefited by small doses of digitalis given three times a day. She became so much better that she was induced to walk out. On doing so, she suddenly fell dead in the street."—J. C.

the following aphorisms are suggested as of the utmost importance in the management of a cardiac disease.

1. A man may have diseased heart, and yet seemingly enjoy good health.

2. Anything which debilitates such a patient, will produce "heart symptoms." These may equally be produced by anything which obstructs the circulation through the pulmonary or systemic systems, *e. g.* bronchitis, renal disease, &c.

3. Anything which overworks a weak heart *suddenly*, may give rise to instant death.

4. The severity of cardiac symptoms is in proportion to a patient's exhaustion.

5. In the treatment of diseases of the heart, bodily repose is more essential than tonic medicines, &c.

6. There is little chance of curing a labouring man of cardiac disease unless he gives up work for a time.

7. In the same hospital, and in individuals apparently in similar conditions of heart disease, a plan of treatment seems successful in some cases, and useless in others, according as the patients are confined to their wards, or are allowed to take unlimited exercise, and to go up and down stairs.

8. In many cases treated for morbus cordis, results have been attributed to medicines, *e. g.* digitalis, which are due to the complete rest in bed, which is enforced upon the patients taking it.

9. Antimony, low diet, calomel, drastic purges, abundant venesection, however much present relief they may give, are ultimately prejudicial in cardiac complaints, if they produce subsequent debility.

10. Tonic medicines are very valuable in heart disease.

Here, again, we light upon the fact, which we have so often before alluded to—viz., that health is best restored to any part of the system by attending to that of the body as a

whole ; and that any treatment which ignores the constitutional power, however scientific it may appear, is based upon a wrong foundation. Of what avail, for example, would it be to cure a cardiac dropsy by elaterium or diuretics, so long as nothing is done to increase the heart's power, and thus prevent re-accumulation of fluid? * How far, even, is an active antiphlogistic treatment advisable in rheumatic or other endocarditis, when we find that depressing agencies are the most fruitful source of heart disease and of all the most distressing of the cardiac symptoms ?

Case.—John C., clerk, æt. 28, married, had an attack of acute rheumatic fever, for which he was treated on the antiphlogistic plan ; after about three weeks the heart became affected, and there was a systolic bellows' sound, best heard at the apex. He was now treated with large doses of mercury ; salivation was not produced, but he had alarming attacks of faintness, attended with distressing irregularity of the heart's action. I now saw him for the first time, and recommended stimulants and the discontinuance of mercury. The improvement in all the symptoms was immediate, and at the end of three days I ceased to attend in consultation. A few nights afterwards, however, I was called up with the intelligence that the man was dying, and that his ordinary attendant was out of town. I found the man perspiring profusely, the breathing was short and oppressed, he was so faint that he could scarcely speak or move, the heart's action was excessively irregular and intermittent, the bellows' sound as before. Not being able to trace this to anything else, I hazarded the question whether the mercurial pills had been resumed. I was told that they had been begun again the very day I left him (under the impression, as I subse-

* "I have seen elaterium remove dropsy, but at the same time it removed the patient quickly from the world."—J. C.

quently learned, that the drug under whose influence endocarditis commonly came on, was the best remedy for obviating its effects). In a few hours he began to be worse, and continued to be so till I saw him. The drug was once more suspended, and stimulants used, and with the happiest results; the plan was never again changed; and the patient ultimately recovered so completely that no bruit was heard at the end of six months.

That very formidable lesions may be perfectly cured by attention to the general health, the following case will show.

Mr. J. J. C., when a lad, had an attack of acute rheumatism, which was treated antiphlogistically. Endocarditis came on, and the same plan of treatment was still further developed; no appreciable change took place, however: the cardiac symptoms remained, and the gloomy prognosis was given, that there was regurgitation through the mitral valve, and this would ultimately destroy life. The rheumatic fever left at the end of six weeks, and the friends were told that the only hope lay in care and attention to the general health. The most sedulous attention was paid to these, and at the end of six years not a single abnormal sound could be heard, nor a "cardiac symptom" detected. The patient is now a fine young man. As I heard the abnormal sounds shortly after his illness, and have since satisfied myself that all is now healthy, I can only draw one of two conclusions, viz., that rheumatic valvular endocarditis may be recovered from—or that the bellows' sound in rheumatism may be produced by some other cause than fibrinous effusions or vegetations. Having had under my own care, in the Northern Hospital, some instances in which signs of valvular disease had come on in the course of acute rheumatism—first, after the rheumatic symptoms had entirely gone; secondly, during the course of a mild attack, the patient being under treatment

by lime-juice only,—I treated them with mercury and local bleeding, in accordance with routine, and I found the symptoms give way, or (if I saw the case after thirty hours' duration) remain stationary in less than two days.

But as the time, and the quantity of mercury, did not warrant the belief that the improvement was due to that drug alone, I determined to watch the course of the next case, if left alone. The opportunity soon came.

John S., *æt.* 35, had acute rheumatic fever, and was treated with eight ounces of lime-juice per day. The case was a bad one, attended with profuse sweating, and great debility. On the twelfth day of the complaint, he had slight cough, dyspnoea, sighing, faintness, and palpitation, and a physical examination detected a distinct bellows' sound, best heard at the apex of the heart. With a somewhat hesitating feeling, yet with the certainty that I was acting upon a fair and legitimate deduction, no treatment was adopted save the use of liquor ammoniæ acetatis as a placebo, and the attention of the students was specially called to the case, that they might correct my own impressions if they were wrong.

The result was that the patient's symptoms gave way in twenty-four hours, and the bruit never increased in intensity. He remained under treatment for about two months longer, as his strength was much reduced by the disease; but he went out at last in as good a condition as I ever knew a patient with cardiac disease leave any hospital which I have had the privilege of attending.

We cannot enlarge more upon this point here, but we would call attention to the following considerations:—1. Those who have been treated most actively by bleeding and mercury, for rheumatic fever, rarely escape endocarditis, which occasionally comes on even while they are under

“salivation.” 2. Those cases of rheumatic fever which are treated mildly from the first are rarely complicated with heart affections. 3. That those cases of cardiac disease which are ultimately the most severe and protracted are those which have been treated the most energetically at the first. 4. That those cases are ultimately the most comfortable which have been treated gently throughout, and with especial reference to the patient’s general condition.

We may put the same facts into a more striking form, thus :—

1. In acute rheumatism the amount of fibrine in the blood is unusually large.

2. The same is true in almost all cachexies.

3. Venesection, salivation, and fasting increase the fibrine in the blood.

4. Venesection and mercury in acute rheumatism favour the occurrence of pericarditis and endocarditis.

5. The duration of acute rheumatism, and the peril of the patient, are increased by a debilitating treatment.

6. Such an acute inflammation as pericarditis, ending with the rapid formation of lymph, may be compared with diphtheria, where the same thing occurs.

7. Diphtheria is a disease of debility, and is best treated with general and local stimuli.

8. It is better to leave a diphtheritic patient alone than to reduce his strength.

Consequently, if rheumatic pericarditis resemble diphtheria, it is positively a more philosophical plan of treatment to leave it alone, than to treat it by bleeding and mercury, the very means which favour its invasion.

As far as my own experience in acute rheumatism has gone, I should say that what is called the “old woman” plan answers far better than the “ardent young doctor” style :

and, comparing the present with the past, nothing has surprised me more than to see acute cardiac inflammation subside rapidly and almost completely in two or three days, under such mild remedies as leeching and a few doses of nitrate of potash—a plan which would have been considered as culpably inert a few years ago. Verily we may say, that as the surgeons in bygone days never learned the true meaning of the words “*vis medicatrix naturee*,” until they were fairly driven to such knowledge by empirics who used “weapon salve” and clean linen only, for the cure of wounds—so the physicians of the present century are gaining their knowledge of the same power, by the frequent success of those who administer potent drugs in impotent quantities.*

* We hear now, as in days gone by, a great deal about the difference between true and pseudo medicine. Few who use the expressions bestow a thought upon what *true medicine* is. I have heard one learned physician lay it down that true medicine is that which Watson’s book teaches, and which Alison and Abercromby taught! In his eyes everything which was new, especially if it came from Germany, must be false; and everything old must be revered as truth; and when he enunciated it, an admiring audience applauded his dictum. It is well that all the profession are not such “*laudatores temporis acti*,” but we are obliged to confess that, as a general rule, the majority of the profession believe that their doxy is “orthodoxy,” and other people’s doxy is “heterodoxy.” But for one hundred years the healing of wounds by the first intention was “heterodoxy;” and curing them by balsams, lint, charpie, vulnararies, &c.—was “orthodoxy.” Since then “*nous avons changé tout cela*.” At present amongst a few—and not long ago amongst the many—the curing of all diseases by drugs, the lancet, blisters, leeches, &c., was “orthodox;” but a time is coming—the sooner the better—when this will be universally considered as “heterodox” as we think the ancient meddling surgical practice was.

When once rational medicine is established in our schools, all the present “pathies” (and their name is legion) will be only cherished by those who are unable to appreciate jewels of gold, or pearls when cast before them.

CHAPTER XI.

DEFICIENCY OF VITAL POWER IN BLOOD-VESSELS.

Deficiency of vital power in blood-vessels—Arteries—Capillaries and veins—Alteration in structure and function—Elasticity destroyed or impaired—Veins varicose.

WE may profitably pass from the central organ of the circulation to the channels through which the blood passes, and inquire how deficient vitality affects the arteries, the capillaries, and the veins. Ere we can enter upon this, we must say a few words about the functions of these vessels respectively, and the circumstances under which it is self-evident that their vitality must be low.

It will be most convenient to take the different class of vessels *seriatim* : we commence with

The arteries, and inquire into their natural functions, and physical condition.

Their function, we shall find, depends mainly on their physical condition, as they appear to be nothing more than elastic cylinders capable of adapting themselves to distension, and again contracting. They do this regularly, whatever may be the quantity of blood contained in the system.

Physically they are made up of a peculiar fibrous tissue which might fairly be designated animal caoutchouc, with a definite contractile power. Any change, therefore, that takes place in them must be in physical condition, and accompanied by loss of elasticity or contractile power.

We can have little difficulty in allowing that we may have deficient vitality in the strumous or phthisical, and in those who are dying of old age.

To study the subject fairly, the best plan is to take the aorta of a very old man. This is to be separated at the heart, near to which it is generally the most changed, and pursued till we arrive at a part which appears perfectly healthy. We propose to commence our examination at the healthy part, and continue it till we reach the termination of the disease. As our naked eye will not tell us everything, we must aid it with the microscope. After having made a few sections in a healthy part to familiarise our eye with the normal structure, we take a few delicate slices from the part immediately above this, and we now find a few scattered oil-globules which we did not see before. These are most numerous just below the serous or epithelial coat. As we near the heart we find the globules increasing in number, and having a definite linear arrangement. They resemble a double wedge made of beads, and are parallel to the length of the artery. Higher up we find the numbers of the oil-globules materially increased, and the linear arrangement has become a circular one. We find, too, in addition to the sub-serous patches, that a larger amount of scattered fat globules are to be met with in the substance of the elastic coat. A careful examination now will enable us to detect with the naked eye, especially after maceration in water, minute opaque white dots studding the apparently healthy artery, beneath the serous coat. We next find that the patches have increased in size, by the addition of oil-globules to their circumference, and we see that those in their centre have been replaced by granular matter. Making now a series of transverse sections, we find that the matter has increased deeply as well as superficially, and that the deposition of fatty globules

extends to the cellular coat of the artery, decreasing, however, in quantity from within outwards. Passing upwards, we find this fatty degeneration, as we may term it, increasing. The patches are much larger, more perceptible to the naked eye, and they evidently raise the serous coat above the surrounding level. As they increase in size they become less fatty and more granular, and a little manipulation shows that they increase in size at the expense of the elastic tissue. The amount of fatty matters scattered "promiscuously" through the rest of the artery is also commensurately augmented. We next find the accumulation so great that it has completely taken the place of the arterial coat for an extent probably about the size of a horse-bean; the serous coat has become thickened, harsh, and opaque. With the back of our scalpel we can readily, however, break through it and dislodge the yellow mass below; when thus scraped out, it leaves a hole through the yellow coat, and we can readily see how this might become the commencement of an aneurism.

There is indeed no reasonable doubt that aneurisms are in reality thus formed: the elastic coat of the artery being entirely replaced, in any spot, by morbid fat, can no longer resist the distending power of the heart; it gives way, and the cellular coat, having once begun to distend, continues to do so. We conclude that aneurisms are thus formed:—First, because it is a very rare thing, if indeed it ever happens, to have an aneurism without our being able to detect fatty degeneration (or what we shall subsequently see under the name of brittle degeneration) in some other part of the same vessel. Second, because when aneurism occurs in one part it is very likely to occur in others. Third, because on no other hypothesis can we explain satisfactorily the size and rotundity of the openings into the aneurismal sac. I once

met with the case of a very old man whose aorta was extraordinarily diseased. It was studded with bony concretions in the upper part, with firm atheromatous or cheesy matter lower down, and at its termination in the iliaes with soft material, as easily removed as butter. One of these had given way from an accidental bodily shock, and death resulted from aneurism in six weeks. I do not of course deny that the brittle degeneration, of which we shall subsequently treat, as it occurs in the capillaries, may not be present in the large arteries, and that the rupture may not be due to that. I can only say that I have not yet met with it.

Fortunately for the patient, however, the degeneration is principally confined to the inner half of the elastic coat, leaving a sufficient amount of healthy tissue to prevent the formation of an aneurism. The degeneration, however, advances, and we have at length a distinct yellow cheesy-looking mass, which does not, as far as I can make out, differ, microscopically, in the smallest respect from yellow tubercle. At this period the serous coat very often gives way, and it is possible that fragments of the atheromatous mass may be separated from the rest and carried onwards by the circulation, ultimately to be arrested by the diminishing calibre of some artery, which they will thus completely block up.

With increased deposit on the interior surface, there is increased degeneration of the rest of the elastic coat, and it is impossible to make a section in which abundance of oil-globules are not seen in the field, giving a totally altered appearance to the ordinary one presented by the yellow coat.

If the individual survive this stage, we next find the deposit becoming denser; a calcareous formation is to be recognised under the serous coat, which is now greatly thickened. The plate of bone (so called) is at first thin and eribriform,

and of the shape of that segment of the cylinder where it is situated. It gradually replaces the yellow deposit, and then begins to contract from the circumference towards the centre. The result of this is, that the osseous plate assumes the form of a shallow bowl. It separates at the edges from the parts below, breaks through the serous coat, and presents a rough obstacle to the circulation of the blood. I am unable to pursue the change further, as I have never seen an instance in which the plate has *become dislodged*.

I have pursued the alteration of physical condition thus far without making more than one digression upon the results following from the change. We must now examine in what way the degeneration deteriorates the artery. This need not detain us long, for it is clear that if the elastic coat is replaced by a fatty, or other non-elastic material, to any extent, it must, *pro tanto*, be weakened. It is just the same as if so much India-rubber were removed from the thickness of a caoutchouc tube, and replaced by butter. The necessary result is a diminished resisting power; the artery, at every systole of the heart, is distended unusually, and is not able to contract with sufficient power during the diastole. Dilatation follows. If the degeneration be general, as it commonly is, we have general enlargement of the arterial calibre: but if partial, as I have on three occasions seen it, we may have local distension, and a "true" aneurism formed. In the cases referred to, the distension occupied the ascending aorta, and the aneurisms resembled the bulbs on chemists' tubes. If the degeneration is more local, and only occupies one side, we may have a pouch formed.

As long as the atheromatous deposit does not roughen the inner surface of the aorta, there is usually no sound to be detected by the stethoscope; but when the serous coat gives way and the osseous plate forms an obstacle to the blood, we

have commonly a loud, and sometimes a continuous rasping sound, best heard over the upper sternum, &c.

With these physical signs, constitutional ones are occasionally met with, fairly referrible to the condition of the artery. They are similar to those produced by valvular disease, or other causes which impede the circulation. This is readily explained, for the power of the heart which, in systole, was once adequate to force the blood along a firm and elastic tube, is now partly expended in distending the slightly resisting canal; while the arterial resiliency which, during diastole, was enough to help on the blood till the next systole, is inadequate to the duty. The heart then must increase its contractile power accordingly, or there will be a comparative arrest of the circulation; just as a paralysed rectum or œsophagus will produce the same effects as a downright stoppage of the canal.

A very remarkable instance of the occasional effects of the degeneration we have spoken of has come under my care, at the Northern Hospital.

Mary M., æt. 26, a sailor's wife, with one child, had symptoms of severe cardiac disease. She had terrible dyspnoea, increased paroxysmally, and almost precluding speech. The pulse was feeble, and the countenance livid. The physical signs showed extensive dulness on percussion, and a loud continuous murmur along the course of the aorta. She was long moribund, and died gradually of asphyxia. The only history we could obtain was, that five weeks before her admission she had been lifting a very heavy weight, had felt something give way in the chest, and immediately suffered from palpitation and dyspnoea, which last had steadily increased. Severe pain was complained of, and always referred to the base of the heart. *Post-mortem*.—Heart alone examined. Left ventricle dilated and hypertrophied; its mus-

cular fibres in a state of fatty degeneration ; the valves were all healthy. On examining the base of the aorta, it was found to be distended to double its ordinary area, and *to such a degree that the valves did not meet and close its lower aperture*. The inner surface of the artery was studded with spots of ecchymosis, and effusions of red blood ; at one spot, covering an area of the size of the little finger-nail, and just above one of the valves, there was a genuine ulcer, about the tenth of an inch in depth, and covered with the torn remains of the serous coat. On making a microscopic examination of the aorta, it was found studded thickly with oil-globules and blood—the last occurring in masses of considerable size : about the ulcer there was pus. There was little reason to doubt that there had originally been a great amount of fatty degeneration, and consequent loss of resisting power in the aorta, and that during the violent effort of lifting the distending had overcome the resisting force ; that the area of the cylinder had been forcibly augmented by stretching, and rupture of much of the fibrous element. The result had been ecchymosis, and subsequent inflammation of the artery. This is the only instance I have met with of genuine aortitis.

If we inquire now into the function of the capillaries and smaller arteries, and examine their physical condition, we shall find that they are very delicate cylinders, having one single, thin, transparent, homogeneous, and elastic coat. In health, their calibre is generally uniform, but in some parts there is provision for a periodic distension, as in the uterus, penis, mamma, ovary, and probably elsewhere. They, with the parts lying in their vicinity, have an influence not yet perfectly understood, over the circulation of the blood. By the thinness of their coats they readily allow the nutritive material of the blood to reach the tissues, or the effete particles to enter into the venous current.

Any alteration of function can be best inferred from change of structure. This change is generally met with in conjunction with atheroma in the arteries and in phthisis. It is common, too, in old age and all diseases of debility.

We find, if we examine the capillaries microscopically, a series of changes, as important in their nature, if not even more so, than what we have seen in the heart and aorta. The change is not uniform in its character, though nearly so in the results arising from them. We have two grand types of degeneration here : the fatty and the brittle. The fatty degeneration does not essentially differ from what we have already seen in the aorta. The capillary walls are first studded over, and then finally replaced by fatty matter.

This may occur without materially altering the calibre of the tube ; but very frequently the hyaline wall is much increased in *thickness*, and sometimes the interstitial deposit in the walls, and the fatty matters adherent to their free surface, is enough to *block up the canal entirely* ;—the vessel then has the appearance of a strip of fat globules.

When the change takes place in any vessel of unusual magnitude, the effect is often very disastrous. The resilient wall has lost its quality at the degenerate part, and being no longer able to resist the distending power of the heart's action, gives way at the weakened spot. If the diseased area be considerable, and the vessel large, the hæmorrhage resulting is formidable. If, on the contrary, both be small, the bleeding will be insignificant, and the gap will soon be closed by the pressure of the effused blood exterior to the ruptured vessel. Whenever this degeneration is present, there is peculiar danger from any powerful bodily exertions, such as straining at stool, lifting weights, or from any other cause which distends to a great degree the cerebral vessels. Intense emotion, especially anger or excitement, the too

liberal use of alcoholic stimulants, will have a similar effect. All alike promote a rending of the healthy coat from the degenerate portion. The same result will ensue from the ordinary strain experienced in systole, whenever the degeneration has reached beyond a certain point.

For the appearance presented by these fatty vessels, I would refer the reader to the woodcuts illustrating Dr. Radclyffe Hall's "Essay on Tubercle," in the *Brit. and For. Med. Chir. Review*, No. 30, page 424, and No. 32, page 482.

Passing by, for the time, the temptation afforded by the last paragraph to develop our views on the nature of the degenerations we have treated of, we come to describe what we have termed the "brittle" change. We have selected the word, because it simply expresses a fact without involving a theory. Every writer on apoplexy has adverted to this particular condition of the arteries, and has connected it with the atheromatous and osseous change so common in the aorta. I need not describe the appearances presented by the larger arteries, beyond saying that they are commonly of a dull white colour; and that, though they seem thicker than natural, they are readily torn through, and have little real strength.

A similar phenomenon is found in the capillaries: they are thickened, and they readily break in manipulation. The increase in thickness is due to some semi-opaque material, in which no structure can be made out with a magnifying power of 600 diameters. The only thing I have been able to compare to it, was a deposit in the arachnoid, met with in a child dead of hydrocephalus. This membrane was most profusely studded with opaque white spots, which all would concur in calling tubercular, but no structure whatever could be seen; there was simple milkiness or opalinity, and nothing more. The thickening of the wall of the capillary is often

so considerable as almost to choke up the calibre of the vessel. A similar change is to be met with in the capillaries of the lungs in phthisis, and of the lower extremities in senile gangrene.

Through the kindness of Dr. Nottingham and Mr. Millett Davis, surgeons of the Liverpool Southern and Northern Hospitals, I have been enabled to recognise changes analogous to the above in arteries near joints where amputation has been performed for strumous affections.

There is, however, another form of degeneration of the capillaries. In it the walls become thickened by the formation within them of large granules—solid, irregular in shape, and of a faint greenish yellow hue, resembling, in fact, the granules which I once found composing a tubercle in the brain. Their size is about the $\frac{1}{330}$ th of an inch, sometimes $\frac{1}{2500}$ th. Occasionally I have seen them adhering to the outside of the capillary vessel by a transparent, yet firm plasma; and sometimes in the interior, surrounded by a cell larger than that of the lingual epithelium.

The measurement of the capillary walls gave a thickness of $\frac{1}{2500}$ th; the diameter of the whole vessel was $\frac{1}{600}$ th; the diameter of the canal was only the $\frac{1}{2546}$ th of an inch. The ordinary diameter of the capillaries may be stated at $\frac{1}{1800}$ th; and the thickness of the wall at $\frac{1}{6000}$ th of an inch. When we consider that the diameter of a blood globule is $\frac{1}{3000}$ th of an inch, we can see that a very little further thickening of the vessel would, in the case above, have rendered it impervious to the red corpuscles.

The necessary effect of the two last changes we have described is a deficiency of nutrient material, in consequence of the quantity of blood circulating in the part being materially diminished, unless, indeed, the contraction in the

canals is compensated for by increased rate of movement : and this is generally impossible ; for we find that the changes are attended by degeneration and debility of the heart itself. The heart, however, under favourable circumstances, does become hypertrophied, and thus prevents, to a certain extent, the necessary consequence of the diminished flow of blood.

If we pursue the consequences likely to result from these changes, we find :—First, apoplexy from cerebral hæmorrhage. This is in many instances the result of great excitement or over-exertion, either of mind or body. By these a sudden flow of blood is directed to the brain. Under ordinary circumstances the capillaries would have allowed it to circulate freely, but now their diameter is reduced in the proportion of $\frac{1}{1546}$ th to $\frac{1}{2800}$ th, or nearly as two to three, their power of distension is all but gone, and a rupture necessarily follows, not of one or two vessels only, but of many. Secondly : In consequence of the quantity of blood circulating in these altered vessels being diminished to at least a third, the parts around lose a large portion of their vital power, and are prone to fall into a state of mortification. This is averted so long as the heart has tolerable activity, and as long as the degeneration is not increasing ; but whenever the former is absent, and the latter present, complete suspension of nutrition follows, and mortification ensues. We recognise this in the senile gangrene of the legs in the aged, and in the softening of the brain, so commonly met with in those whose arteries are atheromatous or otherwise diseased.

The third result from the state of things we have described, is of particular interest to the surgeon. We have seen that atheroma is the most common cause of aneurism ; and we have attempted to show that simultaneously with the change in the large arteries we have formidable alterations in the calibre and elasticity of the smaller vessels and capil-

larics. We scarcely need point out how completely this accounts for the frequency with which more than one aneurism is found in a single patient: but we must lay some stress upon the insight thus given into the occurrence of gangrene of the limb after deligation of the artery, and the comparative frequency with which hæmorrhage occurs after operations for aneurisms not far removed from the aorta, as the carotids and subclavians.

It is assumed by the surgeons, that when an artery which supplies a limb is tied, the other arteries will supply its place. This involves the idea of temporary distension of the capillaries, and of all the small arteries. Experience has shown us that this distension will take place in health: it has equally shown us that it will not uniformly take place after aneurism. How can we now expect that it should, when we know that in such cases the capillaries are reduced in calibre from a sixth to a third, and have lost almost entirely their distensibility? They are not in a position to keep up the circulation; their previous inefficiency has already reduced the vital power of the limb, and when the direct supply leaves them, the parts lose their vitality entirely.

That gangrene does not follow ligature of arteries more frequently, is due to the fact that disease is rarely universal over the whole of a system at the same time,—that is to say, measles does not affect the whole skin simultaneously; phthisis the whole of the lung; syphilis the whole of the penis; atheroma the whole arterial system; or erysipelas the whole of the head. The whole system is obnoxious to the morbid change, but rarely at the same time.

Again; it is a melancholy fact that ligature of arteries for aneurisms near the aorta, is generally an unsuccessful operation. We can be at no loss for explanation, when we

find that in all these cases the middle coat upon which we depend for union, &c., is in such a degenerate condition that it is unable to originate and complete those changes which would take place were it in a healthy condition.

Experiments, in fact, upon healthy arteries and capillaries are not applicable to those which are unhealthy, and aneurism is a certain proof of the presence of disease.*

Lest it should be supposed that I am broaching an entirely new doctrine, let me ask my readers to consult the remarks made by experienced surgeons upon amputation in the aged—in those affected with senile gangrene, and in those whose limbs have mortified after tying an artery—they will almost invariably find a condition of the arteries in the stump referred to, such as I have named: they are either brittle or soft; at any rate, they are easily cut through by the ligature, and when the ligature separates, there is secondary hæmorrhage from non-union of the divided parts of the middle coat.

We have little to say respecting the veins—their function is simply passive. Their walls and valves are arranged to allow of the passage of the blood in a steady current to the heart.

They consist chiefly of white fibrous cylinders, whose walls are incapable of much distension.

But when there is debility present, the veins are greatly distended and become varicose.

This is usually attended with pain.

The distension may be relieved either by mechanical con-

* It is only fair to other observers who have preceded me in the study of the blood-vessels, to state that I have been engaged on the subject for sixteen years, and that I have not quoted them simply because I prefer giving the results arrived at in my own words. I fully acknowledge their priority and their merit.

trivances, by lessening the hydraulic pressure of the blood, or by increasing the general tone of the system.

Upon the ulterior effects of this, *e. g.* ulcers of the leg, it is unnecessary to dwell.

I may, however, give two instances in which a marked improvement took place in enlarged veins from local and general medication.

The first is recorded by Whithead. A lady, while pregnant, suffered very much from enormous venous distension about the vulva; after a variety of plans had been tried in vain, a strong solution of nitrate of silver was used, and the utmost relief followed. The caustic had constricted the veins as it does the capillaries in strumous ophthalmia.

The second has come under my own notice.

A lady in each pregnancy suffered severely from a very large vein close to the vulva,—nothing did it any good, save rest in bed or on a couch; at last it was resolved that, as soon as pregnancy was known to exist, the lady should go to the sea-side. The plan has been successful; and though two periods have now passed, the vein has not again swelled to the same size or become painful.

It is remarkable that in this case the influence of pure air was equally marked on the stomach; the change put a stop completely to the daily vomiting, which had become distressingly severe.

CHAPTER XII.

DEFICIENCY OF VITAL POWER IN THE STOMACH.

Deficiency of vital power in the stomach—Functions during health—Evidence of impairment—Flatulence, acidity, loss of appetite—Case—Anorexia—Its significance as a symptom—Influence on practice—Cases in point.

OUR next examination is into the manner by which deficient vitality makes itself manifest in the stomach.

We have here at our disposal, as in previous instances, various modes for solving the question proposed. We may examine into the changes that take place in the stomach after death; what changes in digestive phenomena ensue while the stomach is being gradually converted into a scirrhous mass; and what phenomena, due to this organ, are met with in cases of asthenia generally.

Ere we enter on the subjects, however, we must first inquire, what are the special functions of the stomach? for until we have satisfied ourselves on this point, it is quite useless to investigate morbid phenomena. Each organ when diseased has symptoms peculiar to itself, and these can only clearly be understood by comparing or contrasting those symptoms with the ordinary healthy phenomena.

The function of the stomach during life is comparatively simple. It has to prepare the food for its ultimate conversion into chyme, chyle, blood, and tissue. In the perform-

ance of this function, it has the power of secreting a peculiar fluid of great solvent or digestive attributes ; it is capable of immense distension without its walls giving way, but it is always firmly appressed over the food it contains, and when empty is contracted upon itself, and the digestive processes go on without pain or other sensation. We anticipate, therefore, that any deficiency of vitality will show itself in faulty secretion, intolerance of food, pain, diminished distensile power, and want of contractility when empty.

If we examine the changes that take place in the stomach after death, we find that they differ according to the condition of the individual during life. Thus, a healthy man, full of life and vigour, struck down suddenly after having taken a meal, is found with the stomach firmly contracted on the food, and itself partially dissolved ; and if the sudden death ensue when the stomach is empty, it is found firmly contracted upon itself ; in one instance, I have seen it distinctly divided into two parts, like an hour-glass, by a circular band of fibres. This condition, however, is not generally permanent ; for after a certain period, say about thirty-six hours, the stomach becomes distended with an enormous amount of gas.

In those who die after long illness, and in whom, prior to the time of death, the vital powers are at a very low ebb, we find almost invariably that the stomach contains other fluid besides food, and that it is greatly distended with gas. Of the nature of this fluid we do not know much—all that we can say is, that it is not healthy gastric juice.

Again ; if we examine the phenomena attendant upon the gradual conversion of the stomach into a scirrhus or other morbid substance, we find, first, a want of healthy gastric juice, and consequently, either simple indigestion, acidity, waterbrash, or we may have a secretion of vast quantities of

flatus, an intolerance of distension beyond a certain point, and consequent vomiting; a condition which may be followed by a loss of nearly all contractile power, the organ then being as distensible as a carpet-bag.

If we turn to asthenic diseases, such as typhus, scarlatina, yellow fever, and the like, we see essentially the same things: vitiated secretion of gastric juice, the generation of gas,* and almost total destruction of the digestive powers, with great impatience of the least distension, and, consequently, almost incessant vomiting; or we may have almost a total want of contractility, the patient taking everything offered to him, but digesting nothing: or there may be irregular contraction, producing very painful cramp.

I well remember an instance in which this last condition was the herald of approaching death. The sufferer, a boy, *æt.* 3 years, was, at the time of the occurrence, in profound coma from water in the head; but he was able to swallow and to digest "wine whey" with facility; one morning, however, the administration of the food was followed by sudden flatulent distension of the stomach, and the lad sprung up in bed with a most distressing cry, screaming apparently with pain, though insensible to what was going on around him. By diligent friction and shampooing, the suffering seemed to cease, and the child relapsed again into the hebetude of coma. After an interval of three hours some more food was given, containing a larger dose of the stimulant, but it was followed almost immediately by the same agonized cry. Shampooing the abdomen again quieted the sufferer, but he died in another hour.

Now, if we find that a dying condition of the stomach,

* The subject is of sufficient interest to warrant the addition of an Essay on Flatulence, which will be found in the Appendix.

i. e. a diminution of its vital powers, is accompanied by such symptoms as we have described, have we not *primâ facie* grounds for considering that, whenever such phenomena are present, they indicate a debilitated condition of that organ? —and must not this consideration materially influence us in our plan of treating its diseases?

If, then, indigestion implies debility, it becomes the duty of the physician to ascertain the cause of such weakness: whether it exists in the stomach alone, as in malignant disease, ulcer, and other diseases of an allied character; or whether the stomach is simply in the same condition as all the other organs, and weak from simple failure of the constitutional power. An exhausted stomach can no more digest food than an exhausted muscle can contract.

Into the details of this subject it is unnecessary to go; sufficient has been said to make the line of treatment obvious —viz. to suit the food to the powers of the stomach, and to increase these as much as possible by hygienic, dietetic, medicinal, or other contrivances, and to avoid, *as directly injurious*, all depressing medicines, such as antimony, mercury, or drastic purges.* The first case I would offer in

* I have known a case of dyspepsia kept up for many months by what the physician considered very mild alterative doses of blue pills or grey powder every second day. During the whole period, the lady steadily got worse, deteriorating in strength, and losing flesh weekly. When first I saw her, she had constant flatulence, and was so debilitated as to be unable to sustain a half-hour's conversation without faintness. Her illness had been caused by long and anxious watching over a delicate husband, and had been aggravated by the directions received from her medical attendant, "to take plenty of exercise." I simply recommended such tonics as steel, digestible and slightly stimulating food, and a disuse of alteratives and aperients. The lady began to improve perceptibly during the first fortnight, and was sufficiently well in six weeks as to require no further attendance.

illustration of this point is one of presumed ulcer of the stomach which I have had an opportunity of watching very closely.

Miss E. C., æt. 40, a fine, healthy, and robust-looking woman, habitually active, both mentally and bodily, and residing in a healthy part of the country, began to suffer from palpitation of the heart, total anorexia, and hysterical fits of crying. These were readily traced to her having had to nurse a valued relative through a very trying illness terminating fatally, and to the anxiety and physical labour it involved. Tonic medicines and change of scene set her up again, and she remained pretty well for twelve months, when she began to suffer from habitually painful dyspepsia : there was constant craving for food—yet no sooner was it taken, than pain commenced and continued till the stomach was empty ; with this there were uncontrollable propensity to cry—a most common sign of general or nervous debility—low spirits, palpitation of the heart, and languid circulation. As all medicine and hygienic management proved useless, she was again obliged to go away for change of air and scene. The effect was immediate, and she came back quite well in less than a fortnight.

Shortly after this, however, the severe illness of the relative with whom she lived threw an unusual amount of physical exertion and mental anxiety upon her shoulders, and all the stomachic symptoms returned, and amongst the worst of these, were eructations of fluid tasting like putrid flesh. There was now total anorexia, and nothing whatever could be taken in the way of food which did not disagree. After vainly trying every plan I could suggest, and the lady not wishing to leave the house once again for change, I recommended her to keep her bed entirely ; as milk disagreed with the stomach, beef-tea was given in its stead, and three glasses

of wine were given daily, with a tea-cupful of arrowroot, as an *enema*. Glycerine had been tried and abandoned. Inunction with oil was used in its stead. The effect of this was very marked: the wine enemata completely staved off the crying fits, and the beef-tea agreeing with the stomach, the nauseous eructations ceased. Finding her improving very rapidly, but recognising from certain signs* that she was still in a very debilitated condition (though she had abundance of colour in the cheek and handsome *embonpoint*), I gave her particular orders not to leave bed on any account whatever for more than five minutes. At my next visit her report was a bad one: she had had a return of the nasty eructations as bad as ever for the last three days, and she attributed them to having sat up in her sick aunt's room for upwards of half an hour. This had been before I spoke to her of the necessity of perfect rest. As is so often the case, the effects of this over-exertion did not show themselves until an interval of twelve hours had elapsed. Since then she has strictly followed my directions and has steadily improved; there are now no eructations or flatulence, the strength is daily increasing and the appetite returning.

The last remark naturally suggests the question,—What does an exhausted stomach do with inappropriate food when it is put into it? The answer leads us to two or three practical conclusions of considerable importance.

1. The stomach rejects the food by vomiting.
2. Or it rejects it by passing it into the bowel and producing purging.

* These signs were "oppression" of the chest—frequent sighing respiration, especially during conversation—a feeling of emptiness in the abdomen, from want of firmness in the abdominal walls—sensations of giddiness when rising to the erect posture, with severe myalgic pains in the lumbar region after sitting—weak pulse, &c.

3. Or it retains it, and is irritated by it into painful spasm.

Upon each of these phenomena we may pass a few remarks, and record a few illustrative cases.

1. In thinking over the circumstances under which the stomach is likely to be enfeebled, it naturally occurs to us that it will very probably be so as soon as pregnancy happens ; and a woman has to make a new or second being out of the materials which have hitherto only just sufficed for the conservancy of one, and in an instant the remembrance of the "morning sickness" of the *enceinte* comes to the surface of memory ; but while ruminating on the mental "cud" thus brought up, recollection of many a case *in both sexes* tells us that "morning sickness" is common in delicate children, virgins, and in consumptive men, and we infer at once that the sickness is not simply produced by the uterine irritation to which it is usually attributed.

This idea being once started we pursue it, and ask ourselves, Do all pregnant women suffer from sickness ? When they do so, why is it chiefly in the morning ? What have the pregnant in common with the other classes we have named ? If all those who are *enceinte* do not suffer from sickness, who are those that escape ? Can the morning sickness be cured ; and if so, can we deduce from that, any inference why some women suffer so much and others so little ? Still further, can we fortify our deductions by reference to other cases in which vomiting has clearly depended upon debility alone ?

To answer all these questions in detail, and to record all the arguments "pro" and "con" which we have examined ere we drew the following conclusions, would occupy too much space ; we must content ourselves therefore with saying

(1.) All pregnant women do not suffer from morning sickness.

(2.) Those who do so are the constitutionally, &c., weak.

(3.) Morning sickness is common amongst delicate boys, girls, and adults* of both sexes. In all the above cases the attack comes on, generally, when the *erect* posture is assumed and *faintness* is felt.

(4.) It is a *morning* sickness because at that time the stomach is the most exhausted by the long "fast" during the night.

(5.) If the pregnant woman's debility is great, the matutinal sickness may become diurnal.

(6.) Those women who are constitutionally strong escape

* The following case is an interesting example of morning sickness in a man :—J. J., æt. 30, a strictly temperate man, manager of a large spirit retail, came to me complaining of a severe inflammatory pain on the left side, which, he said, he could cover with his thumb. I found, on questioning him, that he suffered also in other parts of the trunk from myalgic pains at night, and that for some weeks past he had suffered from cough, and was beginning to lose flesh. I could detect, however, nothing wrong in the lungs. His appetite and digestion were good, and the bowels regular. *Every morning, however, for the past nine months, he had had sickness and vomiting.* This came on generally *about five minutes after he got up*; he merely passed some flatus and stringy mucus. He had no signs, so far as I could discover, of ulcer of the stomach. Considering that the man was simply suffering from debility and overwork, I recommended a glass of milk, with some rum in it, to be taken before getting up; tincture of iron, with eod oil, three times a day; ale or porter at dinner, a good supper about an hour before bedtime, and as much rest, in the horizontal position, during the day, as could be obtained. He adopted this plan, and had no return of the sickness for four weeks. At that time he one day felt so much better, so thoroughly well, as he thought, that he not only returned to his ordinary work, but exceeded it; he felt, he said, at bedtime that he had done too much. The next day the morning sickness came on as usual, and the curd of the milk he had taken was vomited in a long lump. He at once took the hint, kept himself very quiet the whole of that day, and has been careful of himself ever since, and the morning sickness has not returned.

sickness, but if fatigue or anxiety pull down their vigour they suffer like their weaker neighbours.

(7.) A pregnant woman only a little below average health may recover from attacks of morning sickness, by going to reside in a healthy part of the country,—provided she does not take children or other sources of care and anxiety with her.

(8.) Next to change of air, the best cure for morning sickness is, 1. the habitual use of such tonics as steel ; 2. the precaution of taking such food as rum and milk a few minutes before rising into the erect posture will ward off the sickness ; 3. a few days' rest in bed will cure the diurnal sickness ; 4. the cure is expedited by stimulants, and we may add that patients only suffer much from the sickness when they are otherwise weakly or miserable.

Can we fortify these deductions by appealing to other classes of experience ? The first fact that strikes us is that, amongst many, faintness and sickness are almost convertible terms, *i. e.* persons are sick because they are faint. Too much whisky and water produces sickness, not at the time but the next day, when the whole frame is debilitated ; the same may be said of chloroform inhalation, the use of opium, &c.

The next fact, to which we can scarcely give too prominent a place, has been driven upon our notice by close clinical observation, totally irrespective of theory or system, *viz. over-exertion, whether of brain or muscles, in the sick produces vomiting* (of course it must be borne in mind that it may produce spasm or purging, *instead of*, or in addition to, vomiting).

I shall best prove my point by detailing one or two cases, in few words.

Mrs. T. T., æt. 38, had recurrent attacks of vomiting,

chiefly of grass-green bile, for many months ; she would recover health sufficient to be free from sickness for days, and then again relapse. Ultimately it was discovered that this was due to mental trouble,—each relapse was traced to some new complication of anxiety ; the source of the misery at length ceased, and the recovery was complete. The frequency with which mental worry—especially such wearing anxiety as that produced by fear, by jealousy, or pecuniary danger—is followed by anorexia, nausea, and vomiting, is well known.

The next case profoundly impressed me at the time, and I quote it freely here, as it is evident, from her “Notes on Nursing,” that Miss Nightingale was familiar with many such.

Mrs. B., æt. 62, recently made a widow, had been ill for some three or four weeks with symptoms that led her medical attendant to fear disease of the liver, and subsequently peritonitis. She had been treated accordingly, and amongst other things had taken grey powder to slight salivation, but she was steadily becoming worse. On seeing her in consultation, I found her confined to bed and excessively low, but the diagnosis seemed to be clear, and ran thus :—great general debility, the stomach and nervous system especially affected. The sickness, which was the most distressing symptom, I attributed to weakness, not to organic disease. In accordance with this view, the treatment adopted was essentially dietetic, including an adequate amount of alcohol ; but the utmost stress was laid upon the most absolute abstinence from conversation in the sick-room,—even between two attendants, when more than one was accidentally present. The improvement was soon apparent, and my visits soon seemed to be simply matters of course, or to superintend the nursing. One day, however, we were met by gloomy faces,

and the intelligence that the sickness had returned as bad as ever ; and ere we went to see our patient we had to inspect nearly a quart of frothy mucus which had been ejected. This was disheartening, and the lady's face was still more so ; she seemed almost moribund. My first question to the nurse was, What has she been doing ? The next, Whom has she seen ? I was told that a niece had been to visit her, but had not stayed long. To my next question, Had they been talking over any exciting matters ? The answer was a flood of tears ; the conversation had been of the "dear departed," and the patient remarked "that it had been too much for her." After this—as both the lady and all about her were fully convinced of the interdependence of fatigue and the vomiting, and that the most trifling excitement produced both the one and the other—the sick-room was managed as Miss Nightingale would have directed. In four days more I took my leave, and in about three weeks thereafter the lady called to pay me for my attendance, but looking so strong and healthy that I did not recognise her till she told me who she was.

Since that time I have taken three patients into the Liverpool Royal Infirmary whose sole disease (so far as I could ascertain it) was vomiting, the result of overwork ; and I presume that my diagnosis was correct, as they were all cured by a few days' quiet rest in the house. In none of these was there presumptive evidence of ulcer of the stomach or other organic disease.

There is strong reason to believe that the so-called hysteric vomiting consists essentially in the rejection by the stomach of so much of the food as that organ cannot digest comfortably. Dr. Hunter's case quoted by Watson confirms this view.

2. The phenomena of lientery, of *tabes mesenterica*, and

the purging which so commonly follows the ingestion of food during the early stage of eatarrh and influenza, sufficiently demonstrate that the stomach, when it is weak, may discharge what is put into it downwards, instead of upwards.

3. The third manner in which a weakened stomach behaves, deserves a more extended remark.

We may fairly presume that the organ is for a time debilitated by loss of blood, by purging, by influenza, and other depressing diseases, by exhaustion from bodily or mental fatigue, by the use of nauseants, *e. g.* tobacco, antimony, calomel, &c. Under these circumstances, what happens if a heavy meal is taken, or any food which the stomach cannot digest, the following cases will show.

Mr. B., just after recovering from typhus, took a long drive and transacted a good deal of business, and tempted by the smell of a good dinner, ate largely. This was followed by severe stomachic pain and profuse vomiting.

Mrs. P. was in the habit of eating the outer rind of oranges, and did so with impunity when in health; but on one occasion, when pulled down by influenza and purging, their ingestion was followed by severe spasms and pain, with vomiting, which lasted three days.

Mrs. G. was in the habit of eating cheese, but one day when she was weakened, this produced stomachic cramp of great severity.

Mrs. J. has spasms of the stomach if she takes any meal whatever after exhausting fatigue.

Mr. T., after fasting from 9 A.M. to 11 P.M., and smoking a few cigars to keep off hunger, had a full meal of "Welsh rabbit," which he had up to that time found a very easily digested food; the result was severe stomachic spasm, which lasted for eighteen hours.

Mr. H. never now can smoke a single cigar without suffering from severe epigastric pain after the ensuing meal.

Other cases will be mentioned further on.

The following case illustrates in a very remarkable manner the influence of general exhaustion on the stomach, or rather the proof which exists that the stomach is in an enfeebled condition when the whole system is weakened :—Mr. I., æt. 64, merchant, had always enjoyed perfectly good health, until he was 56, when he had a fit of regular gout, which recurred at intervals of about two years. He had always lived freely, but during the last few months had entirely given up the use of stimuli, with the exception of an occasional glass of ale. He lived in the country, and his usual habit was to breakfast at eight o'clock, then go to business, and return at four. He dined an hour afterwards, taking nothing during the interval. The circulation at this time was very languid, and he complained of coldness of the extremities. There was also an almost total loss of appetite. The bowels were regular; the urine healthy. About five months prior to his death, it was noticed that he occasionally vomited his food; but he refused all medical advice, and paid no attention to himself. It was soon noticed by his family that the vomiting was always induced by any harassing business or unusual fatigue. At first it came on at dinner-time only, and took place before the meal was completed; but after a while it came on at all periods of the day, but very rarely unless he had been taking something at the time. He had no pain or suffering, and no nausea; the bowels were regular, and his spirits much as usual. As the vomiting materially diminished his strength, so it continued to increase in frequency, until he vomited after taking anything; but it was remarkable that he would eject a first glass of milk, then take another, and digest it comfortably without even feeling nausea. After the illness had continued about three months, he placed himself under medical treatment, and was directed to confine himself entirely to

the house for a short period, and to have for diet milk, with or without bread, and cream, with well-pounded blanched sweet almonds. Improvement was apparent in two days' time, and he continued steadily to get better; but it was again noticed that any mental annoyance or bodily fatigue, or even prolonged fasting, brought on the sickness. The closest attention was now paid to these points, and the tincture of the sesquichloride of iron was used as a tonic. The result was a more rapid amelioration of all the symptoms. In about a fortnight's time, the patient was allowed to take exercise in the open air; but the first result was unsatisfactory, as he always tired himself, and with this fatigue the vomiting returned,—*the stomach evidencing the effect of fatigue long before the patient was conscious of it himself.** This somewhat retarded the progress to convalescence; but the patient conforming himself at last strictly to what was enjoined, gained strength daily. With returning strength came returning appetite: and with this a relish for more solid food. By carefully following out the plan of suiting the diet to the digestive powers, Mr. I. came at last to have a better appetite and better digestion than he had had for years, and was able to sit down to the family dinner and enjoy it. At this time, four weeks after the treatment was begun, he

* This observation is important. I have on many occasions noticed the fact; and have had always great difficulty in inducing patients to believe that the stomach is weakened by an amount of bodily exertion, fasting, &c., of which they are mentally unconscious. I have now under my care a lady, *æt.* 64, who has painful dyspepsia, invariably produced by over-fatigue; yet she says she never feels that she has done too much till the pain comes on. Cases of a similar kind will be found further on.

It is also to be noted that fatigue endured *to-day* may not manifest its effects on the stomach until *to-morrow*, and sometimes even not until the second day after.

felt so well that he insisted upon returning to business ; there had been no sickness for a fortnight ; he could take long walks or drives without being exhausted, and eat and digest a hearty breakfast and dinner. For a day or two he did not go to business for a longer period than two hours ; but as he could stand this without difficulty, he increased the time, and remained in town from ten to four o'clock, returning always to his home both faint and cold. In consequence of this, the appetite began to flag : solid food could no longer be taken : all stimulants were loathed ; the tonic seemed to have no power to counteract the influence of exhaustion ; and in ten days from his first leaving home for business, the sickness returned with all its former severity. He now refused all medical aid ; continued to go to town as usual ; until, after an hour's exposure to a biting cold wind, without any extra clothing, he was laid up with intense sciatica. This was soon relieved by the use of anodynes locally and generally ; but it left him in a sinking state. The sickness continued ; but when beef-tea was substituted for milk, the vomiting ceased. He never rallied, however, after the attack of sciatica, and slowly sank,—the mind first giving way, and the last few days of life were passed without his uttering a word, and seeming unconscious of what was going on. Digestion, however, and the action of the bowels and kidneys, were perfect to the last ; and he was able to walk about his room till within an hour of dissolution. The final cause of death was an attack of convulsions.

This case suggests a very important consideration, and one which the physician can turn to practical advantage. It will be noticed, that at the time the treatment was begun, there was no appetite, and scarcely any power of digestion. Is there any real connexion between these two circumstances ? for if there be, we shall find that anorexia becomes

a symptom of great importance. Ere we answer this question dogmatically, let us make a few observations which will demonstrate the grounds upon which such answer is given. First, let us ask, what is appetite ?

Appetite is a feeling which induces us to take such nourishment as is necessary for the sustentation of the body. In health, it is greatly increased by a certain amount of exercise ; it is diminished by quiescence. It is vastly augmented during diabetes, during convalescence from fevers, after fasting ; and during the period of childhood it is far greater than during adult or old age. It is increased in women during pregnancy, and still more during lactation ; in fine, we may say, that in health the appetite is increased whenever there has been an excessive expenditure of vital power, and that the appetite is in direct proportion to the demands of the system for sustentation. The phenomena attending stricture of the œsophagus, or pylorus, or mesenteric disease, point to the same fact. There is then perpetual appetite, because there is perpetual expenditure, which the food taken cannot sufficiently supply, as from one cause or another it does not reach the blood.

But it is to be noted, that even in health the appetite is not always augmented by exercise. This may be carried to such an extent that the appetite fails. Such a feeling is commonly expressed by the remark, "I am past my dinner." This feeling comes on, not only from fatigue, but from prolonged fasting, and it seems to indicate simply a want of power, for when once food or drink is put into the stomach the appetite returns,—a fact generally expressed by the remark, "that the appetite comes on with eating," and "the more we eat the more we seem to want."

This recovery of the appetite, after prolonged exertion or fasting, is not, however, habitual to all men. It seems to depend a great deal upon general vigour of the constitution.

Thus we find the majority of persons living in town do not regain a lost appetite like hunters, seamen, and others whose general standard of health is very high. They, when they are past their appetite, do not regain it by forcing themselves to take food ; they simply become flatulent and dyspeptic. Now, if individuals who are tolerably strong and well are liable to loss of appetite from exhaustion, we should expect to find this a symptom of those diseases which are characterised by debility. Practically, it is so : we have anorexia as an accompaniment of fevers, of phthisis, of anæmia, of chlorosis ; it is deficient in struma generally ; it is taken away entirely by fright, anxiety, and grief. When lactation is carried to an exhausting extent, the mother often almost ceases to eat anything, and lives upon stimulants. It is often absent during hæmoptysis and menorrhagia, and a similar result is produced by diarrhœa, and sometimes by the presence of cancer. At such periods there is a positive disgust for solid food ; and if the patients force themselves to take it, the dyspepsia is so great that they naturally refuse to continue the experiment.

But though they cannot take solid food, they can take liquid nourishment, and probably digest it well, provided the quantity is not excessive, or the material such as their stomachs would reject in health.

Under the use of liquid food the strength may be gradually restored, and then it is to be noted that the appetite increases with the constitutional vigour, and the augmentation continues until the patient recovers his appetite for solid food. Thus, it may be said, that even in the debilitated the appetite will come with eating ; but it comes very slowly, and only by the use of food of appropriate character.

With this preface, we answer the question above proposed, in the following manner :—

Loss of appetite for solid food, with fondness for aliment

of farinaceous or saccharine character, a craving for stimulants, &c., indicate deficiency of digestive power. The cause of this deficiency may be localized in the stomach, as in cases of ulcer of that organ, or it may be general and constitutional; but into the diagnostic marks decisive of the category to which any individual case is to be referred, it is not our province now to enter.

A belief in the foregoing principles influences our treatment immensely in all cases of dyspepsia. It leads us to avoid all depressing agencies; to discourage any exertion which produces fatigue—even including “exercise” in the category*—excessive mental labour, anxiety, &c.; to do everything to increase the tone and vigour of the system, to adapt the food to the power of the stomach to digest it, to assist this by appropriate stimuli, to adjust the meals in such a manner that the stomach shall not have time to be exhausted, to recommend that the principal meal of the day be taken about noon or one o’clock, before the individual shall be exhausted by fatigue of body or mind, or a few hours’ fasting, and to eschew such habits as debilitate the stomach, *e. g.* tobacco-smoking and chewing, snuff-taking, and dram-drinking.

Let us illustrate our meaning practically:—

The histories of privation tell us, that if a person in good health has been fasting for only two or three days he may indulge his appetite, even to gormandizing, with impunity (*vide* “Ruxton’s Life in the Far West,” pp. 188-9); but if the privation is prolonged, food has to be administered with the greatest care, lest it should produce fatal effects.

* Miss E. C., whose case I have given page 225, and who was so signally improved by rest, was importuned by a female acquaintance to live on beef and bread and to walk for two hours daily—as this was an infallible cure for indigestion! By and by we shall have the ladies saying that all the sex must dress with the same length of skirt, whether they are short or tall.

In these cases there is simply debility from starvation. A similar effect will ensue if there is equal debility from other causes.

Miss Kate R., æt. 18, of very delicate constitution, had an attack of epidemic influenza, for which the sole treatment her medical attendant adopted was a dose of salts. While weak from these causes, she ate a hearty solid meal. It was too much, and she died immediately afterwards.*

These fatal effects, however, from eating heartily when there is much debility, are not common; because, as we have mentioned, a healthy appetite is almost incompatible with much constitutional debility: where the two are combined and a heavy meal is taken, it is apt to produce epileptic fits or apoplectiform attacks, which yield as soon as the stomach is emptied.

Cases like the following are very common:—

Dr. B. had an attack of fever, during which all appetite was gone and fresh meat loathed; the fever left him, and in an hour or so afterwards the appetite for solid food returned, and his digestive power was perfect.

Mr. B., æt. 50, very consumptive, was extraordinarily weak, and loathed all solid food. He was kept weak by the use of mild aperients (grey powder, &c.) to relieve the bowels. The treatment was changed; medicine abandoned; cream with brandy, and milk with rum, used as diet; the bowels became regular; he increased in strength steadily, and with this came a healthy appetite for solid food, and a sound digestion.

* “Fever patients, after the crisis, have often a ravenous appetite, and many die from its indulgence. A stout man had fever, and recovered; his appetite was so great, that he not only devoured his own allowance, but went round the ward to eat up what other patients had left of their dinners. He died the moment he regained his own bed. Where indulgence in food does not kill after fever, it often brings on a relapse.”—W. N.

Mrs. B., æt. 43, or thereabouts, had an attack of diarrhœa which pulled her down excessively ; the appetite entirely left her, and she was much troubled with flatulence. In four days the diarrhœa ceased ; quinine was then given, and in three days she felt perfectly restored ; and with returning vigour there was a healthy appetite and sound digestion.

John S., æt. 25, had acute double pneumonia ; on the fifth day he had profuse perspiration, which lasted thirty-six hours. At the end of that period he seemed constitutionally well. Up to that time he had not the smallest inclination for food. When I saw him, however, thus improved, I suggested beef-steak and porter to him. His eyes sparkled at the idea, the food was allowed, and in two days he left the hospital as strong, apparently, as ever he was, though the lower half of both lungs were solid. He returned from time to time for examination : he had no relapse, but six months passed ere the lungs were perfectly restored.

Mr. H., æt. 65, had symptoms of intense dyspepsia following influenza ; fearing cancer, he went to London for advice, and was told that his case was simply indigestion from overwork. He was a lawyer, and had a large and anxious business to conduct. He dined late, and always reached home faint and exhausted. He had small appetite then, and so little digestive power that his meal overcame him, producing lethargy and flatulence. On learning these particulars, I simply recommended him to take as medicine, about three ounces of cream and half an ounce of brandy at eleven, two, and five o'clock. The result was apparent in a week, for by that time he had increased in flesh, had a healthier colour, went home with an appetite, and was comfortable during the evening. By sustaining his general power, the stomach power was sustained too.

Dr. K. never dines till late, and takes no lunch. He always takes a walk before dinner ; and he invariably returns exhausted, ready for a meal, but with diminished power of digestion. Such meals are with him followed habitually by flatulence and dyspepsia.

Dr. — finds that, if circumstances permit him, he can eat largely and digest well a meal taken about one o'clock ; but if he has nothing until six o'clock he loathes food, and has indigestion if he takes it.

Miss M. C. is so weak that three hours' fasting brings on fainting, and food every two hours is necessary to support the system.

Mrs. P. eats largely during the day, and is always comfortable in the evening ; but the long fast through the night is always followed by distressing faintness : this is always diminished by food taken through the night.

When there is much constitutional debility, as there was in this case, it is incredible the amount of nourishment which can be taken, and, indeed, seems necessary—which is digested, and yet which gives little, if any, appreciable support to the system.

Mrs. S. had flooding after miscarriage, and was extremely weak. She required food half-hourly. She was, unfortunately, allowed to sleep too long, and she awoke only to die. Food was given, it is true, as before, but the digestive or incorporating power had gone. Practically, her stomach was dead ere she herself was a corpse.

Mrs. B., æt. 55, a farmer's wife, has for many years been subject to intensely painful spasms of the stomach ; I found that they could invariably be traced to too long fasting, to too much work, or to mental emotion a day or two previously. By attending closely to the rules suggested by the history of the case, she tells me that she has ceased to suffer.

CHAPTER XIII.

Diseases of the liver—Supposed to be common—The reason why—Meaning attached to the words “bilious” and “biliousness”—Proofs of “bile”—Significance of symptoms—Action of mercury on the liver—Congestion—Case—Inflammation; sign of—African fevers; influence of on liver—Jaundice—Cases—Questions proposed—Influence of calomel—Dr. Scott’s researches—Green tinge in stools after calomel in children—Opium; its influence; its effects in diabetes mellitus—Aloes, taraxacum, &c.—Deductions.

WHEN we come to investigate the influence of defective vital power in the liver, we find ourselves in a host of difficulties.

We are unable, in the first place, to define accurately what are its normal functions, in health; and, in the second, we really know little of its behaviour during disease.

To any one who listens to the ordinary jargon of routine practice, it would appear as if the diseases or disorders of the liver were far more familiar to doctors than those of any other organ; and when we are abroad in the world, we find nine-tenths of our acquaintance equally confident of their knowledge, and firmly convinced that they, or their friends, are “bilious,” or “subject to bile,” or that “their liver is out of order.” This state of things is clearly due to that carelessness of mind which has allowed practitioners to be content with insufficient evidence, or to the still more culpable

habit of attributing to the liver every symptom, or set of symptoms, that could not readily be accounted for.

I well remember a conversation I held once with a young London surgeon, whose tact and general knowledge I then greatly envied; for I had only just "passed" the "Hall" and "College" at the time, and, like many another under similar circumstances, had felt myself baffled in diagnosis repeatedly. On telling this to my friend, and asking him what he did when he was puzzled, "Oh," was his reply, "it will not do to let my patients think I am at a loss; so, whenever I do not know what the complaint really is, I tell them very confidently that 'it is their liver that is out of order;' for," he added, "everybody knows they have a liver, and believes that disorders of that organ are very common." It is this style of diagnosis which has led to the belief in the frequency of hepatic disease.

With an earnest wish to obtain an exact amount of knowledge respecting the disorders of the liver, the author has for thirty years specially investigated every case he could, in which "biliousness" has been complained of, with a view to test, as accurately as possible, the real meaning attached to the word, and the symptoms which are supposed to be characteristic of a disordered liver. As might naturally be supposed, he has found the utmost vagueness. One man considers that he is bilious, because he has nausea in the morning after a good dinner, or a series of epicurean enjoyments,—and *à propos* of this it may be added, that a very intelligent druggist in this town has noticed that the individuals who have most frequently come to him for calomel pills, "to clear off bile," have died suddenly from apoplexy, an observation that gives point to many of the remarks made in Chapter viii. Another man considers he is bilious, because he feels lighter and more

comfortable after taking blue pill ; a lady knew she was "bilious," because "whenever she felt poorly she took some opening medicine, and all the motions after the first were sufficiently hot and acrid to excoriate the anus,"—this was a clear proof of bile ! and as she was better the next day, she felt assured her opinion was correct ! Another felt confident she was "bilious," because "she looked so yellow about the eyes in a morning." Another, because fat bacon agreed with her. Another, because she was very subject to sick headaches ; and another, because there was a tendency to griping and diarrhœa ! The proof another gave was, that she was subject to vomiting green bile in small quantities whenever she was sick ! And another, because after a few days' indigestion, &c., she had vomiting and purging with enormous discharge of bile !

The symptoms relied on by medical men or their patients are equally vague. One man considers a pain in the right shoulder as unequivocal evidence of hepatic disease ; another pins his faith on pain in the right hypochondrium. If with this there is diarrhœa, the liver is said to be "irritable ;" and if there is constipation, the liver is pronounced "sluggish." Another swears by an itching skin, another by high-coloured urine, and another judges of the liver entirely by the colour of the fœces. A young lady, æt. 7, who felt giddy, and said that the house was flying up and about, was pronounced to have a deficiency of bile by her doctor ! and another who was unusually drowsy, was declared by another to have the same disease. One practitioner lays it down that mercury affects the liver, and, therefore, any symptom relieved by the use of calomel or blue pill must have an hepatic origin ; and another, whose patient had drunk about a bottle of brandy over night and felt queer afterwards, put down the morning symptoms to "infarction" of the liver.

With such vague ideas of diagnosis who can wonder that our knowledge is inexact ?

We see another cause for confusion in the estimate which is made of the influence of certain articles on the liver. Some lay down the law, that beer is "bilious," others that "bacon prevents bile;" some consider that "gin hardens the liver," the majority believe that mercury stimulates it, and this in proportion to the smallness of the dose, *e. g.* two grains of calomel irritate the organ, while ten grains act as a sedative on it, yet the sole proof that mercury acts on the liver at all is that it produces purging; which other cathartics do equally! and this is rendered nugatory by the experiments on dogs elsewhere alluded to, which show that although calomel is a cathartic, it very notably *reduces* the amount of bile secreted. Aloes is another drug supposed to act upon the liver, but of its real influence over it we are absolutely without proof.

When we turn to treatises on hepatic disease, we find ourselves in little better condition than before; we see a number of symptoms put down as characterising "congestion," "inflammation," and "atrophy of the liver," which are sometimes present when such diseases do not exist, and are absent when they do.

We are positively, therefore, obliged to conclude that the sole reliable signs are those usually called physical.

This will readily be granted when we consider that congestion of the liver is common enough in cases of diseased heart, yet no alteration in function which we can appreciate results therefrom. I once knew intimately, for many years, a physician who seemed to enjoy most excellent health, but who increased in bulk about the abdomen every year until his gait resembled that of a woman far advanced in pregnancy. He supped with me a week before his death, and was then, as ever, apparently in the

possession of full health. Seven days afterwards he complained of malaise and "biliousness," went home to bed, and was found to be dead shortly afterwards. No other symptom of illness had been recognised during life, yet after death the liver was found to occupy the whole of the abdomen and to reach far down into the pelvis. The stomach was inflamed and the lungs gorged with blood, but I did not learn the immediate cause of the sudden dissolution. Again, I have met with two instances, in which abscess in the liver has been found after death, without there being any appreciable sign of hepatic disease during life, and I have seen six others in which this condition has been recognised during life, without there being any other signs than those called physical, and local pain. In other cases I have found tubercular or cancerous deposits in this organ after death, where no symptom could be found during life, fairly traceable to them. In others, atrophy of the liver, or as it was once unfairly called "gin drinker's liver," is found to exist after death when there was no symptom of its presence during life; and when a diagnosis has been made before death, the first sign fairly traceable has been either hæmatemesis, mælena, or ascites, symptoms which may equally arise from disease of the spleen or other organs. Even in genuine inflammation of this organ, large as it is, there are few distinctive signs unless the inflammatory process extend to the diaphragm, abdominal muscles, or to the peritoneum generally. In phthisis and serofula we occasionally find this viscus of an enormous size, yet no alteration of its functions can be detected; and *per contra*, there may be an enormous change in the glycogenic functions of the liver (if recent observations are to be depended on), as in diabetes mellitus, and yet no appreciable structural alteration can be noted.

It is true that we frequently observe diabetes mellitus come on after severe or prolonged exposure to cold, or after some depressing disease or accident, yet it is equally true that it may come on without such exposure, and that individuals whose vital powers are low, as in phthisis and old age, do not suffer from this complaint.

If we extend our inquiries to the intense African or other tropical fevers, we see that the liver has been found after death to be almost diffuent, yet that there may have been no special signs of disease of that organ during life; the same obtains in cholera—the secretion of the viscus is suspended, yet, beyond the absence of bile in the motions, we have no pure hepatic symptom during life, nor appreciable lesion to be found after death.

In jaundice, too, we have equal difficulty: it may be present under an infinite variety of circumstances—the liver may after death appear to be quite healthy, or it may be the seat of cancer, tubercle, or hydatid; the ducts may be pervious or impervious, there may be gall-stone, or there may not be, yet all these conditions may be present without jaundice. One person may have jaundice with enlarged liver; another, with a similar enlargement, has a healthy hue of skin. One man, with atrophy of this viscus and whose gall-bladder after death seems filled with thin watery bile, has no jaundice; and another, whose gall-bladder contains an apparently rich bile, may have a very yellow hue of skin.

Again, even with so well-marked a symptom as jaundice, we have a doubt whether to attribute it really to the liver or to the blood. Thus, for example, one man dying with jaundice, has the liver pale and apparently free from bile, and we conclude that the bile has been formed in the blood, and that the jaundice has arisen from the liver ceasing to act in removing it. Another man has an equally bile-less liver;

as in hobnailed atrophy, and there is no jaundice, because, it is affirmed, the blood has not formed any bile at all.*

What again are we to say of those cases, of which I have seen several, where jaundice persists for weeks, in spite of a return of healthy action of the liver, as evidenced by the natural colour of the fæces? I have now a case under my care in which a jaundiced hue of the skin is noticed in the morning, but which goes off after the mid-day meal; and this not once or twice, but frequently. In the same lady, jaundice and painful dyspepsia have now been caused no less than eight or ten times from mental emotion or bodily fatigue, and the yellow tint is always deepened by purgation.

Not long ago I had at the Liverpool Royal Infirmary a female patient ill with jaundice under my care. After improving rapidly under the use of compound spirit of ammonia, she persisted, against my directions, in taking aperient medicine "to carry off the colour," as she thought. The result was an increased depth in the yellow tint of the skin and great debility.

Other patients at the same institution I have treated on an equally simple plan, and have seen them steadily recover. One I may specially mention. A poor withered old woman applied for admission with the deepest jaundice I had ever seen, and I took her in, feeling sure that she must shortly die. On examination, I could find no physical change in the liver, any cause for the jaundice or any distinct indication of treatment. I prescribed rest in bed, and a drachm of the compound spirit of ammonia three times a day. Her recovery was rapid, and she left the house at the end of

* For some very interesting observations on this subject, see Frerichs' "Treatise on Hepatic Diseases," New Sydenham Society's Translation, pp. 78 to 86.

two months, without more than a faint yellow tinge on the skin.

From the preceding observations, it is tolerably clear, that our real knowledge of hepatic symptoms is very meagre indeed, consequently we can say little respecting the manner in which it may be affected when its vitality is low.

This, then, being the conclusion to which our investigations have led us, it is advisable to review the principles upon which presumed diseases of the liver are generally treated, and the value of those special medicines which are most in vogue.

We have to ask ourselves the very natural questions, Is all the experience of the past to be ignored? Are we for the future to distrust calomel, blue pill, grey powder, aloes, taraxacum, liquor potassæ, nitro-muriatic acid baths, and the like, in diseases of the liver? If so, to what are we to trust?

I do not know in the whole range of strict medical inquiry, questions more important than these, or more difficult of solution. On the one side are ranged all the strong feelings we imbibed in our early years, when we stored our memory, rather than cultivated our thinking powers; when we worshipped our lecturers as incarnations of *Æsculapius* and *Hippocrates*, and prostrated ourselves before the books of revered authors, as *Hindoos* are said to do before the ponderous ear of *Juggernaut*, submitting to be crushed rather than venture to stand upright in their august presence? We feel, in spite of ourselves, bound to reverence perpetually those whom we once thought to be medical demigods, and we cannot without a strong mental qualm, and self-accusation of pride, allow ourselves to consider that the *Gamaliels* at whose feet we sat admiringly ought to be opposed. Yet on the other hand, strong in the power of facts, an

idea of duty urges us on. We remember that Paul—once an intense Hebrew, and as pertinacious and cruel in his opposition to Christianity as a model doctor is to what he calls “ quackery ”—confuted, when he had himself become an intelligent convert to the faith, the very St. Peter to whom all the Christians then looked up. He “ withstood him to his face, because he was to be blamed.” Why ? because he regulated his doctrines and practice to the old prejudices of others ; because the man who ought to be the leader allowed himself to be led ; and because the advance of truth never could be promoted by a clinging to ancient errors. With this in view, shall we take the view of Peter or Paul ? There can but be one response from independent minds. The Peters of medicine must be resisted by the Pauls whenever they are to be blamed, and by this means the spread of truth will be promoted.

Let us inquire, first, what we really know respecting the influence of mercury on the liver. We know that people may be salivated by mercurial inunction, or by inhalation, or in other ways, and yet no perceptible change takes place in the functions of the liver during life, and no alteration in structure can be detected after death, beyond softening and, possibly, some pallor. In cases of death from poisoning by the preparations of mercury, no peculiarity is noted in the liver ; and in the *post-mortem* appearances* found after death from corrosive-sublimate, this organ is not even incidentally mentioned ; nor do we find in the accounts of cases where a very large dose of calomel has been taken any sign distinctly referrible to the hepatic system.

Dr. Scott† has carried his researches on this point so far, that we may say he has travelled from the region of doubt and inference to that of certainty, and in his very careful

* Dr. Taylor on “ Poisons.”

† “ Beale’s Archives of Medicine,” vol. i. p. 209.

experiments on dogs, has shown that calomel positively *diminishes* the amount of bile secreted. The dogs, however, *were purged*, and this demonstrates that the aperient operation of calomel is quite independent of its action on the liver,—for in these cases all the bile secreted was collected in a vessel external to the body and never reached the bowels at all.

Here, then, is one of our fallacies destroyed at once. Calomel is not a specially good cathartic, because it acts upon the liver!

Dr. Scott's testimony respecting the action of this drug upon the mucous membrane of the bowels, receives great support from some observations made by Dr. Petrie, of this town, some time ago, though not, I believe, published. He informed me that he had had many opportunities for examining the intestines of young children who had died under the influence of calomel, and were passing the well-known "green stools" for some time prior to death. He found in every case that there was no appreciable alteration in the liver or in the colour of the bile in the gall-bladder, but that the green tinge began in the jejunum, and continued deepening in intensity to the termination of the rectum; and on scraping off a portion of the secretion he found ample evidence, in the appearance of the membrane below it, to demonstrate that the green matter was an altered intestinal secretion, totally independent of the liver or the bile.

We get less correct information, though still valuable, from noticing the effect of blue pill given to produce salivation; it produces purging, but the ejected matters are not unusually bilious, they are simply feculent, and the effect of opium in preventing this purging is similar to its effects in preventing purging from medicines never suspected of acting on the liver at all.

We have referred to the general belief that small doses

of calomel *irritate* the liver, while large doses emulge it. Let us now test the truth of this idea by inquiring if there are any other drugs which irritate it, and whether they produce similar effects to the mercurial. Let us begin with arsenic; its acrid or irritating effects are well known, and we are tolerably familiar with its influence both in minute doses and in poisonous quantities. Dr. Taylor informs us that it has special affinities for the liver, and is to be found in that organ in a larger proportion than in any other portion of the body of equal bulk. Yet experience tells us that the secretion of bile is not increased by small doses of this drug, nor can we find that it is modified by large ones. Bilious diarrhoea is not a sign of an arsenical overdose, though purging is, and in fatal cases of poisoning we find that "the heart, brain, and lungs present no appearances which can be considered characteristic of arsenical poisoning, and the same remark applies to the *liver*, spleen, and kidneys, although these, like the other soft organs, become receptacles of the absorbed poison."—*Taylor on Poisons*.

A reference to antimony and other acrid poisons brings us to similar conclusions, and as a logical deduction we are driven to believe—

1. That there is no proof that calomel specially irritates the liver.

2. That there is no proof that an irritant to the liver necessarily increases the secretion of bile.

3. That there is no proof that an increased quantity of an irritant modifies its influence favourably, or makes it less irritating.

A reference to a subsequent chapter (the influence of debility upon secretion) will show that the use of an irritant may diminish secretion.

Consequently,

4. That the current doctrines respecting the value of

calomel in hepatic diseases are in the main untenable, and require very important modifications.*

Let us now examine another medicine so frequently combined with calomel, viz. opium. It is said to lock up the secretions of the liver as the mercury is said to open them. Does it do so? The answer has hitherto been in the affirmative, because the day after a dose of the drug has been taken the stools are generally white.

This result, when it does occur, is supposed to be due either to the retention of bile in the ducts, or a quasi-paralysed condition of the secretory apparatus, or to a deficiency of blood in the viscus, and consequently a want of material from which the bile may be formed. Of the possibility of opium producing a pale yellow bile in normal quantity nothing is said.

On turning to Taylor's work on Poisons, to ascertain whether opium in poisonous doses has any marked influence on the physical condition of the liver, I find that organ mentioned as being somewhat enlarged and congested in one case, in another and a third the liver is not mentioned. In none is any note made of any absence of bile in the gall-bladder or intestines—a point which would be certain to have attracted attention had whiteness of the stool been present.

* Dr. Wilson Philip says:—"Mercury has a specific operation on the liver, a power not merely of exciting its function, but of correcting the various derangements of that function, in a way which it does not possess with respect to any other organ, and which no other medicine possesses with respect to the liver." Pereira, though he distrusts it, quotes this observation, and there is little doubt that it expresses a general belief; yet what can be more absurd than to represent calomel as Policeman Drug, who will always keep order in his hepatic beat, who will rouse the inhabitants if they are drowsy, send them to sleep if they are too active, and keep them to work if lazy. A real policeman can find his way to his beat in a town, but it may reasonably be doubted whether calomel would always find his way to the beat Dr. Philip has assigned to him.

But there is another consideration of greater weight than this, viz. that opium eaters, and those who take the drug for a long time medicinally, ought to have jaundice or some equivalent disease; if opium were the janitor of bile which it is said to be, yet we all know that jaundice does not come on in consequence of the use of opiates. Still further, I know as a fact, that three grains of opium may be taken daily for a lengthened period without there being any perceptible difference from the healthy appearance of the stools.

We conclude, therefore, that the influence of opium on the bile-producing function of the liver has, to say the least of it, been greatly over-rated.* Has it any greater influence on its glycogenic functions?

The sole answer we can offer to this query, is, that experience has taught us that opium diminishes the amount of sugar discharged in diabetes mellitus, to a far greater extent than any other drug we know, and experiments have led to the conclusion that the sugar in this disease is chiefly, if not exclusively, formed in the liver; but whether the opium diminishes the amount produced, or promotes a more complete consumption of it in the body, is a point on which we are, as yet, in ignorance. Assuming, however, that opium does diminish its glycogenic action, that by no means proves that the drug has any *specific* influence over the liver, for there is no proof that the secretion, such as it is, is diminished in a greater ratio than are the secretions from the nostrils, lungs, bowels, or kidneys, by the same medicine.

Of the influence of aloes, taraxacum, iodide of potassium,

* Any one who will take the trouble to examine the symptoms given by Frerichs as indicative of acholia, or suppression of the functions of the liver (New Sydenham Society's Translation, p. 197), will see at once that they differ materially from those produced by opium.

and the like upon the liver, we are in the greatest uncertainty.

“What !” I can well imagine many saying, “the author surely does not deny, that patients while using these medicines have had their livers decreased in size, and their health recovered ?” “By no means,” is the reply, “but that has little to do with the question before us. *You* assume that certain symptoms which are occasionally present when the liver is enlarged, are due to disease of the organ. *I* have an equal right to assume that the liver is enlarged, as one of a train of symptoms arising from a general disorder. *You* know nothing about the cause of the enlargement ; that it produces the effects you suppose, is a pure ‘*petitio principii*.’ I know that so-called hypertrophy of the liver attends phthisis, morbus cordis, and occasionally ague. I know that enlargement of the spleen is the frequent result of the ague poison, and of the strumous diathesis. I know that bulky brains, thick lips, a large tongue, a fat body, enormous lungs, thickened peritoneum, and distended bones, are quite compatible with various forms of struma, asthma, &c. I know too that under the use of steel, glycerine, cod-liver oil, good air, &c., all these bulkinesses may be reduced. I have seen the cranium diminish in calibre under the influence of steel, asthmatic lungs reduce from residence in an appropriate atmosphere, thick lips become thin from the use of tonics, a fat woman become thin from the use of potash, and an enlarged spleen return to its fair proportions from quinine. Such things are common, yet who would say that any of the medicines named were special in their effects ? When a poor phthisical patient recovers under the influence of steel, glycerine, cod-oil, and pure air, we do not say he does so because any of these have a special influence over the lungs ; neither, I affirm, have we any right to assume that the drugs in question have a specific effect on

the liver because under their use a morbid condition is sometimes removed.”

Granting, for the sake of argument, that taraxacum, &c., do sometimes seem to remove some forms of hepatic enlargement, how meagre is our knowledge so long as we have no definite information what forms of enlargement they are which are benefited! Without such our practice must be essentially empirical, and probably wrong.

The first step to real knowledge is frequently scientific doubt.

When, therefore, I throw doubts upon current doctrine I do so with the desire of attaining precision, and not with the iconoclastic feeling which urged people to the destruction of beautiful statues, simply because they were old, or were valued by, what were thought, an error-loving race.

When the architect finds a building in a dangerous state, he examines the foundations; if they are bad he pulls everything down and rectifies these. As our hepatic pathology has been faulty and its foundations false, we must do the like.

But what foundation is available? As yet, I believe physiology has not given us a reliable answer; but the following statements seem to be a fair and satisfactory exposition of our knowledge.

1. A large proportion of the materials for the bile, and a smaller proportion of the bile itself, are to be found in the blood before it reaches the liver.

Corollaries 1. Excessive formation of bile does not necessarily depend upon disorder of the liver, *e. g.* excessive action.

2. Deficient formation of bile may depend upon the blood and tissues generally, and not upon such hepatic disease as is spoken of as “sluggishness,” &c.

Corollaries 3. Jaundice may arise from excess of bile or bilious materials in the blood, the liver secretion continuing as usual, or from deficient action in the liver, the amount of bile in the blood continuing normal; or from the re-absorption of bile from the hepatic ducts, &c.

4. The amount of bile excreted cannot be indefinitely increased, inasmuch as, within certain limits, the biliary materials are definite in quantity.

2. Bile is poured into the stomach during prolonged vomiting, from any cause; as a consequence of accidents to the head, or of mental anxiety, from the use of fatty articles of diet, occasionally from irritating matters in the stomach, from the influence of miasms, and probably from other causes.

Corollaries 1. At the same time, and from the same causes, the bile may be poured into the bowels; if so, although its presence in the stomach may produce vomiting, its presence in the bowels does not necessarily produce purging.

2. It is often doubtful whether vomiting brings into the stomach the bile ejected, or bile in the stomach produces the vomiting.

3. The presence of bile in the ejecta is no proof of hepatic disease.

4. Vomiting of bilious matter is not to be cured simply by inducing purging, or by "directing the bile into the proper channel."

5. As increased secretion, and altered quality in secretions, are very generally the results

of debility (*vide* a subsequent chapter), it is highly probable the secretion of bile may be augmented and its quality changed by debility.

Corollary 6. Excess of bile in the cjeeta does not necessarily imply redundant material in the blood, any more than colliquative perspirations imply excessive richness in that fluid.

3. All the diseases of the liver with which we are acquainted are unaccompanied by pain so long as they are confined to the organ itself.

Corollaries 1. Pain, &c., referred to the region of the liver, is not a reliable symptom of hepatic disease.

2. Pain in the right shoulder is no more to be depended on.

4. Extensive disease of the liver is compatible with apparently perfect health.

Corollaries 1. Disease of the liver may show no special signs.

2. Unless the signs of presumed hepatic disease differ materially from those of other diseases—*e. g.* cachexia, ague, diarrhoea, myalgia, dyspepsia, &c.—we have no right to attribute all the symptoms to disease of the liver, simply because that organ is enlarged.

5. There are no proofs that calomel or blue pill augments the hepatic secretion.

Corollaries 1. All arguments or hypotheses founded upon the presumed influence of these drugs upon the liver are fallacious.

Corollaries 2. Until other and satisfactory experiments upset Dr. Scott and others' observations on dogs, the use of mercurials in presumed sluggishness of the liver is unphilosophical.

3. That the so-called *practical* men, who adhere with pertinacity to the use of doubtful, and generally prejudicial, drugs, in spite of careful experiments, are in reality *theorists* of the worst order,—they *will* not see, and consequently do not.

6. There is reason to believe that the liver has a glycogenic as well as a biliary function, but in deaths from diabetes there is no appreciable structural change in the organ.

Corollaries 1. Diabetes mellitus may, therefore, essentially depend upon hepatic disease.

2. We are yet in ignorance as to the part played by the liver in diabetes mellitus.

7. Jaundice does not accompany diabetes mellitus, nor does the latter occur during jaundice; consequently we may infer that the biliary and glycogenic functions are distinct from each other.

8. The size of the liver during foetal life, when the bile is not wanted to assist in digestion; the large size of the organ in all animals, so apparently disproportionate to the amount of bile required for digestion; the emaciation so common in hobbled atrophy; the large supply of blood, arterial and venous, so disproportionate to the material secreted; and the continuance of health for about a month in the dogs experimented on by Dr. Scott, in whom all the bile produced was discharged externally, would lead us to suppose that the glycogenic or other function of the liver was as important as the biliary.

Upon these conclusions we may more or less depend.

Our knowledge then of the liver being so restricted, can we gain any additional knowledge of its behaviour during debility, so as to answer satisfactorily the question at the head of this chapter? I fear not.

I have known the liver to perform all its functions well in an individual dying from sheer exhaustion. No peculiar hepatic symptom is present during famine or death by thirst. There is no change recognisable in old age; and in bad cases of struma or phthisis we only find fatty or albuminoid enlargement, without any apparent change of function.

But there is in diabetes a tendency to death by phthisis, and there are other evidences in that complaint of deficient vital power in the system generally, and the disease is frequently induced by privation, exposure to cold, great anxiety of mind, and from frequent transitions from excessive heat to cold.

Acting on this view, I have treated four cases of diabetes mellitus with opium combined with tonics, *e. g.* quinine and steel, using the ordinary diet without any restriction, and have found under their influence, that the amount of sugar in the urine has very materially diminished, and there has been such a very decided improvement in the patients' general condition, that they have been able to resume their ordinary avocations, and to remain at them for a considerable period.

The conclusions we have arrived at are unsatisfactory; they can be said to settle nothing beyond the fact of our ignorance and our propensity to be satisfied with insufficient evidence. It is to be hoped that in future years this reproach may be wiped away.

CHAPTER XIV.

DEFICIENT VITALITY IN THE SKIN.

Deficient vital power in the cutaneous system—Healthy structure of the skin—Functions during good health—Imperfect regeneration of cuticle—Skin diseases—Case of psoriasis—*Tinea capitis*; constitutional measures—Roughness of skin—Brittleness—*Erythema nodosum*—*Pemphigus*, &c.—Syphilitic eruptions—Internal medicines—*Modus operandi*—Iodide of potassium—Local or general—Bleeding in *eczema*—Conclusions.

I now propose to examine the signs by which we may recognise deficient vital power in the skin.

The subject is both intricate and difficult, though it is possible to treat it in such a manner as to bring into prominence many important considerations, if not to establish a general law.

In a former chapter, I have assumed that any deficiency in the dynamic condition of an organ must show itself by alteration of function, by change of structure, or by both; consequently that all investigations into the diseases of tissues ought to be preceded by a dissertation of the structure and functions of the part during health.

As I have nothing to add respecting the structure of the skin, to what is already known, I need not take up space by dwelling upon that, and will pass on to the functions and attributes of the healthy skin. The skin, as we all know, is a thick, strong, fibrous material, covering

the whole of our bodies, capable of being greatly stretched without giving way, as we see in pregnancy and dropsy ; it is everywhere endowed with common sensation, and as Mr. Lewes has recently shown, it is, *par excellence*, the recipient of such impressions which eventuate in subsequent muscular actions.

It is furnished with hairs ; oil and sweat-glands ; on the hands and feet, with nails ; and from the glands and surface, generally, a large amount of fluid passes off as cutaneous transpiration. As a general rule, this transpiration has a peculiar odour in various animals and in different men, and this is so characteristic, that the difference between man and man, the white and black human races, can be recognised thereby.

There is strong reason to believe that in addition to the aqueous and odorous principle, emanating from the skin, there is another (referred to hereafter in the chapter about excretion) which is more or less aerid.

Amongst its other properties, the skin has a power of inhibition, by which materials are introduced into the body : thus constant cutaneous contact with lead will produce lead colic ; an animal may be poisoned by keeping its body immersed in carbonic acid, and cantharidine applied to the skin makes its way through it to the interior of the body.

But though the skin appears to be the same in every part, its functions or attributes are not identical everywhere, and we find that there is a greater tendency to diseased action in some spots than in others. The inner angle of the elbows differs materially from the outer, and the axilla differs from the groin. In this the skin resembles the lungs, which though apparently homogeneous are affected by different diseases in different portions of their structure.

The skin possesses a self-renovating power in common

with all other organs, and constantly reproduces itself whenever it is destroyed by accident or simply expended in the ordinary wear and tear of life.

If this power should be impaired, the skin is said to be diseased, and as the number of forms under which cutaneous disease appears is very great, they have long been made a special study, and their character described with a minuteness most distressing to the student whose memory for hard words is small, and whose appreciation of small distinctions is faint.

The author has no objection to all these definitions and hair splittings, but he is of opinion that dermatology requires the exposition of some general laws, by which the understanding and memory may be greatly assisted; whether such laws are to be eliminated by an attention to vital force, to electrical, chemical, atmospheric, or other imponderable agencies, or by a close investigation of physical conditions solely, is a point of the greatest interest.

Beginning with the last point, we can come to no other conclusion, than that changes in the skin, such as occur during life, are not due to its physical condition; a dead fragment of our bodies simply dries up, or is converted into leather by the tanner's art—it is never affected by eruptions of any kind, nor if injured does it regenerate itself.

For regeneration there must be life, and life in a definite amount, *e. g.* in typhus and hospital gangrene, though the patient is alive, the skin when destroyed is not restored until the health improves.

But if life be present we know that the condition of the skin is modified by other forces, such as heat, cold, oil, water, dryness, and the like. It may equally be modified by such chemical agents, as acids, alkalies, caustics, &c. It seems then, as if we might take organismal force as our starting

point, and extend our inquiries into how this is modified by the physical forces.

But it may be objected *in limine*, that we have no right to attribute diseases of the skin to deficient vital power, and that to do so is simply a flagrant example of riding a hobby to death. It is, therefore, necessary that we should attempt to show that we are acting upon strict analogy.

Let us take a series of cases of intense tuberculosis: in them, we may fairly assert that there is a want of healthy organismal vigour. What are the results? We find, in one instance, that the brain does not reproduce itself, but forms tubercle, water, or serum. The lung forms tubercle instead of pulmonary tissue, the liver and kidneys produce fat or fibrine instead of renal tissue, and the bones produce unhealthy marrow instead of cancellar plates; and if in these cases the skin should be modified in structure, can we say its modifications arise from a far different source than do the other changes we have mentioned?

If we find skin diseases to be encouraged by poverty, misery, insufficient food and clothing,—by exhausting diseases and the like; and if, on the contrary, we find them cured by the use of such means as are likely to improve the tone and vigour of the constitution, are we not justified in considering that the cutaneous organ may, like the other organs of the body, have its vitality impaired?

We shall give more point to these remarks by the recital of a case or two than by elaborate reasoning. Let the following therefore illustrate my view.

J. B., æt. 24, came under my care about three years ago, at the Liverpool Northern Hospital, with psoriasis affecting the whole of the body, including the nails and conjunctivæ. The man was of medium height, a broad, burly seaman from Trieste, built apparently in the mould of a Hercules. As

far as I could understand him, this was his second attack, and the complaint was hereditary. I had witnessed, when a House Surgeon to the Liverpool Infirmary, one such case before, in a man of similar build, and had the opportunity of watching it for three years. No improvement ever occurred, and the man died suddenly from bronchitis; consequently, I took special interest in this case, and tried every plan my own experience suggested; but at that period, the views I am now advocating were undeveloped, and I looked to special remedies rather than to constitutional treatment. One day, while in the ward, my colleague, Dr. Broadbent, passed, and I pointed out the case to him, saying, "What can you suggest?" The answer was simply, "Your own favourite medicines, steel and cod-liver oil." "What!" I rejoined, "give tonics to a Milo!" "Try," was the reply, and I acted accordingly. In two days improvement was apparent, and in six weeks the man's skin was perfectly clear and healthy looking, the conjunctivæ were less congested, and the nails were becoming of the usual character.

A case so remarkable naturally set me to think of previous experiences, and I readily recalled two instances in which tinea capitis was cured by simple change of air, after every local remedy had been tried in vain. I had repeatedly examined the hair and the fungus during the disease; and when it was cured I found the fungus present still, and this not after a day or two only, but at the end of six months. Hence the natural conclusion was drawn, that the complaint did not depend upon the fungus alone, but upon the parasite finding an appropriate nidus in an unhealthy skin. Compare this with C. Bernard's observations upon frogs, elsewhere referred to, viz. that the healthy ones resist parasitic growth, which would cover the body of the unhealthy ones in twenty-four hours, and the deduction is irresistible.

While cogitating over these matters, a very delicate young lady, *æt.* 12, who had only recovered from scarlatina two months before, was brought to me with *tinea capitis*; and I resolved to test my views practically, by adopting what I considered to be more of a constitutional than a local plan of treatment. I ordered her to take a dessert-spoonful of glycerine in a glass of port wine three times a day, to live well, and be as much in pure air as possible. To the head the simple iodide of lead ointment was used. She came again to show herself in a fortnight, and by that period the hairs in the affected spots were three-eighths of an inch long, and all seemed to be perfectly healthy. The greatest portion of the skin was clear and the disease was essentially cured, though for the sake of precaution I recommended the continuance of the plan for a fortnight longer. At the end of that period she went away for change of air, and had never a return of the complaint.

If we pass on from *tinea* to *favus* we meet essentially the same facts, *viz.* the weakly are affected rather than the strong, children more frequently than adults, and women than men. The same remark applies, indeed, to all the so-called parasitic diseases of the skin.

Let us now systematically endeavour to ascertain the various effects of deficient vital power in the skin. We do so by inquiring under what circumstances this condition must be present.

We consider that it must be present during slow death by famine, during the later stages of fever, of phthisis, of old age; it is present in the children of strumous, consumptive, or syphilitic parents; in those who are brought up by hand in large towns, and it is present in parts exposed to prolonged cold.

Under these circumstances, we find the skin harsh, hard,

dry, or else moist and perspiring excessively ; or it may be so brittle as to be cracked, or chapped as it is called, in many spots ; or it may be covered with ulcers, pustules, vesicles, scabs, or scales. Prurigo is as common in old age as eczema or crusta lactea is amongst infants or children, and syphilitic eruptions are severe and prolonged according to the constitutional vigour of the individual.

If, on the other hand, we turn to those who are in every way in good health, we find that cutaneous affections are as uncommon with them as are other diseases. We next inquire whether experience, irrespective of theory, will support our views on this subject. That it does so the following cases which have fallen under the author's observation will show :—

M. H. has the skin of her hands so brittle during the time she is nursing her successive infants, that they are constantly covered with deep fissures. Her parents and collateral relations are delicate, and her children are weakly. The hands heal again as soon as the drain of nursing is over.

The family of W. J. had eczema more or less severely, one after another, during infancy and childhood, especially if fed by hand, so long as they remained in town, or were living in an unhealthy spot. Since their removal to a pure air and healthy locality the eruptions have ceased in all, and the infants now born are dry-nursed without the smallest difficulty, and without showing any tendency to cutaneous disease.

In another family of the same stock as the preceding, all the members of which are constitutionally delicate, lepra vulgaris constantly shows itself as the first sign of failing strength, and after a variety of trials nothing has been found so efficacious in its cure as steel, glycerine, and change of air.

C. J., æt. 21, a remarkably fine young man, had erythema

nodosum, and intense debility ; he was cured in a week by the profuse employment of wine and quinine.

Three other cases treated by Epsom salts, low diet, and febrifuge medicines, were ill with the complaint for two months.

B. J., æt. 3, had chronic pemphigus, and subsequently a severe threatening of hydrocephalus ; he was cured by glycerine and wine at the time. Since then he has pemphigus whenever he is unusually weak ; this is always accompanied by anorexia. He never gets well without tonics or change of air.

J. B., æt. 40, had rupia, not syphilitic : it was due apparently to poverty of diet. He was cured by generous living and tonics.

Some cases of prurigo senilis induced by poor living, and cured by the use of stimulants, will be found further on.

Miss B., æt. 4 months, had "erusta lactea" to a fearful extent, while being dry-nursed. Every local application was tried in vain ; a wet-nurse was at length adopted and the eruptions soon healed.

Miss C., æt. 40, has suffered during the last few years from eczema, which is always aggravated by any alcoholic drinks ; during an attack of indigestion, during which only a very small amount of nourishment could be taken, the eruption was greatly aggravated. In this, as on other occasions, she is cured by tonics and change of air.

Mr. B., æt. 41, long resident in a hot climate, had prurigo severely ; after trying a variety of remedies he was contented to adopt a tonic plan of treatment and generous diet, with a full use of wine. In a month all his symptoms had gone.

We need not multiply cases further, but we will next endeavour to show that the plan of treatment empirically adopted is not at variance with the views we are advocating.

Amongst the most popular medicines for cutaneous diseases, are arsenic and iodide of potassium. Let us inquire what is their claim to the position—what is their influence on the skin.

Arsenic, experience tells us, when taken in excess, produces a sort of chronic inflammation of the skin, accompanied by œdema, harshness, and dryness, and followed by desquamation of the cuticle and shedding of the hair, and sometimes of the nails. We say, therefore, that arsenic is an irritant to the skin as it is to the stomach and bowels; and this the following cases will show :—

Dr. J., æt. 25, a surgeon to a large dispensary, came to consult me respecting an eruption on the face. He told me that it came on every year, and that he had adopted a variety of measures for relief; he never got any good from arsenic, for he found that the drug always made him feel ill, and the eruption increased in severity in direct proportion to the nausea and purging the drops produced.

Mr. M., æt. 30, who had eczema of the hands, took five minims of liquor arsenicalis three times a day, and after a meal on each occasion. The drug affected the stomach and bowels in a week, and the hands steadily got worse. The medicine was suspended for a week, and then begun again in two-minim doses; it never now affected his stomach nor his general health, and the eruption slowly disappeared.

Mr. L., æt. 25, had an eruption of the face, supposed to be syphilitic, for which he took small doses (six grains daily) of iodide of potassium with sarsaparilla; no improvement could be detected for many weeks. At last the medicine was given up, and the eruption got well in a few days. Reference to other cases of a similar import will be found in a subsequent chapter.

Iodide of potassium is also an irritant. We all know its

irritating action on the nose, fauces, throat, and kidneys ; that it is equally irritating to the skin the following cases will show :—

John C., æt. 8, had a strumous abscess in the axilla for which his doctor ordered a poultice locally, and a mixture containing the iodide internally. One day the child was brought to me in a deplorable condition, the skin covered with a squamous eruption, and the part covered by the poultice as brilliantly red as a boiled lobster ; the child was scratching himself incessantly and could get no sleep at night. On referring to the prescription and the label on the bottle, and then inquiring into the method in which the mother gave the medicine, I found that the child had taken in three days what had been intended to last six weeks. The doctor had intended to give nine grains per day, the mother administered about one hundred and fifty ! I recommended a prolonged warm bath and copious draughts of water, and the child was soon restored.

Mr. M., æt. 40, had a syphilitic eruption on the skin (eczema), for which his doctor ordered large doses of iodide of potassium, a drachm daily. Under this plan the cutaneous affection increased, and *pari passu* with this the surgeon increased the dose of the iodide. At the end of a fortnight the irritation of the skin was so excessive, that sleep was impossible, even under the influence of opium. A second opinion was then called in, but the iodide was not suspended. Large bullæ now appeared, and gave great pain. The patient's life was now considered in danger, further assistance was requested, and my friend Mr. Nisbet, whose name I have so often to mention eulogistically, was selected. He at once suggested the discontinuance of the medicine, and the body to be kept constantly moist with buttermilk, frequently renewed. The result was apparent in twenty-four

hours ; the intense irritation subsided and no more bullæ appeared ; in a few days more the skin had returned to its healthy state.

From these illustrations it is evident that the doses of arsenic and iodide of potassium may be so increased as to produce or keep up disease of the skin ; consequently that the amount administered in any case must be most jealously regarded.

Of the *modus operandi* of judicious doses, we need say no more than that experience has shown us that the vital powers of a part may be favourably affected, when they are low, by the application to it of a stimulant or irritant,—a subject which is referred to at greater length in a subsequent chapter, *i. e.* on counter-irritants.

These drugs are more or less general in their operation ; they are medicines which permeate the skin in common with all other tissues, and to which the term constitutional fairly applies.

It is precisely in this manner that we explain the utility of golden ointment in certain cutaneous eruptions. The value of tar, of creosote, nitric acid, chloroform, nitrate of silver, bichloride of mercury, and a host of other irritants, is probably due to the fact that they permeate the skin, and stimulate the parts to which they are applied.

But we cannot in this category class all the remedies used by dermatologists. Many skin diseases arise from causes in daily operation. Exposure to heat, to sunshine, to soap, to sugar, to various powders, and the like, may each produce a definite disease. When they do the doctor has as far as possible to withdraw the patient from such causes, or to do something to protect the skin from their influence. Or it may be that there is too much blood in the part, a definite cutaneous congestion ; this interferes with nutrition, and it

must be removed. If the normal condition cannot be restored by the use of irritants or astringents, the blood must be removed by a local bleeding with a lancet or a needle. In this manner I have cured eezema solaris of the ears in a few days, which had previously resisted all my efforts. Of the beneficial influence of small general bleedings in extensive eezema, and of the utility of prefaeing special treatment by this means, I have seen many examples.

In some instances the secretion from the skin is unusually irritating and acid, and the remedy required is an alkali. In others, the skin is simply dry and requires anointing. In others, it is impatient of oleaginous preparations and requires aqueous solutions, such as gruel or arrowroot, which leave a coat on the skin when the fluid has evaporated.

The conclusion, then, we draw is, that there are a vast number of cases in which cutaneous diseases of various kinds are due essentially to an impoverished condition of the system, and which require for their treatment such means as are calculated to improve the vital force generally and locally. But at the same time there are also a large number which we cannot bring into this category fairly.

While on this subject we may remark that there are some very interesting points connected with cutaneous eruptions which have never yet been fully elucidated. We believe that the various forms of cutaneous eruption in erysipelas, small-pox, chicken-pox, measles, scarlatina, and the like, are due to the presence of various poisons modifying the healthy condition of the skin. Are we therefore to conclude that all the various forms of cutaneous eruption are due to the presence of one or more poison forces modifying the vital power, or are they due simply to some altered condition of the skin itself? What is the essential difference between common and syphilitic lepra, eezema, eethyma, &c. ? If we say the

syphilitic poison produces rupia, what shall we say of the presence of rupia when no such poison can be present? And why does syphilis produce eczema in one patient, ecthyma in another, roseola in a third, psoriasis in a fourth, and lepra in a fifth? Does syphilis act as a poison, or simply by inducing a condition resembling that which may be present without any such contamination? If it act as a poison, why is not its influence as uniform as that of the variolous, rubeolous, scarlatinal, and other poisons which modify the condition of the skin, and produce eruptions of a specific character?

The action of tinea, of favus, of arsenic, iodide of potassium, and other substances, is distinct enough. Why is not the itch insect equally specific? Why does it produce vesicles in one part or in one person, and pustules in another?

Questions like these are more readily asked than answered; we record them simply to show what need we yet have of an increase of knowledge, and with a firm conviction that the amount of thought and observation which a solution of these difficulties must entail will be of essential service to the mind which entertains them.

CHAPTER XV.

DEFICIENCY OF VITAL POWER IN THE MUSCULAR SYSTEM.

Deficiency of vital power in the muscular system—Functions during health—Contractility—Voluntary and involuntary muscles—Paralysis—Irritability—Want of control—Cramp—Stomach, intestines, rectum, &c.

AFTER having inquired into the influence of deficient vitality on the most important organs of the body as regards life, we may devote a few words to another system, intimately connected with locomotion and comfort—the muscular system—and investigate the manner in which it is affected when the body is brought into a low condition.

The muscular system is commonly divided into two departments—the voluntary and the involuntary—those with striped fibres, and those with unstriped; but this is to a certain extent unsatisfactory to our purpose, and we shall find it more convenient to arrange the muscles under two categories—those whose action is rhythmical or regular, and those whose action depends mainly upon the action of the will. There are some, too, it must be noted, which may be placed in each category—*e. g.* the diaphragm and the muscles of ordinary respiration.

We will commence our investigation into the influence of deficient vitality upon the so-called voluntary muscles.

What is the function of a muscle? It is simply contraction. Under the direction of a certain influence (transmitted from the nervous system, we believe), a muscle approximates its two ends, and thus brings its two insertions into nearer proximity to each other than they were before; or it may be, under the same influence the muscle becomes rigid, and prevents any motion: thus the action of the biceps may either raise the fore-arm, if the arm is straight, or keep it rigid, if it is semiflexed; and the triceps extensor may either extend the arm, if already bent, or keep it straight, if the person wishes to resist a flexing power.

But it is to be noticed that the muscle does not exert more contractile power than what is necessary: it obeys the will distinctly, acting simply, as it were, according to orders. Its contraction is unattended with suffering, and if it is made rigid, there is no pain.

Its physical condition is almost as characteristic as its function—it is simply one of firmness and solidity, as contradistinguished from the softness and semi-fluidity of fat, &c.

Tendon, or fascia, forms an almost essential part of the voluntary muscular system, and its function is one of simple rigidity; it may be described as an inelastic and unstretchable cord, capable of bearing the strain laid upon it, without the man being conscious of a painful sensation in any part of its course.

In what way are these functions influenced by deficient vitality? Our first step must be to investigate the circumstances under which there is unquestionably a loss of vital power in the muscular system, and then, from facts which are well known, deduce others not so generally recognised.

There is no difficulty in recognising the fact, that muscular action ceases at the time of death. In many instances (in Asiatic cholera, for example), it is true that the contractile

power does not pass away until some time has elapsed after death, but it does cease entirely after the lapse of a certain period. We have no hesitation, therefore, in saying that deficient vitality involves deficient contractile power.

But we have an indisputable right to believe that vitality is departing from the body generally from the time an individual begins to die, up to the period of his actual dissolution, and that the muscles evidence this condition with the rest of the system. What, then, is their state shortly before death by some such lingering disease as slow fevers, anæmia, cancer, and the like? We notice that their physical condition is one of extreme softness; they have lost all firmness, and resemble fat; and with this they are liable to irregular spasmodic twitchings (so well known as *subsultus tendinum*), entirely independent of the will; and they are unable any longer to do the bidding of the patient's brain.

From these instances we turn to others in which there can be little doubt of the vital power of the body generally being impaired, and examine the phenomena attending muscular action in them. Let us take delirium tremens in adults, chorea in children, and debility with convulsions in infants. Let us go further, and take those cases of excessive fatigue in which the individual is reduced so low that he requires the utmost care to survive—*e. g.* persons long at the pumps at sea, or swimming for their own lives, or to save others. In all these there are the following phenomena:—A want of control over the muscles, these organs doing less or more than the will requires of them; great irritability, and great irregularity of action, including cramp.

Upon what this last depends it is difficult to say, but the fact is certain that cramp is far more common in a muscle when it is fatigued and exhausted, than when it is fresh to

its work ; and we thus become aware of the curious phenomenon, that *what appears to be excess of action may be produced by decrease of power*, and that the rigidity of muscular fibre, which is perfectly *painless* in the strong, is intensely *painful* in the weak—an interesting corroboration of a remark we have previously made, that the process of dying is, in many parts of the body, attended with severe suffering.

When cramp passes away, it leaves the muscle and the skin over it in a state of *soreness*, the true explanation of which it is difficult, in the present state of our knowledge, to give. We call attention to the fact, because experience has shown us that excessive muscular action is always followed by a similar sensation—a sensation, however, varying so greatly in intensity, that some individuals simply describe it as an “aching,” while others speak of it as being an acute pain.

We have already spoken at great length on painful muscular affections, in a “Treatise on Myalgia,” and it is not necessary to go into the whole subject now. It will be sufficient for our purpose here if we advert to the fact, that excessive muscular action may take place in a variety of ways : by simple cramp, by long-continued exertion beyond the muscle’s power, or by a very ordinary amount of action when the muscle itself or the individual is extremely debilitated.

The soreness of the muscle is almost invariably accompanied by heightened sensibility of the skin over it, and this cutaneous affection has so often attracted the chief attention, that the condition of the muscular system has not been thought of.

This soreness and cutaneous tenderness is always in direct proportion to the debility of the muscular system, and is

more marked during the convalescence from scarlet fever than in any other disease I am acquainted with.*

We find, then, as a general law, that deficient vitality in the voluntary muscular system manifests itself by diminished firmness, by loss of contractile power, by irregular action, by disobedience to orders, by painful rigidity or cramp—*i. e.* muscular contraction becomes *painful*, instead of painless—and by soreness.

An important corollary follows from these observations—*viz.* whenever a muscle acts irregularly, as above mentioned, there is *primâ facie* evidence that it is weak; and if weak, it is the province of the physician to ascertain whether it is so from being over-worked or under-powered; that is to

* A few months ago I had an opportunity of noting this in my own family. I was frequently called up during the night in consequence of my son, *æt.* 9, crying from the severity of certain pains. The fever had left him very weak, but he was vivacious enough generally while lying down. The first time he sat up in bed he had intense abdominal myalgia for many hours, and this occurred repeatedly, from a similar cause. On another occasion he had myalgia in one sterno-mastoid, from reclining on the elbow without supporting the head; on another he had myalgia in the sterno-hyoid, sterno-thyroid, and the omo-hyoid muscles, produced by almost incessant talking and laughing. On all occasions the pain was followed by eutaneous soreness for some days.

My daughter, *æt.* 11, was an equal sufferer; and the day after her removal into the country, for change of air, although everything had been done to spare her any exertion, she had such intense general myalgia as to appear a perfect cripple from rheumatism. For a long period, walking, prolonged sitting, talking, sewing, &c., were followed by severe muscular pains.

It admits of doubt whether the so-called rheumatic attacks following scarlatina are not in reality myalgic, and due to over-exertion in weakened muscles, and thus analogous to the pain, soreness, and stiffness, we all more or less experience after a hard day's labour at such unusual work as rowing, pumping, baling, or wielding a heavy hammer.

say, whether the muscles have been simply fatigued by a more or less temporary excess of labour, or whether they are weak from constitutional causes alone, or whether they are acting irregularly from irregular nervous influence, or by all these causes combined.

The functions of tendon, or fascia, being simply passive, the influence of deficient vitality upon it is not so distinctly marked as it is in muscle; it is, however, readily recognisable. It is manifested by the fibrous tissue being more readily stretched, such stretching being attended with more or less of pain. Thus, when the gastrocnemii and solei muscles are fatigued, and their vitality reduced by long-continued walking, or standing or climbing, we must infer that the "tendo Achillis" is so too, and the result is more or less acute pain in that tendon. Long standing or long climbing in a mountainous country fatigues greatly the peronei muscles, tibialis anticus, and all those whose united action tends to keep the foot in its normal position; with the fatigue comes a greater stretchability, and many are the individuals who practically recognise this fact with great readiness, from the knowledge they possess, that they are infinitely more liable to "put out," or "twist," the ankle joint towards the end of a long walk than during the early part of it. However common such "twists" are to a pedestrian, he cannot remember one as occurring before noon.

The influence of struma and general debility upon white fibrous tissue is readily recognised in the failure of the strong ligaments of the knee* and other joints, producing what is known as "bow legs," "in-knees," "spinal curvature."

* "A number of cases said to be diseases of the joints originate in injuries to the ligaments, caused by the want of power in fatigued muscles to keep the parts from twisting."—J. C.

We have already adverted to the influence of deficient vital force upon the respiratory muscles and the heart. It remains for us now to consider the method in which the involuntary and non-striped muscular system is affected from a similar cause. Such muscles are found in the œsophagus, the alimentary canal generally, in the bladder, and in the uterus. All these, during life, have separate functions to perform ; and their action is more or less intermitting. In the œsophagus and the intestines the action is peristaltic, in a definite direction, and more or less regular and constant ; in the stomach, however, as in the bladder and uterus, distension is allowed to a certain extent, after which contraction follows.

Now, in cases where vitality is at a low ebb in the body generally, how do we find that these muscles are affected ? We find just what we should anticipate—viz. that their actions are irregular, and the rhythm which was present is lost. The œsophagus has its peristaltic action reversed ; a ball seems to rise from the stomach, to the throat, or instead of allowing the food to pass quietly and painlessly to the stomach, the muscles are affected by painful cramp, and dysphagia is the result.

The bowels may be affected in a similar manner—the peristaltic actions may be suspended, or the reverse ; or they may be so active that intussusception may take place ; or they may partake of the nature of cramp, and be attended, as in griping, with severe pain.

The bladder may refuse to contract when full, and thus it will become distended to an immense size, or it will refuse to be distended beyond a certain point, as in incontinence of urine. The unimpregnated uterus, which, under ordinary circumstances, is perfectly quiet, may take up irregular action, and contract its walls in such a manner as to give

rise to anteversion or retroversion, and when impregnated it may either refuse to be distended to its healthy limits, and thus produce miscarriage, or it may suffer from irregular and painful contractions (independently of parturition), either before confinement or afterwards, as in spurious and after-pains.

CHAPTER XVI.

DEFICIENT VITALITY IN THE BLOOD.

Effects of deficient vitality in the body generally, and in the blood—Increase of fibrine—Decrease of red particles—Acute rheumatic fever—Gout—Fevers—Typhus—Influence of famine—Debility increases the secretions of the body, fæces, urine—Debility alters secretions, makes them denser, &c.—Influence of debility upon the excretions—Cases.

AFTER having investigated the manner in which deficient vitality in certain organs shows itself, our next inquiry must be more general in its nature; and we will try to ascertain its influence on the body as a whole, and on the blood, as one of the most important parts of the whole system.

We begin by considering the blood as being the most convenient, and ask in what way does the blood of an enfeebled man differ from that of a man in perfect health? The first point is to consider it under those circumstances when the existence of debility must be self-evident, and then to examine it in others in which there is reason to assume the existence of deficient vital power.

We presume that no one doubts the condition of a man or of any of the lower animals, when they are dying from privation of food—all must allow that they are in a very

enfeebled state. The same may be said of any individual who has lost nearly half the blood in the body. Now, if we analyse the blood in these classes, we find two very notable departures from the healthy standard. The blood is very poor in globules, or red material, and extremely rich in fibrine. The proportional diminution of the former varies from 30 to 60 per cent., while the increase of the latter rises to 200 per cent., or even higher.

A similar change takes place in diseases eminently characterised by debility. Thus, in pulmonary consumption, the red parts are diminished 50 per cent., and the fibrine is augmented 580 per cent. ;* and in one case it was noted, that after the patient had taken cod-liver oil, the excess was *diminished* until the amount of fibrine was only 250 per cent. above the average.

In cancer there is a similar phenomenon, the average excess of fibrine in that disease being 600 per cent. In one case of leucocythemia, in an old man who had been treated by calomel, the excess of fibrine was 1100 per cent.

In sea-scurvy a similar change is seen—the red globules are diminished about 50 per cent., and the fibrine increased at a rate of 250 per cent. ; and we may say generally, that in other diseases implying great debility or want of vital power, a similar change is found.

But the alteration in the blood is not confined to its chemical characters alone ; there is a change equally conspicuous in its coagulating properties. An individual suffering under any of the conditions we have described, experiences great difficulty in arresting, in his own person, any accidental flow of blood from wounds. In like manner, consumptive females,

* The tendency to hæmorrhage in phthisical patients was once attributed to the blood being poor in fibrine. This was clearly a mistake—a false deduction founded on a false fact.

and others who are suffering from debility, are occasionally sufferers from frequent and excessive catamenial discharges, which there is great difficulty in checking. I knew one lady in whom two hours' walking always produced menorrhagia. Leeches applied to the skin of delicate children, of debilitated females or males, of those suffering from anæmia, chlorosis, erysipelas, and chronic secondary syphilis, produce wounds whose bleeding is arrested with difficulty; and generally we may say, that the arrest of hæmorrhage is difficult, in direct proportion to the poverty of the blood in red particles, and its richness in fibrine.

We have elsewhere shown* that the quantity of fibrine in the blood is evidence of poverty rather than of richness, and that it is more allied to an excrementitious product than to one intended for nutrition; and, consequently, that the doctrines founded on the contrary assumptions were untenable, and the deductions drawn from them faulty.

If, then, we are able, by the assistance of the chemist, to ascertain that the blood abounds in fibrine in those individuals who have been long fasting, who are wasted by poverty and old age, or debilitated by cancer, &c., are we not justified in drawing the conclusion, that whenever there is excess of fibrine in the blood, a considerable amount of debility is present? And if this proposition be true, does it not lead to the important rule of practice, that in all such cases the physician must have his attention fixed rather on improving the constitutional powers than on impoverishing them by an antiphlogistic plan of treatment?

Acute rheumatic fever forms a most interesting illustration of the importance of this deduction. In it the excess of fibrine in the blood is very considerable; and when that was

* *Vide* Appendix No. II.

looked upon as an indication of richness, the disease was considered essentially sthenic, and thus it demanded for its cure the most vigorous bleeding and mercurial salivation. Under this plan it was found that the disease was not only long and severe, but that it was commonly attended with acute inflammation of the pericardium, or the heart generally, and laid the foundation for life-long complaints. But since the same disease has been treated on a milder plan, and the utmost pains have been taken to keep up the vital powers, cardiac complications have been rare, and the duration and intensity of the disease have been very materially reduced.

Remarks of a similar nature may be made respecting pneumonia, erysipelas, and other complaints, in which excess of fibrine is present.

We do not know how far fibrine is identical in its character with the colourless corpuscles of the blood; whether it is so or not, the following observations of Mr. Paget are of considerable importance:—In order to satisfy himself as to the probable cause why inflammation in one man terminated in fibrous effusion, while in another it ended in suppuration, he applied a small blister to the skin of fifty individuals, and then carefully examined the serum produced. He found that this fluid was rich in colourless corpuscles in direct proportion to the cachectic condition of the individual, and still further, that the more debilitated the individual the greater was the tendency to suppurative or destructive inflammation.

Associating this fact with what has gone before, with the close microscopic resemblance between the colourless corpuscles and pus globules, and the knowledge that it is in the cachectic constitutions that suppurative inflammations are most common, we may fairly draw the conclusion, that an

excess of fibrine in the blood, and a richness of colourless corpuscles, predispose inflammation, when present, to assume a low or suppurative type ; and if this deduction be true, we may conclude conversely, that the existence of suppurative inflammation indicates a very debilitated condition of the body.

This observation forms a very natural prelude to the further inquiry—How does debility influence the body generally ? The answer is very simple—it predisposes it to all forms of disease.

In saying this, we do not mean to affirm that no individuals suffer from disease except those who are in some way weakened—*i. e.* whose condition is below the normal condition of health at the moment of the attack. Such is far from being the fact. Small-pox and cholera, scarlatina and measles, attack the healthy as well as the unhealthy, though in smaller proportionate numbers ; nor does plague fasten solely on those whose health has been deteriorated by excess or other causes.

What we wish to call attention to is the fact, that, as a general rule, the weakly are more obnoxious to disease than the strong.

The importance of this law we have already dwelt upon at some length, but we may adduce one or two more examples of its application.

Take, for the first illustration, the condition of woman at a time when her powers are very materially reduced by the exertion required in parturition and the consequent loss of blood, &c.—what more common than to find her succumb under influences that do not affect to an appreciable degree her female attendants ? Puerperal fever, highly contagious though it be, rarely affects the nurse ; nor is even the woman herself obnoxious to it, so long as her strength is firm, and she is not reduced by the contingent drains of “labour.”

From hence we may carry our mental vision along the hosts of patients we have seen, with skin disease, with ring-worm, porrigo, scabies, lepra, psoriasis; with chorea, convulsions, epilepsy; with scrofula, diseased bones, consumption; with indigestion, purging, hæmorrhage; with rheumatism, apoplexy, mania; with gonorrhœa, syphilis, dissecting wounds; with neuralgia, sciatica, cramps, hysteria;—and what do we find, but the broad fact, that these diseases are, *cæteris paribus*, more common amongst the weak than the strong, amongst women than men, amongst the inhabitants of towns rather than of rural districts; that they are aggravated by low diet, by loss of blood, by excessive fatigue, by purging, by foul air and the like; and that they are improved by generous living, pure air, and tonic medicines?

If there be any truth in the foregoing considerations, if it be true that debility predisposes to disease, that disease implies the existence of debility, general, local, or both, does it not follow, as a most important corollary, that disease must be more difficult to cure in the debilitated than in the strong, that weakness of body will increase the tenacity of its grasp, and counteract the efforts of the physician?

And if this deduction be true, how false and mischievous must be the doctrine that I have heard expressed, which teaches that it is necessary to lower the constitutional power at the commencement of a disease, that this may be the more readily subdued in the end; and how radically bad was that system of medicine, whose prime supports were bleeding, mercury,* purgatives, antimony, and low diet, and which rarely used tonics and generous living until the weakness of

* “In all acute diseases the lancet is the right arm of medicine, and perhaps calomel the left.”—*Dr. Armstrong.*

“What a sad thing that both arms have been amputated as if from senile gangrene!”—*Dr. Nottingham.*

the patient was such, that there was manifest and immediate danger of death from asthenia !

Nor when we contrast the active lowering treatment of the physicians in days not long gone by—if, indeed, they may be said to have passed away at the present date—with the do-nothing-in-the-medicine-way-system of Homœopathy, ought we to be surprised at the success of the latter ? for the drugs of the former did positive harm, by keeping up the conditions they were intended to cure ; whereas, in the latter system, the patient was at least left to the pure powers of nature, and ran no risk of dying of the doctor's misinterpretation of nature's signs.

I have already given many cases which will illustrate this remark : I may add another which has recently come under my care, and which proves forcibly the influence of debility in producing disease, and of certain medicines in aggravating it.

Mrs. M., æt. 35, had floodings three months ago, and since that period has had menorrhagia frequently. Shortly after the first severe loss of blood, she began to suffer from indigestion, acidity, and flatulence. The bowels were irritable, and any mental emotion would bring on diarrhœa. The pulse was very weak, the circulation languid, the extremities cold ; there was tickling cough from relaxed uvula ; the sleep was disturbed and sometimes absent ; she had nausea in the morning, and was excitable and "nervous" at night. She had a sensation of fulness in the bowels, for which she took Gregory's powder frequently. She had myalgic pains in various parts of the trunk, which were sometimes very severe. She had been very careful and abstemious in her diet, but had found no benefit from being so.

I adopted a tonic plan of treatment, with every possible adjunct, and laid an embargo upon all aperient medicine.

Improvement was apparent in ten days, and in two months she was in better health than she had ever before enjoyed, and her husband repeatedly and emphatically said that the good was mainly owing to her having given up "the frightful system of dosing with Gregory's powder." When she was well, the following was her report of herself. She could now get through the day without discomfort, walk any reasonable distance without fatigue, go to concerts and parties without feeling sure that they would be attended with sore-throat and followed by catarrh. She was in buoyant spirits, and had lost her propensity to ery at trifles; the appetite was good, the digestion perfect, the bowels regular without medicine; the catamenia correct both as to time and quantity; the sleep was sound and natural; and there were no myalgic pains except after very unusual exertion. The only part of the treatment she still keeps up are those I laid the most stress upon from the beginning: viz. a daily rest for one hour in the afternoon after an early dinner, and a total abstinence from all aperients.

I scarcely need point out how forcible an illustration of the value of globulism this case would have appeared to be, had it fallen into the hands of those who, while they give steel and cod oil in full doses to support the strength, administer special remedies in such infinitely small proportions that they neither can do good nor harm. With improvement in the vital powers all symptoms of disease abate, and the patient recovers; how easy is it for a careless mind to ignore the influence of the general remedies which gave strength, and to attribute every good result to the special medicine which was given with the definite intention of curing this or that symptom! It is this carelessness of mind which has made so many converts to a theory so manifestly absurd as Homœopathy.

The following cases illustrate this point well :—

Mr. B., æt. 50, had for years taken medicine to keep his bowels open, and felt sure he could not do without it. He was always ailing, and had total anorexia. He gave up his pills at last, and found that the bowels were regular without them ; after that he improved daily in appetite and vigour till he regained his health completely.

Mr. C., under similar circumstances, went to a Homœopathic physician, and took the decillionth of a grain of “nux” every night instead of five grains of colocynt and five of blue pill. He too was cured, and became one of the most ardent apostles of Hahnemann in the town !

Mr. — was suffering from syphilitic eruption, and took abundance of iodide of potassium in full doses. The eruption, which was largely vesicular, increased ; the irritation of the skin was excessive. A consultation was held, and the dose of the iodide was increased to overcome the mischief, and opium given to enable the man to bear it. As the man’s life seemed now in danger, another doctor was called in ; he saw at once the connexion between the sufferings and the medicine used. The requisite means were taken. The iodide was discontinued, and in two days the patient was well. Had the last doctor administered globules containing vaccinia, he would doubtless have converted the gentlemen he met in consultation to the Homœopathic faith.

In pursuance of this subject, we may next inquire into the influence of deficient vitality upon the function of *secretion* generally. In doing so, we shall come upon some very startling facts—startling not from their novelty, for they have long been familiar to all, but because their true significance has been so completely ignored, and a false reading of them adopted.

As far as I can ascertain the general notion about secre-

tion, it is, that it is essentially an active process ; and that increased secretion, as a necessary consequence, implies the idea of increased action in the secreting organ. Thus we speak of perspiration as increased action of the skin, diarrhœa as increased action of the bowels, diuresis of the kidney, and the like. Still further, we consider that various organs can be stimulated or goaded into increased action, and we find such ideas constantly put into formulas in the following manner :—diaphoretics, diuretics, aperients, &c., are given to increase the action of the skin, the kidneys, the bowels, and the like.

Under other circumstances, we have the idea of increased action put in another form ; thus, in rheumatic fever, we are told that perspiration is an “effort of nature” to throw off or eliminate a certain poison ; in the diarrhœa accompanying many cases of Bright’s disease, we are told that the bowels take on “increased action” to relieve the kidneys ; that in scarlatina the kidneys take on increased action so as to supplement the deficient action of the skin, &c. In all these instances, and many others we might name, there is a steady idea apparent, that increased secretion implies increased action, and that increased action implies increased power. This idea receives corroboration from the constancy with which increased secretion from the nostrils, bronchi, urethra, and vagina, are spoken of as produced by “inflammation” of the Schneiderian membrane, of the mucous membrane of the bronchi, &c.

Now we are not going to make the startling assertion that all our ideas on this point are wrong, that increased secretion never depends on increased action, but to group a number of well-known facts in such a manner that it must be apparent to every one, that another interpretation may be given of the phenomenon of increased secretion, besides

that of "increased action;" and to point out some of the very practical conclusions which a re-consideration of the subject involves.*

The first fact to which I would call attention is, that during the short period of life which elapses between an apoplectic stroke and its fatal termination, we have in a vast majority of instances, if not universally, an abundant perspiration upon the skin, and a copious formation of mucus in the trachea and the larger bronchi. Cold, clammy perspiration, and the "death rattle" in the throat, have in many diseases long been recognised as immediate harbingers of death. With the dying condition of the patient before our eyes, it is impossible to attribute these phenomena to increased power, or increased action; we must, on the contrary, allow that they are due to a failing condition of the vital powers.†

But as copious perspiration and abundant bronchial secretion do not always come together, we may advantageously follow up each symptom separately, and ascertain how far the preceding inference is correct.

We ask, in what classes of persons is *perspiration* most common, constant, and severe? The answer is, it is an almost habitual attendant on consumption; it is nearly constant in hectic and rheumatic fever; it comes on partially in the later stages of typhus fever; it is frequent in cases of psoas abscess and strumous disease of the bones; it attends simple debility, whether arising from accidental or consti-

* "The skin is dry in the active stage of fever. The kidneys secrete no urine when they are inflamed, and the same is true of other secreting glands; whilst upon the subsidence of such inflammation, the parts being left in a state of weakness, inordinate secretion from them occurs."—J. C.

† Compare this with page 277, where increased action in a muscle seems to result from deficient power.

tutional cause ; it is common in delicate children ; and it is frequently produced by fright or other depressing mental emotion.* It often accompanies bronchitis ; and one of the most severe cases of colliquative perspiration I have seen, arose from sexual excesses. It is also very common in delirium tremens, a complaint in which there is a great amount of asthenia present, and the perspiration ceases as soon as the patient recovers his strength. In none of these instances can we suppose that there is increased action and augmented power.

It occurs in every case of ague, and in that is cured by quina ; and I have recently met with it as a very troublesome symptom in a lady dying of debility and old age.

With regard to the causes influencing the amount of the *bronchial secretion*, we may again ask, In what persons is it

* I have repeatedly had occasion to note that those cases of acute rheumatism are the most severe and most difficult of cure, in which the amount of perspiration is most excessive. I have rarely seen these recover under three weeks. In all, the first sign of improvement is a gradual restoration of the skin to its healthy character. In one case recently under my care at the Liverpool Royal Infirmary, the man was very pale and weak, the sweating was extreme, and a copious miliary eruption (sudamina) accompanied it. A profuse supply of lime-juice was given, but with little apparent effect ; on the fourteenth day, however, full doses of the tincture of the sesquichloride of iron were substituted for it, and the patient shortly experienced a considerable abatement both of the pain and sweating, and spoke of a consciousness of increasing strength. After being apparently well, however, for a few days, he had a relapse, and the sweating was as bad as ever. I now gave him full doses of lime-juice and steel combined, and he was well in a week ; after this he had no relapse, but continued very weak for a long period. I have had, since this occurred, many other examples of a similar nature ; and after a tolerably extensive experience in this complaint, I cannot recall one single instance in which relief has attended a copious perspiration.

most abundant? We find it far more copious in old age, when the powers are low, than in youth, when they are vigorous; it augments in quantity every year as the patient grows older and is more enfeebled; and it is increased by all depressing agencies, by the action of cold upon the surface, which checks the circulation, by the abstinence of food which poverty too often enjoins, and by the use of such drugs as mercury, squills, colchicum, and antimony.

The following cases well illustrate the depressing influence of this last medicine on the bronchial and cutaneous secretions:—

R. J., æt. 40, of spare frame, and habitually asthmatical, suffered, on two different occasions, from pneumonia and profuse bronchitis; from each of them he recovered slowly but completely; in the intervals he drank to excess. I then lost sight of him, as he went to reside in the south of England. One day, however, I received a note from his wife, stating that he was ill again, with his old complaint; that he was far weaker than he had ever been before, and that the expectoration was most profuse. In reply, I recommended her to tell his doctor that he required a free exhibition of stimulants, and that antimony would do mischief. In a few days more I heard that Mr. J. was much worse, that he thought himself dying, and that he was too weak to sit up in bed without fainting; that he perspired profusely, and that the cough and expectoration were worse than ever, while, in answer to my remarks, his doctor had said that he was administering antimony, and he thought it was of service. I again wrote as before, and stated that I knew that tartar emetic acted on my old friend as a poison; but his attendant persevering in its use, the patient refused to take any medicine but tonics, and from that time began to improve, the overwhelming debility produced by the drug left him, and with this the skin became

drier, and the bronchial secretion diminished, and he regained his usual health by slow degrees.

Mrs. M., æt. 40, had an attack of acute bronchitis, for which she was treated with expectorants, small doses of antimony, and a blister to the chest. As she did not improve, I was requested to visit her in consultation. I found the whole of both lungs affected with the complaint, the cough severe, the expectoration purulent and excessive in quantity, the skin moist and perspiring, and the debility considerable. Acting on the views here promulgated, I recommended steel as a tonic ; five grains of styrax pill three times a day, to relieve the cough ; friction with turpentine liniment to the back of the thorax, as a local stimulant ; inunction with oil on the arms and thighs, to assist the diet ; the inhalation of the vapour of turpentine, as a stimulant to the mucous membrane of bronchi ; with equal parts of rum, honey, and lemon juice, as an expectorant ; generous diet with wine, &c.

Improvement was perceptible in twelve hours, but on the second day she was thrown back by mental agitation and anxiety. On the fourth day, however, I found her so much improved that I discontinued my visits ; at that time the cough was easier, the expectoration had diminished one half and had lost its purulent character, and become simply frothy mucus. With this change in the bronchi, a corresponding one had taken place in the skin ; instead of its being moist, clammy, and perspiring, it was firm and of healthy dryness, and it was impossible for us not to conceive that there was an analogy between the profuse expectoration of bronchitis and the excessive sweating of phthisis. In a few days more the patient was entirely cured.

The bronchial secretion is frequently increased by even trifling exercise, and I have known in many cases a short walk to prove fatal.

The same secretion is unusually abundant in strumous children, in those who have a tendency to decline, or are already in consumption. I have known an inordinate amount of it induced in a young woman by fasting, and almost magically cured in less than three days by a very generous diet. Nor is the fact without interest, that of all the popular remedies for profuse bronchitic secretion, those are the most successful which are practically the most stimulating, *e. g.* ammonia, polygala, myrrh, ammoniacum, tinctures, balsams, &c.

In pursuance of the ideas here promulgated, I paid special attention to the cases of bronchitis under my care during the last winter, at the Liverpool Royal Infirmary. I found, that so long as they were taking the routine medicine, ordered by the then junior house-surgeon, in accordance with the old belief in the value of antimonial or febrifuge expectorants, so long did the skin feel moist, clammy, and perspiring, and the amount of the bronchial secretion keep up or increase. A change to steel, ammonia, wine, or quinine soon dried the skin, and with it the bronchial mucous membrane.

One day's treatment of bronchorrhœa with ammonia and quinine converted it into common bronchitis.

One elderly woman came in with severe bronchitis, and its attendant coldness, blueness, and dyspnœa. I simply ordered her to confine herself to the ward, to have good diet, and a teaspoonful of compound spirits of ammonia every four hours; the improvement was immediate, and she was soon well. The next old body I took in I intended to treat in the same manner; but she spontaneously took to her bed, and would have no physie, and her improvement was as rapid as could be desired.

As both of these were charwomen, and had been working

on until they could work no longer, and had been living withal upon a most meagre diet, I concluded, first, that the bronchitis had been steadily aggravated by excessive labour, and secondly, that the chief causes of improvement were rest, warmth, and comfort.

If we now extend our inquiry into other secretions, what do we find? That struma is very generally attended with increased secretion from the eyes, the nostrils, the bronchi, the bowels, the skin, and in females from the vagina; that a weak old age is attended with, and often fatally ended by, hydrothorax and hydropericardium, *i. e.* increased secretion from the pleura and pericardium; that ascites is common under the same circumstances; and that general dropsy frequently occurs from debility or old age, even when there is neither renal nor cardiac disease. We know that large losses of blood occasionally eventuate in the same phenomena. We know that the children of consumptive parents are unusually liable to increased secretion from the lining membrane of the cerebral ventricles, *i. e.* to watery effusion. I have had many patients under my own eye, in whom hydropericardium and hydrothorax have been traceable to no other cause than cold, privation, misery, and hard usage at sea. I have had others, in which large effusions into the knee and elbow-joints have been due to a similar cause, and where the products of the increased secretion of the synovial membranes have been taken up again under the influence of strong local stimulation, *e. g.* blisters and iodine paint. Still further, we know that diarrhoea, *i. e.* increased secretion from the bowels, is a frequent cause of infantine death in the miserable dwellings of the wretched poor, where starvation is more common than profusion, and a low vitality than a flush of strength. The same complaint is common in struma, phthisis, typhus, and

other exhausting diseases ; it often attends sea-scurvy, and is almost habitually produced by fear, the most depressing of all emotions. Fear will also produce, both in man and woman, a profuse diuresis.

If we turn to the female sex, we find that the secretion of the catamenia is frequently, though by no means universally, increased by debility ; that in the consumptive or strumous, or in those who are simply weak from growing too fast, from excessive walking exercise—from prolonged anxiety, or from some constitutional peculiarity—it is not only excessive in quantity, but that it is brought on at irregular intervals by an amount of exertion and fatigue totally inadequate to produce similar effects on the healthy.* We find, too, that the vaginal secretion is wonderfully increased

* In illustration of this remark, I append the heads of cases that have come under my own eye :—

Mrs. T., æt. 36.—Menorrhagia ; debility from too heavy work ; tall, thin ; cured by rest and tonics.

Mrs. M.'s case—given at p. 198.

Mrs. H., æt. 27.—Consumptive family ; menorrhagia from any pedestrian exercise beyond an hour and a half ; habitually unwell every fortnight.

Mrs. C. S., æt. 31.—Of delicate family ; water in the head when young ; tall, spare ; unwell every ten days whenever she was weakened by diarrhoea, influenza, or too much exercise ; is cured by rest and tonics.

Mrs. G., æt. 37, a remarkably active and apparently healthy woman, though of somewhat delicate family, whose sister came under my care for excessive debility, which no treatment could effectually cure, has lately suffered from menorrhagia ; for this she has tried all the usual remedies, including turpentine, and more recently ergot of rye. The attack was brought on two months ago by the fatigue of a railway journey taken during the first day of the monthly period, and the discharge has been kept up by the daily labours of active housewifery.

Mrs. C. J., æt. 24.—Tall, healthy looking, stout ; was much reduced by her fourth confinement ; cured by ten minims of turpentine.

in the delicate female ; and that leucorrhœa is at once the evidence of debility and the cause of its continuance or increase. In man, we find that the quantity of semen is augmented by various depressing agencies, such as excessive heat, excessive fatigue, and sexual excess ; the quality of the secretion is deteriorated, but the amount formed in any given period, say for a week or a month, is amazingly increased, *i. e.* in spermatorrhœa the amount of the discharge, which is very thin and watery, will reach an ounce in three weeks or thereabouts, whereas in health the same amount would not be discharged spontaneously in as many months, while its consistence would be infinitely increased.

Nor does our experience of gonorrhœa militate against the preceding facts. We have had repeated opportunities of noticing that the discharge is always most excessive in those of a strumous habit or debilitated frame ; and that it may in them be diminished more surely by the use of steel or other tonic, than by a rigidly meagre diet and total abstinence from stimuli : and we would call attention to the well-known fact, that the

Miss A., æt. 12.—A tall overgrown girl, beginning to menstruate at 11 ; has been kept extremely weak by menorrhagia.

Miss C., æt. 14.—Ditto, ditto ; cured by ten minims of turpentine.

Mary S., æt. 19.—Phthisical ; catamenia are excessive in quantity, and come on every three weeks.

Miss J. M., æt. 12, began to menstruate six months ago ; is remarkably tall and womanly, but very delicate ; an hour's walk will give her myalgia, and induce a copious uterine flow.

It is a remarkable fact that debility will produce amenorrhœa in some, while it produces the contrary effect in others. Many of the preceding cases suffered at a previous period from chlorosis, and the instances are very numerous in which patients answering to the usual inquiries respecting the state of the catamenia, remark—“ I am either not poorly at all at the proper times, or I am too much so.” This tallies with what we see in other parts ; one consumptive has the skin bathed with sweat, another has it harsh and dry.

most popular medicines in that complaint are such excitants as cubebs and copaiba, *which stimulate the parts to decreased action.*

Nor is increased secretion confined to cases of venereal origin ; for I have the following account from a well-known physiologist :— “ In my most feeble state,” he writes, “ I observed the secretion from the glans penis to be *unusually* abundant, so much so that, having omitted for three days to take my cold bath in a morning, I found stains on my shirt.” I have myself repeatedly noticed that the glans is far more moist, and the sebaceous secretion around the corona far more abundant, in delicate or strumous young men, than in perfectly healthy subjects. A similar remark applies to the vulva of females.

We next turn to the secretion from the kidneys, and find that it is no exception to the rule. This secretion, as we have already remarked, is increased by fear and by hysteria—essentially a disease of debility ; and in diabetes insipidus—which, there is reason to believe, is the *result* of extraordinary debility of the constitution, rather than its *cause*, inasmuch as the amount of solid matter excreted is too small in itself to produce any marked effect on the system—the amount of the secretion is excessive.

Few are ignorant how much the secretion of the mucous membrane of the bladder is increased during that low state of vitality which accompanies paraplegia ; and how the mucus, till then hardly recognisable in the urine, becomes one of its most characteristic ingredients.

Respecting the liver, we have not much definite information to offer : all we can say is, that its sugar-production is increased, as in diabetes, by certain debilitating agencies, and diminished by such things as increase the patient's strength. Respecting the influence of debility in increasing the secre-

tion of the stomach, we cannot say much beyond the fact that waterbrash is common in those whose stomachs are weakened by ulceration, &c.

But our facts do not end even here ; for we may now turn to parts in which the amount of secretion is naturally so small as to be imperceptible, viz. the eye and external ear. In the former, we have increased secretion in the poorly fed, the delicate, the strumous, and the aged. Shakespeare, amongst the characters of old age, sets down "a moist eye," "eyes purging thick amber and plum-tree gum." And we may add as a significant fact, that those who are weakly, not only weep sooner, but cry with far more copious tears than those who are strong ; that an hysterical burst of crying may be repeatedly checked by a glass of wine, or other stimulant ; and that many a man will, when fasting, or after long fatigue, weep over griefs, which cannot bring a single tear if presented to him when full. In the ear, we have otorrhœa occurring amongst the scrofulous, the children of consumptive patients, and in those who are or have been reduced by scarlatina or other depressing diseases. I have seen it come on when the patient was at the lowest extremity of weakness, and go off as he returned to his strength.

We speak with some hesitation respecting the influence of deficient vital power on the secretion of the milk in the female. But we think that we have noticed, as a general rule, that very healthy women have not so large a quantity as the weakly ; that the quantity in the weakly increases in proportion to the debility lactation produces in them ; that large quantity and good quality do not generally go together ; and that the influence of tonics and stimuli upon a nurse is to increase her own health and condition, and to diminish the quantity of the milk produced.

Let us for one moment turn to one of the causes of in-

ereased secretion, the presence of so-called chronic inflammation. What are the facts connected therewith? Why, that during the acute state of the disease, when the power or increased action may be considered at its height, all secretion is suspended and the secreting surfaces are *dry*; that the increased secretion comes on when the inflammation is chronic, and that the parts are restored to health under the influence of stimulants. We know to what extent debility increases the secretion of pus from a sore; how it abounds under the use of poultices, and almost disappears when dry lint is used, or any stimulating wash or ointment.

Coupling all these facts together, we are forced to the conclusion, *that increase in the amount of any secretion is not necessarily evidence of increased action or augmented power, but that it may, and very frequently does, result from diminished vitality, and even expiring life.* How frequently these last conditions are the cause, I would hardly venture to enunciate. My impression is, that they are far more common than any one has hitherto supposed.

The practical application of the view we have been setting forward is readily appreciable. Chronic bronchitis, strumous coryza, and some other profuse discharges, have long been treated by stimulants and the most generous diet; but in some other diseases, which fairly come into a similar category, the same principles are studiously avoided. Thus, in gonorrhoea, while we give with one hand such stimulants as copaiba and eubeba, and even apply such local irritants as cantharides externally, we take away with the other hand the patient's beer and wine. I have long thought that this plan could not be the correct one, and I have sought, first, for some reason why alcoholic stimuli should be prohibited in any case; secondly, when they might be administered with advantage. The reason why they are in general tabooed

is, because gonorrhœa is most common in young men, that it prevents them from having connexion, that this encourages erections, that erections are very painful, and that alcoholic stimuli increase sensual desire, and promote erections ; hence they are forbidden. But if erections are not troublesome, and rarely, if ever occur ; if the patient be not strong, is of a strumous habit, has much exertion, or suffers from any cause of debility, tonics and alcoholic stimuli may be given with great advantage. Under their use I have seen cases of gonorrhœa yield rapidly, which had previously appeared to be intractable, and even gleet may be cured by tonics.

But there is another application of the subject to which I must refer in a few words. If the increased secretion into the cells of the areolar tissue in general *dropsy* has its origin in an enfeebled condition of the system (and we will not waste time by demonstrating that it is not produced *simply* by obstruction to the circulation, for that will exist as in phlegmasia dolens, &c., without dropsical effusion, and heart disease without dropsy is common enough), is not any plan of treatment which ignores the use of strengthening remedies manifestly insufficient to complete the cure ? Is not the plan of treating it by diuretics and frequent purgation alone radically bad ? To these observations I will add, that I have had under my care a girl with general dropsy, from renal disease, in which an artificial diarrhœa had been kept up for some months, ere she came into hospital, and during that period the anasarca had steadily increased. On her admission, the treatment was entirely changed, the purging checked, and tonics given, and an improvement was immediately apparent. She remained, however, only under notice for a fortnight, and was taken away by her friends, the dropsy remaining uncured.*

* Mr. Nisbet has told me of a case in which a man was cured of

Many cases have now come under my notice in which anasarea, ascites, hydropericardium, and hydrothorax, all of them eminently diseases of debility, have been greatly relieved, and in some instances completely cured, by the use of tonics alone. Nor is it uninteresting to know that amongst the most popular medicines in the last two complaints is iodide of potassium, which acts as a local stimulant to every part of the body to which it is conveyed, and cantharidine blisters, whose locally stimulating influence will be demonstrated in a subsequent chapter.

To these views it has been objected (1) that secretions may be divided into active and passive ; (2) that the latter are almost entirely physical acts ; and (3) that many of the secretions named above are increased not because they contain more solid matter, but simply because there has been a transudation of water, which has diluted them. But these objections have little force ; for it is practically impossible to draw any limit between active and passive secretion. Nor is it correct, so long as secretion is not met with in the dead body, to call it a physical act. The third objection is founded on false facts ; for true experience teaches us that, in the cases we have referred to, the secretion is oftentimes thicker than usual, and in many instances changed in quality. Thus in diphtheria, a disease attended with most intense debility, we have a very dense, copious, and tenacious material, produced by the mucous membrane, far exceeding in quantity and firmness healthy mucus. And we may add, still further, that the complaint is generally treated by most vigorous local and general stimulation.

general dropsy (from cardiac disease) when death was considered to be inevitable, by drinking a soda water bottleful of turpentine, which the patient took of his own accord.

Again, the more asthenic the type of croup, the more dense is the tracheal secretion.

A very dense secretion of mucus is frequently formed in the throat when a patient suffers much from relaxation of the uvula, soft palate, and fauces. The following is a case in point:—Mr. M., æt. 55, called upon me complaining of the daily discharge of a very dense pellet of mucus from the left nostril. His eyes gave evidence of previous strumous ophthalmia, which he told me he had had very severely when a lad and young man; and he told me that he had had an attack of erythema nodosum twelve months ago. I then examined his throat. Its appearance would almost have warranted the statement that he had chronic diphtheria. There was daily a very tenacious discharge of mucus from the fauces, but of that he thought little. It was evident in this case that the nasal and other discharge were due to local debility, connected with struma, and an appropriate treatment was adopted with great relief.

Again, it is to be noted that leucorrhœa from debility is not simply an augmentation of the natural vaginal mucus—it is in many cases of a genuine purulent character—and so far from its being a dilution of the healthy amount, it exceeds that in solid material by fifty or a hundred fold. In a healthy state the mucus never appears outside the vulva at all; in great debility, it flows outwardly in a continuous stream.

In connexion with altered secretion, I may briefly touch upon a point which has not, to my knowledge, been investigated by chemists or physiologists, viz. the acidity of the cutaneous secretion. I have often noticed that the prolonged application of oil-silk to the naked skin produces a considerable amount of inflammation, and sometimes an eruption of vesicles. I thought at first that this was due to some quality in the impermeable material employed, but more

extended experience demonstrated that similar results followed the use of gutta pereha and India rubber, and that somewhat similar effects were produced by thick linsced-meal poultices. After wearing an impermeable finger-stall for some weeks (in consequence of an accident to a nail), I found all the part covered up was inflamed and brawn-like, and covered with minute vesicles from which a serous pus escaped, and the whole skin subsequently exfoliated, as after erysipelas, &c.

An elderly gentleman of my acquaintance has on more than one occasion had extensive cutaneous inflammation, excited by the use of too large a piece of gutta pereha applied as "water dressing" to a sore, the redness being confined entirely to the surface covered. Every accoucheur has had his attention called to the redness and soreness (intertrigo) produced in young infants, in parts where two folds of skin are in contact: the surgeon knows that if he should strap two fingers together, without an intervening substance, the surfaces opposed to each other would become inflamed; and the lusty pedestrian knows, to his discomfort, that a most painful inflammation is produced at the spot where the nates come in contact with each other, whenever he takes an unusually long or perspiring walk. In young female children, too, we often see that inflammation is present just where the "labia" are in contact with each other.

Hence we infer that there is some acrid material naturally secreted by the skin, the retention of which within it, or the prevention of whose escape, will produce the same effect as the application of an irritant.

There is some reason to believe that the acrid material here spoken of is of a volatile nature, and that its quantity is considerable. It has often struck me that the restlessness some sensitive people complain of when in bed may be due

to the presence of this agent. A lady awakes at night possibly with the legs feeling hot, uncomfortable, and fidgety, and she cannot sleep again; she gets up, walks about, and then returns to bed—still it is the same—she then remembers an old saying, takes off the bedclothes, dissipates the acrid stuff, makes the bed again, lies down, and is comfortable at once; another may be too poorly to rise from bed, and the legs get fidgety and hot as in the former case; the careful nurse now turns up the bedclothes, dissipates the irritating atmosphere lying between the sheets, sponges the skin with cool water, and the patient is comfortable. Other nurses simply transfer their charges from one side of the bed to the other, leaving the one side open, so as to “air” it. All these plans answer and give the patient comfort, and this we can best explain by assuming the presence of some agent emanating from the skin whose influence is prejudicial, and which can be removed by exposure to fresh air.

If such a material pass from the skin, we may infer that a similar one may be formed by certain mucous membranes. Be this as it may, it is certain that the nasal mucus in scarlatina, catarrh, and struma, is sufficiently acrid and irritating to produce inflammation of the upper lip.

I have often been struck by the extreme acidity of the intestinal secretion in certain cases of diarrhœa. Under ordinary circumstances the feculent matter lies in contact with the mucous membrane of the rectum without irritating it preternaturally. But when diarrhœa occurs, whether spontaneously or under the influence of aperients, nothing is more common than to have the rectum in so irritable a condition that the smallest amount of feculent matter in contact with it is intolerable. Hence we have tenesmus as a frequent sequel of purging; and in three instances I have known the irritation sufficient to produce

inflammation of the rectum extending to the bladder, and giving rise to severe and prolonged suffering. In like manner the leucorrhœal secretion will occasionally give rise to inflammation of the vulva in woman, and a corresponding inflammation in the male who has come in contact with it. This occurs when there is no venereal taint; and when this is present, the effect is heightened. Thus gonorrhœa in the female is never so virulent as when the discharge is profuse; and in man, as a general rule, the discharge is irritating in proportion to its quantity. In many of the above cases the secretion is very acid; in others it has an alkaline reaction.

If we adopt these views of secretion, it will follow, that one very important item in the treatment of leucorrhœa and gonorrhœa is the frequent removal of the irritating secretion from the mucous membrane. In the former this is generally acknowledged, but not in the latter.

To test the truth of the idea, I treated gonorrhœal patients with nothing beyond frequent syringings with tepid water and tonics where necessary, and I found the results on a small scale so highly satisfactory, that I mentioned them to Mr. Nisbet, of Egremont, of whose practical knowledge I have the highest estimate. His reply was characteristic, viz. "There are two ways of washing out the urethra—one by syringing with water, and the other by cleansing it out with watery urine. I have long been in the habit of telling my patients to drink plenty of weak gin and water and to micurate every ten minutes, or as often as they can, and I scarcely ever have a case which lasts over three weeks; and I have never occasion to order any medicine or the use of a syringe." As his plan is the simplest, it is the most worthy of adoption.

In the preceding pages we have called attention to the

influence which a debilitated condition of the system has upon *secretion* generally: we must next examine the influence the same cause has upon the matters secreted—the excretions as they are termed.

All of us are more or less familiar with the fact that the excretions do not decompose, as a general rule, while they are in the body. The *fæces*, retained though they be sometimes for days, and in some rare cases for weeks and months, in the colon or the rectum, do not decompose there, as they do when they are expelled from the body; and this observation holds good, even though the bowels are distended with flatus, and the *fæcal* matter is in contact with a gas differing in no degree from common atmospheric air. The urine, when retained in the bladder, becomes denser, and undergoes some change; but it does not decompose in the same manner, in the interior of the body, as it does when expelled therefrom and kept in a close, well-stoppered bottle. We account for this by saying that the excreta have a certain vitality so long as they remain in the body, which enables them to resist the ordinary laws governing the inorganic world.

As we know from experience that the vital power does not leave a limb immediately after it has been amputated; so we may inquire whether vitality may not also remain in excretions for some time after their expulsion from the body. In other words, we ask, do the excretions lose their vitality as soon as they are expelled? or is there a period during which they successfully resist chemical laws? And, if such period exist, is it definite for all? Do the excretions of some decompose, *cæteris paribus*, sooner than those of others? and, if so, can we associate that phenomenon in any way with the condition of the individual at the time?

My attention was first called to this subject in the following manner. When M. Ledoyen came to Liverpool, about

twelve years ago, to demonstrate the deodorizing power of his "disinfectant" fluid, amongst other experiments the following was made. The alvine dejections of a certain number of patients, ill with fever and various other diseases, were all placed side by side, to the number of thirty or more, in a small room attached to the pauper hospital. They remained all night in the chamber, and the next day M. Ledoyen commenced operations. After demonstrating the general advantages of his compound, he proceeded to sprinkle a few drops of his diluted mixture into each utensil. The amount used was the same in each case; but the appearance produced varied immensely; and, according as the chemical change was excessive or otherwise, he judged of the condition of the individuals who had passed the "motions." "This patient," he would say, "is not very bad; that one is seriously ill; this one is dying; this one is nearly dead;" &c. As his observations were correct, he was asked how he judged of the danger the patient was in? His reply was, "that he had found, in the course of his experiments, that feces decomposed rapidly or otherwise, according to the debility of the individual passing them."

For a period, the principle here enunciated seemed to belong to the class of interesting but useless facts. More recent observations have, however, shown that it may be turned to good practical account.

If any one will diligently consult the napkins used by infants, he will find that, during the time the motions are of a good healthy yellow colour, they have a peculiar odour, which they retain for twelve hours at least; but if, from any cause—*e. g.* debility in the nurse, or inappropriateness of the food—the child loses its healthy condition, the motions not only change in colour and consistence, but in smell, and decompose in a very short time after being passed. Where there

is diarrhoea and excessive depression of the vital powers, the motions are often found to be decomposed in a few minutes after, and sometimes even before they are passed. We may notice, too, that a similar result is met with at the same time in the other secretions of the child; and that the urine decomposes quickly, and the breath is foul or sickly.

But it is not in children alone that this change may be detected: it is equally evident in adults. If, for example, the doctor is called to attend a case of diarrhoea, where there is always more or less debility present, he may consider it necessary to inspect all the alvine discharges that take place. His visits are at intervals of twelve hours only; and he has placed before him on each occasion perhaps as many as six motions in different utensils. He is probably struck with the different odour exhaled from the various specimens, and notices a difference in the colour; but a few words from the nurse soon explain the mystery. The dark brown stinking ones are those passed the longest period ago; the healthy-looking and smelling ones are those evacuated a short time before the doctor's visit.

Simple though this fact seems to be, it is one which is not universally acknowledged and acted on. I have known "motions" which have simply become decomposed taken for "foul secretions," and the patient dosed with mercurials, under the impression that they would improve the condition of the bowels. The result has been what might have been anticipated; the patient has got weaker, and the bowels no better. The following case came under my notice some time ago. It is valuable as illustrating the danger resulting from inattention to these points.

An elderly gentleman was under treatment for indigestion. He was improving upon a tonic plan of treatment, when he

was induced by his friends to have a "second opinion." When the physician called, he was shown a motion which had been passed twelve hours before. It had undergone decomposition, and was pronounced to be extremely "vitiated;" and, with the intention of improving the secretion, a mercurial alterative was prescribed. This acted freely; and when the visit was made the next day, the motions were all inspected, and, as the latest passed seemed to be the most healthy, the natural conclusion was that the medicine had done good. It was therefore persevered with; on the next occasion, and for some time subsequently, only the last motion passed was inspected, and as it had not time to be decomposed, it was thought to be healthy, and the patient was supposed to be "better," as his secretions were no longer "vitiated." But, notwithstanding this opinion, it was clear to the first attendant that the man was getting more feeble and debilitated day by day. If the medicine did improve the secretions, it certainly impaired the strength. It was then doubted whether the first inference was correct; and, to decide this, the nurse was directed to save all the "motions," and arrange them in the order in which they were passed. When they were inspected, the same order of things was noted as at the first examination; but the older ones appeared more vitiated than ever, and the most recent ones had begun to change in colour. It was interesting to know how the same fact struck the two doctors. One remarked, "that with such secretions, there was greater necessity for an alterative than ever;" the other said, "that seeing such had been the effect of the alteratives which the patient had already taken, the sooner they were suspended the better." This led to a warm debate, which was ultimately decided by an appeal to the nurse. Thus: "Nurse, which is the last motion passed?" "This" (the healthy-

looking one). "How long has it been passed?" "An hour." "What was the appearance of the other motions when they were passed?" "They looked precisely the same as the one first referred to." "Then they have all changed in appearance since they were placed here?" "Yes." "Do the motions change in appearance now more rapidly than they used to do?" "Yes." This confirmed the idea that the "vitiating character of the secretions" was, so to speak, a *post-mortem* appearance, and simply indicated a smaller amount of vital force (as opposed to chemical) than is usually possessed by vital products when separated from the body. The termination of the case showed the justice of this view; for the patient's strength continued to diminish, and he died shortly afterwards of pure debility and exhaustion. It is useless to speculate upon what might have been the result had the phenomena been read correctly throughout.

As decomposition takes place in the alvine secretions very rapidly in fevers and all diseases marked by great debility, the practitioner must ever have his attention alive to the fact, that what he calls "vitiating" may be more apparent than real, and a sign which calls for stimulants and strengthening remedies rather than mercurial alterative medicines, whose invariable effect is to make a weak patient weaker.*

* While this sheet was passing through the press, the author was called in consultation to see a slight, delicate girl, *æt.* 14, suffering from dilatation of the heart, with slight general dropsy, and extreme debility. The treatment adopted by the regular attendant seemed judicious in every degree save one, viz. that as the *faeces* often seemed "vitiating," calomel or some other mercurial was adopted to "correct them." An improved appearance of the motions was considered proof of the correctness of the plan, notwithstanding that the patient was becoming more feeble. The author suggested the abandonment of the mercury; and this was complied with, though it was clear that the proposition was considered by the surgeon equivalent to

In conversation respecting the preceding case with the first attendant, a remarkably clever and observant surgeon, he observed that he had once before lost a patient in a similar way, and it was that which enabled him to be so positive. He was, he told me, requested to attend a man of middle age, a free liver—never intoxicated, but always tipping—and there was reason to believe that he had something wrong with the liver. He had the motions kept for his examination, and finding them to be dark, fetid, and vitiated, he thought he could not do wrong if he ordered mercurial aperients, for a time. When next he inspected the fæces, he saw a motion recently passed, and seeing it was healthy, he considered that the medicine was doing good, and so continued it. On a subsequent occasion, however, the motions seemed as bad as ever in colour and smell, and the idea struck him that this was possibly due to some change occurring since they had been passed; he took the pains therefore to see the next motion directly after it occurred, and he had it put by for subsequent examination. His surmise was just; the fæces which seemed quite healthy at first, changed so much in two hours that they had all the characters of that “vitiating secretion” which had induced him to use the mercurial. He at once abandoned the plan and gave stimulants; but “by George,” he added, “it was too late, the patient rapidly sank and died; I firmly believe from the effect of the purgatives given ‘to improve the secretions.’” How few there are who have the acumen to investigate so closely, or the candour to acknowledge their error so freely, without adding a single word of apology!

wilful homicide. Far better it was thought that the patient should die while passing healthy-looking stools, than live and pass vitiated ones. The power of mercury for good in correcting secretions, and its powerlessness for harm, were assumed as incontrovertible facts!

The excretions of the body being comparatively few, and for other reasons, we cannot prosecute our inquiries into the influence of vitality upon them in the same way as we did concerning the function of secretion. We are not in the habit of requesting our patients to retain their saliva, their tears, their leucorrhœal or catamenial secretions, &c., for our inspection ; consequently we know little about the phenomena of decomposition in these fluids, and the changes effected thereby.

There are, however, two other excretions with which we are tolerably familiar ; namely, the breath and the urine, respecting which we may say a few words. As a general rule we know that the breath of healthy children is free from any odour perceptible to our senses ; and we may say the same of that of healthy adults. But as soon as a child begins to suffer from debility, we know that we can recognise in its breath a variety of unpleasent smells, which we designate as sour, sickly, or putrescent. These odours are increased in intensity and duration by every cause which tends to augment the existing debility ; and they go away as soon as the health is restored. In adults, the influence of debility in producing "foul breath" is very remarkable. I know individuals in whom it is invariably produced by a day's fatigue, by the occurrence of the catamenia, or by the too prodigal use of aperient medicines. In these instances, it is cured by wine, tonics, and rest, as certainly as diarrhœa is checked by opium, &c. In others, it comes on in consequence of indulgence in such passions as anger, or from excessive fear, anxiety, and disappointment. In others, it precedes and accompanies asthenic indigestion ; and in such, a debauch is as surely followed by foul breath as it is followed in others by nausea and headache. Of course it may be argued that this foul breath is not due to decomposition of the expired

air after it leaves the lungs, but simply to the exhalation of "crudities" already existing in the blood. I acknowledge the force of the argument; but it matters little which solution we accept, so long as we recognise in such phenomena the presence of impaired vital force, and the necessity that exists for adjusting the work to be done to the constitutional power to do it.

There can be no such difficulty respecting the urine. Under ordinary circumstances, this excretion continues for about four-and-twenty hours, without undergoing any perceptible decomposition; but when the individual passing it is weak, decomposition takes place with a rapidity varying according to the amount of debility present; nay, we may go further, and say that in some instances—as in paraplegia, where the vitality of the kidneys and bladder is very low—the urine is actually decomposed ere it leaves the body. The decomposition is recognised in a variety of ways: by the smell, by the occurrence of vegetable growths, vibriones, torulæ, &c.; by the abundant formation of ammoniacal salts; by turbidity, &c.

It is scarcely necessary to remark that we are fully alive to the fact, that atmospheric conditions have a great influence in promoting the rapid decomposition both of urine and faecal matter. What we want to call attention to is, that if on a cool day and in a cool room the urine of a patient shows evidence of decomposition in twelve hours, it is evidence of a debilitated condition of the bladder, the kidney, or the system generally. As such conclusion seems very dull and meagre, however, when thus announced, we will endeavour to point the moral by recording the ease which originated this train of thought.

A medical friend sent me a bottle of urine, with the laconic request that I would give my opinion upon it, and

my views of the treatment to be recommended. The sole information he imparted to me was, that it was passed that morning by a boy about ten years old. After allowing the fluid to stand for some hours, it was examined microscopically, by simple chemical tests, &c., but nothing wrong could be found with it, except that it had begun to decompose. The first impulse was simply to communicate that fact to my friend, and leave him to draw his own inference; but as it would be a useful mental exertion to put down the conclusions which might be drawn from that fact alone, I resolved to give an account of the symptoms which I thought the case would present.

The following was the train of argument. As there is an absence of much mucus, triple phosphates, &c., there is presumptive evidence against the idea of vesical or renal disease. There is then general debility; and the presumption is that there will be debility in all the organs of the body, and consequent disorder of function. The signs by which deficient vital power in the brain and nervous system, in the respiratory, digestive, cardiac, and other sets of organs, might generally manifest itself, were then mentioned.

Commencing with the nervous system, I reported to the following effect:—

The child is either preternaturally sharp, quick, and irritable, or he is dull at his lessons, and careless under instruction. He is probably lively and active during the evening, and very heavy and sleepy in the morning. He suffers occasionally from headache, which is relieved by rest in bed. He is soon "put out," the tears are near the surface, and he is given to quiet mischief. The pupils of the eyes are unusually large, and there is a tendency to squint towards evening, or after reading small print for a long time.

His breath is probably offensive, he sighs a good deal, and is rather short-winded on exertion.

His hands and feet are cold, he suffers from palpitation, and his pulse is quick and weak.

He is always improved by food. His tongue is foul, and broad, and pale. His appetite is variable, and he suffers from occasional nausea while eating. He is troubled with wind on the stomach in a morning.

His bowels are variable, generally costive; and the motions have a sickly odour.

His skin is unusually moist or dry, and possibly there is some eruption on it.

His muscular system is weak and flaccid.

He suffers from myalgic pains in the back and trunk, and probably in the limbs.

The plan of treatment to be adopted in such a case is one essentially tonic and invigorating.

In a day or two I had another note from my friend, saying that it was impossible for any one who had seen the case to have given a more accurate account of all the symptoms the lad was suffering with, and stating that I had mentioned certain symptoms which were present, but which had not been recognised until my report was received. He was surprised, and naturally so, at what appeared to be a *tour de magicien*; but it will be readily understood, that the symptoms I have enumerated are simply those indicative of general debility, and that when the presence of this has been ascertained, there is no difficulty in enunciating the most probable signs by which it may be recognised in the different organs.

It is scarcely correct to call the *milk* an excretion; but it is certain that the influence of debility upon it is more marked than upon any of those we have named. A young mother may be well able to nurse her offspring, but as her

years increase she finds herself unable to do so ; not because the supply fails, but because the milk seems positively poisonous to the baby. At first this may be counteracted by steel, quinine, generous diet, and by country air ; but as she advances in years, these do not suffice. A weakly mother invariably produces "windy milk," and ensures a crying child. She produces this vitiated milk equally whether she is constitutionally or accidentally debilitated—a day's passion, purging, anxiety, fasting, or fatigue, always "tells" upon the child. An hour's daily rest for the mamma, with a bottle of strengthening medicine, will produce refreshing quiet in many a scream-resounding house ; and tonics for the mother will often quiet an infant far more surely than all the soothing syrups ever invented.

I am at present collecting information respecting the rapidity with which the *perspiration* decomposes ; the facts, as they already appear, arrange themselves thus :—The perspiration in acute rheumatism is generally very sour-smelling, but it very frequently is odourless ; it smells the strongest in the worst cases, and especially when "any internal complication or metastasis supervenes :" these are the cases which are unquestionably attended by the greatest debility. The perspiration and the odour are greatly diminished, and ultimately cured by tonics. (*Vide* case, p. 293, note.)

But the sour-smelling perspiration is not peculiar to rheumatic fever ; it is occasionally to be met with in phthisis, after delivery in very delicate women, in strumous diseases of joints, and other diseases characterised by great loss of vital power.

Consequently it admits of doubt whether the peculiar odour is not due to a rapid decomposition of the perspiration *after* its formation, and not simply to an alteration in the chemical constituents of the secretion.

This idea receives corroboration from Dr. Copland's remarks, article "Skin," paragraphs 6 and 7 :—"The sweat of rheumatic and gouty persons is generally acid, whilst in putro-adyamic fever and scurvy it has a putrid odour. The sweat of scrofulous persons resembles sour beer." Slack says that "lactic acid is increased in the perspiration during scrofula, rickets, various cutaneous eruptions; and both it and acetic acid exist in the sweat of females during their confinements, and even during suckling."

Couple these observations with the sour smell noticed in the green motions of infants shortly after they have been passed, and the hypothesis seems a tenable one that the peculiar odour spoken of is a *post-mortem* one (so to speak).

It is not often that we have to note any marked change in the perspiration from simple debility, yet we do see some remarkable cases in which individuals secrete a fetid material from the skin, under circumstances which would in others produce a foul breath. Thus I have met with a delicate young lady by whose side any one might sit for hours without noticing any peculiarities, yet whose skin will suddenly emit a most offensive odour under the influence of mental emotion. She notices a similar effect at or after the catamenial period, and after diarrhœa or fatigue. Another lady who suffered much from this during a period when she was weakly, has now no return of it unless after prolonged nursing or excessive fatigue. In another lady, the secretion was intolerably fetid, and emanated chiefly from the lower parts of the trunk. It always occurred and went off suddenly, and it was noticed that it generally came on in the evenings, when exhaustion was present after the active labours of the day. It was invariably aggravated by aperients, menorrhagia, anorexia, or fatigue. After every remedy that could be suggested had been tried in vain, change of air was

adopted ; by this the general health was much improved, and the very unpleasant symptom left her altogether.

The practical conclusion to be drawn from the foregoing observations is obvious. If the physician finds that the excretions of any of his patients decompose more rapidly than they would do during health (under the same external circumstances of light, air, and heat), he may feel certain that the vital powers are seriously impaired ; and if under the treatment he adopts, decomposition occur at an earlier period than it did before, there is reason to inquire whether such phenomenon is due to the augmentation of the disease itself, or to the medicines administered for its cure. It will then be a subject for consideration whether the plan of treatment is to be further developed in the same direction as before, or to be fundamentally changed.

Nor is this a matter of so slight importance as it might at first sight appear. Many seem to think that it is the simplest matter in the world to enable a patient to regain strength ; and, consequently, they care little about employing medicines which, while they reduce the powers generally, seem to have some special influence over particular organs. But it is by no means an easy matter to restore health to a patient ; and any one who systematically endeavours to do so, will have to acknowledge that it is one of the most difficult problems in medicine. It is easy to reduce the strength, for that we have a host of drugs ; but directly to increase it, we have literally none.*

“*Facilis descensus Averni,
Sed revocare gradum superasque evadere ad auras,
Hic labor hoc opus est.*”

* A similar remark was simultaneously made by the late Dr. Todd :—“ I am convinced,” he says, “ that it is much better to err on

the side of over-stimulation than not to give enough, for if we have over-stimulated a patient it is very easy to pull him down again : there are plenty of appliances and means for this purpose, but if the patient sink too low, nothing is more difficult than to restore him. If by your feeding and stimulating, the thermometer of life has risen to too high a point, nothing is easier than to depress it; but if fallen below a certain point, then to raise it again, much more to restore it to the height from which it fell, *hic labor hoc opus est.*"—*Clinical Lectures on Acute Diseases*, p. 130.

CHAPTER XVII.

PRACTICAL CONCLUSIONS.

The question, Is it right to treat a diseased man by means which would make a sound man ill? considered—Does the physician do so?—Examples—Mercury—Opium—Antimony—Under what circumstances are they used?—Prevalent ideas—Delirium tremens taken as an example—Drug power ought not to be increased *pari passu* with diseased action—Conclusions drawn—False theories respecting the use of mercury—What was the result of the energetic treatment once adopted?—“Success” a comparative word—What was considered success formerly is not so reckoned now—Illustrated by reference to water in the head—Tubercle, Cancer—Amputations, &c.—Is all medicine useless?—Proofs to the contrary—Ague—Gout—Fever—Lead colic—Mercurial tremor—Chlorosis—Tic, Neuralgia—Tape and other worms—Ergot of rye, &c.—Rule for the use of medicines—Exemplified by reference to arsenic—Iodido of potassium—Quinino—Opium—Alcohol—Colchicum—Deduction.

If the principles we have been enunciating are reliable, it follows as a necessary consequence, that the aim of the physician must be to restore the vital forces of his patient, and thus enable him to regain his health.

But for a period so long that its origin is shrouded in obscurity, it has been the practice of physicians to treat their patients in a manner likely to reduce their vital powers, *e. g.* by drastic purging, low diet, and venæsection, in

the time of classic antiquity ;* and by mercury, antimony, colchicum, and other depressing drugs superadded, in more modern times.

This "time-honoured" custom deserves a rigorous inquiry. It would not be fair to pass it by in contemptuous silence, or class those who have pursued it in the same category as they have been accustomed to place the holders of false doctrine in. We propose, therefore, to inquire into the following questions :—

On what principle does a physician endeavour to restore his patient to health when he employs means which would make a sound man ill ?

This necessitates the further questions :—

* This is not universally true ; for we find Celsus in many parts referring to the state of the strength. Amongst his rules for bleeding, he says, "The question is not what is the age, nor whether there be pregnancy, but in what state is the strength," Book 2, ch. 10. Again, ch. 12 : "But physis is generally hurtful to the stomach ; and when the bowels are much relaxed, or when frequently opened by clysters, the patient is weakened." Again, Lib. 3, ch. 3 : "But even when the malady is not in the whole body, but in a part only, it is more to the purpose to aim at increasing the strength of the whole system than to remedy diseased parts exclusively." We find him also stating, that in certain cases "food seasonably administered is the best medicine," Book 3, ch. 4. And nothing can be more appropriate than his remarks upon phthisis, Book 2, ch. 22. Again, he remarks : "But although purges are sometimes necessary, yet they are often dangerous ; for the body thus becomes injured to the receiving of no nourishment ; whilst debility subjects it in the highest degree to all manner of diseases," Book 1, ch. 3.

On the other hand, he recommends bleeding in phrenesis (mania), though Aselepiades condemns it, Book 3, ch. 18. For a cachexy, he recommends abstinence ; and for epilepsy, bleeding, purging, and clysters.

Had Celsus lived in our own times, he would probably have written the most philosophical book on medicine of the present age.

1. Does a physician employ means which would make a sound man ill ?

2. Under what circumstances does he do so ?

3. What are the results which he obtains ?

That the physician does employ means which would make a sound man ill, no one can doubt who takes up any book on *Materia Medica*. We will select a few examples.

Mercury has been given in syphilis and a variety of other diseases to a great extent ; indeed, few complaints can be named in which it has not at one time or another been employed in large doses.* Of its effects on persons in comparative health, or who are only suffering from primary sores, Dr. Porter remarks,† “ Persons while taking mercury become deranged. The examples of this which I have seen were all maniacal ; and the symptoms, such as might be expected, from inflammation of the brain or its membranes.‡ They all died. . . . At the time when each case occurred I could not avoid placing the mercury and the madness as cause and effect. Again, persons whilst taking mercury become paralytic. Several years ago, when investigating the pathology of aneurism, I remarked the frequency of that disease in persons who had been subject to protracted courses of mercury. . . . Almost all the aged people treated with mercury for syphilis have, according to my observation, died shortly afterwards of hæmoptysis or apoplexy ; nor are such

* One physician in Liverpool, now dead, ordered ʒij of calomel nightly to a child with supposed hydrocephalus, and defended it on the ground that desperate diseases required desperate remedies ! Fortunately the medicine was not given. This was only twenty years ago.

† “ Dublin Medical Press,” quoted from “ Ranking’s Abstract of the Medical Sciences,” vol. v. p. 66.

‡ Compare this with the remarks upon pages 117-8-9, respecting madness from famine, &c.

casualties confined to the aged, for I have seen several instances of young persons, under similar circumstances, being seized with spitting of blood and dying rapidly of consumption." I forbear quoting Dr. Porter further in his observations on mercury, as they form so dark a picture of the thoughtlessness of routine. There is scarcely one of his remarks which I cannot endorse from cases which have come to my knowledge.

It must not be supposed, however, that his observations apply to the excessive use of calomel alone, or solely to the administration of the most active of mercurials; they are, in a modified way, applicable to the mildest forms of the drug, for I have myself seen in women, in delicate children,* in the consumptive, and in those affected by Bright's disease, as serious results from small doses of grey powder, as are recorded of large doses of calomel; nor can we wonder at this, when adults in health are sickened by a simple aperient dose of blue pill; when the healthiest convicts succumb to the influence of the quicksilver in the mines of Almaden, and elsewhere, in the course of two years or less; and when sailors in the ships carrying mercury from Spain to South America, are affected during a comparatively short voyage.

I may here quote Dr. Brinton, who when speaking of mercurials in the treatment of ulcer of the stomach ("Diseases of Stomach," p. 209) says:—"It would be a

* "Be careful, I pray you, how you employ active depleting remedies in children: you may cure the disease for which you administer your agents, but you may at the same time kill the child by the injuries inflicted on its general powers. And with reference to mercury, I would advise you to have your grey powder bottles marked, *Dangerous, especially in alterative doses.*"—(Jenner on Rickets, *Med. Times and Gazette*, May 12, 1860.)

dereliction of duty in me not to express the strong opinion I entertain against the employment of mercury in these cases in any form or under whatever pretence whatever. I believe that I have known one or two instances, in which the ulcer has been definitively produced by the administration of mereury for other maladies, and am certain that I have witnessed relapses which could only be attributed to a similar cause. A simple calomel purgative has even appeared to undo all that months of sedulous treatment has been able to effect towards the relief of a gastric ulcer." To all this I cordially assent, but I would extend the application of the remarks to a vast number of other complaints, besides stomachic ulceration.

The following are cases illustrative of the prejudicial influence of small doses of the bichloride of mercury, a medicine extremely popular from the length of time it can be taken without producing salivation.

B. H., æt. 40, had progressive paraplegia, and anæsthesia, from sexual excess. After trying a variety of means he consulted a physician, who ordered him the twelfth of a grain of corrosive sublimate three times a day. Its administration was carefully watched, yet in four days, without any warning, the mucous membrane of the bladder became inflamed, and the agony accompanying this was so extreme that enormous doses of opium were required to give him ease; under the influence of one of these he died in convulsions.

I. H. D., æt. 35, a delicate-looking man, who had lost a sister with phthisis, had been resident in a warm climate, and who had suffered a year before from syphilis, applied to a distinguished London physician with enlargement of the right knee joint, and rheumatic (myalgic) pains along the legs and thighs. He was ordered to take bichloride of mercury, one-fifth of a grain daily, and this medicine was

continued with occasional changes of vehicle for three months. During this time a large sore formed in front of the ligamentum patellæ on the right side, the hands became very tremulous, the bowels became so irritable that diarrhœa was almost a daily occurrence, the patient felt excessively nervous, and did not sleep more than one hour in the four-and-twenty. At the end of the period named he came to Liverpool; when I saw him the sore showed no disposition to heal, the margins being of that purple hue so common in asthenic ulcers, the urine was albuminous and very scanty, and his general condition was very bad. The first plan I adopted was to omit all medicine, so as to see whether the influence of the mercurial was such as I inferred. In four days the ulcer had begun to cicatrize, and the bowels had become more regular, almost costive, the hands became less tremulous, and the patient's spirits rose accordingly. A strengthening plan of treatment was then commenced, with an opiate at night and an anodyne liniment for the myalgia, and the patient began to recover. The improvement was only temporary, however, as the constitutional powers have been brought too low for a complete rally.

There are few medicines more frequently used than opium. Of its poisonous effect in large doses upon those unaccustomed to its use, our coroners' courts give abundant proof; and those to whose lot it has fallen to notice the depressing effects of the drug after its first poisonous action has gone off, are well aware of the intense prostration of power which ensues from it. Taylor gives one instance in which an individual died of the debility the drug induced, though recovery had taken place from the original narcotism.*

* My friend Dr. Nottingham has favoured me with the following remarks on this point :—

“ I had a patient, a gentleman, æt. 45, who had for long been in

Yet this drug in excessive doses is given in certain diseases to patients who are wholly unaccustomed to its use. In tetanus, in mania, and delirium tremens, its administration is constantly resorted to; and we find in standard authors a recommendation to use opium in full doses, and to repeat them fearlessly in the last-mentioned complaint until sleep is produced.*

In other words, we are told that it is sound practice to risk the patient's life, by giving poison, to keep him alive. That opium does act as a poison when used in large doses in delirium tremens we have many examples. Dr. Laycock, in a most deeply interesting paper on this subject in the *Edinburgh Medical Journal*, has given some cases of this kind; and, taking a series of years, has put down the mortality from delirium tremens, when treated by opium, as

the habit of taking opium to such an extent that one ounce of laudanum scarcely affected him, and he took two ounces with impunity; he died of the debility alluded to in the text solely. On examining the brain after death, it was found very pale. He first took laudanum for delirium tremens, and insanity was in the family." A few years ago the same doctor communicated to a meeting of the Lancashire and Cheshire Branch of the British Medical Association an account of some cases of death from delirium tremens, in which the brain was also pale and exsanguine. We shall have occasion to refer to these remarks hereafter.

* In a conversation recently held with a young surgeon in a responsible position, he assured me that he had seen large doses of opium do good when small ones had produced irritation, and that one patient under his care for delirium tremens had experienced no benefit whatever, until the dose of this drug had been increased to *eighty grains at bed-time*—an equivalent quantity to about two ounces of laudanum! Under this plan a cure was effected. He had, he said, "seen patients die under the opium treatment, but this was only because they had not had a sufficient quantity." It is difficult to appreciate the philosophy which would adopt so desperate a remedy, and the temerity which would carry it out in a country where coroners' inquests abound.

about one in four. Dr. Noble, of Manchester, communicated to a branch meeting of the British Medical Association two cases of death from the persevering use of morphia to procure sleep in mania. The first case of delirium tremens under the author's care was, he feels convinced, sacrificed by the administration of a full dose of opium, which was recommended by him in consultation after that drug had been already used very freely in the ease without procuring sleep; after the last dose the man fell into a state of low muttering delirium and died in about thirty-six hours after, and since then he has been informed by medical friends of others equally unfortunate. A very important paper on this subject is to be found in the *B. and F. Med. Chir. Rev.* for October, 1859.

Antimony is another medicine in great repute. That it has an influence prejudicial to the vital powers is readily proved by the numerous instances in which it has been successfully used by the murderer as a poison. Of its effects when used medicinally to counteract the effect of inflammation, the following, from the pen of Dr. Boling, U. S. A., is a graphic account.* Speaking of pneumonia, he says, "The patient may be seen to be doing very well under the antimony . . . when suddenly in some cases, more gradually in others, he becomes restless, thirsty, somewhat purged, the belly becoming tympanitic, and sometimes tender. He vomits, or tries to do so, the tongue is dry and pointed, jactitation and anxiety of countenance appear, together with delirium, and, perhaps, shortly before death, stupor. Occasionally jaundice supervenes, and in a few cases the matter ejected closely resembles that of yellow fever. During the

* Quoted from "Ranking's Abstract of the Medical Sciences," vol. xv. p. 25.

occurrence the pulse becomes hard, small, thready. Death may take place within six hours after the first appearance of these unfavourable symptoms : more frequently it is delayed for ten or twelve hours, and in some cases yet longer. Simultaneously with the advent of the above symptoms, or just preceding them, there is a more or less rapid disappearance of the symptoms of the original disease." In few words, the patients are cured of pneumonia by poisoning them with antimony. They die of the doctor rather than of the disease. The Abstract goes on to remark : "This cannot be a rare occurrence in the Southern States of America, as the author has seen almost as many die of the induced as of the primary disease . . . Gölis gives a graphic account of a similar train of phenomena produced by the use of large doses of calomel in hydrocephalus and croup."

The effect of his experience upon Dr. Boling has been, that he now uses only three grains of tartar emetic in twenty-four hours, instead of double the quantity, as he used to do, and he finds the remedy as efficacious as before, and far less dangerous. In an hospital experience of nine years the author has only used antimony once, for pneumonia, and he has never seen cause to regret it. On the one occasion, judging according to the laws of evidence, it did good.

The prejudicial effects of antimony used medicinally are not, however, confined to America ; for the author has seen patients brought to a most fearfully depressed state from tartar emetic used under the impression that it was a remedy for inflammation. In one case of bronchitis thus treated, the patient died in twelve hours, clearly from the effects of the drug.*

* For another example of the prejudicial effects of antimony, see page 294.

We may take another illustration, from the treatment adopted for gout by various physicians ; and, in doing so, we shall follow Dr. Gairdner's philosophical and valuable treatise on the disease.

After giving "authorities" in favour of bleeding in gout to an extent sufficient to subdue inflammation, he adds, as his own experience, that such losses of blood "are much to be avoided ;" but on the next page he speaks most highly of small abstractions of blood not exceeding six ounces. Such venæsections act as tonics to those whose stamina is unimpaired.

After giving the opinions of various older authors on purgation, he says, "The opinion of Seudamore, that gout was chiefly owing to obstruction of the liver, confirmed these prepossessions (in favour of aperients), and for some years past the strongest cathartics have been used with a freedom which I think in the highest degree dangerous ;" and he subsequently adds a paragraph with which I most cordially coincide, viz. "Had we not fallen into the very great error of using the most drastic purgatives with a rashness which has received so stern a rebuke from the public, it is probable we should have heard little, in this country at least, of Homœopathy. But it seems to have flourished here even more than in its parent land. It found us enslaved to a system of overdosing of the most reckless and pernicious kind," &c.

But it is only the abuse of purgatives that Dr. Gairdner aims at, for in his next paragraph he says, "Laxatives are essential in gout ; even when the patients lead a most abstemious life, it is necessary that the bowels should be relieved by medicine."

Both these sets of remarks show that there is a point,

carried beyond which, *beneficial* remedies become *prejudicial* and positively dangerous.

Of the abuse of venæsection as a remedy for many diseases no one can have any doubt.

The following quotation from Kussmaul and Tenner on Convulsions (New Sydenham Society's Translation) aptly describes this :—

“More attention has unquestionably been paid by English physicians than by others to the subject of convulsions arising from loss of blood. The frightful vampirism prevalent in the British islands may have afforded them greater opportunities of observing such dangerous consequences than would be presented elsewhere. Wardrop is of opinion, that frequently in inflammations as much as from 30 to 50 ounces of blood may be drawn in the first venæsection, and that sometimes even 100 to 200 ounces may be taken away. Marshall Hall mentions many cases from the practice of himself and others, in which from 100 to 120 ounces of blood were taken away in a short time. It is, therefore, no wonder that we have received from England the first explanations of the hydropcephaloid disease arising from exhaustion, as well as more accurate notions on convulsions after great losses of blood. . . .

. . . . Travers speaks of many patients who were so utterly unable to bear abstraction of blood that they soon fell into convulsions, whilst the circulation became so feeble that they were often obliged to have stimulants employed for many hours before they recovered. A clergyman from whom 20 ounces of blood were taken had fits, which came on at intervals, and resembled most violent puerperal convulsions ; it was only by the continual administration of stimulants for a whole day that danger was averted.”

It would be a thankless task to prosecute this inquiry, and

catalogue, as we might readily do, a list of cases which have succumbed under the use of low diet, purging, digitalis, squills, and the like. It suffices to our purpose to show that these drugs have been recommended, and their use in full doses generally adopted, and that they have a direct tendency to deteriorate health.

We cannot imagine, however, that physicians ever have used these remedies with the knowledge that they were extremely dangerous to health, and possibly fatal to life. We presume that they had a reason sufficiently valid to themselves for what they did. This reason it is well to ferret out. We inquire, therefore,

2. Under what circumstances did they use them ?

To answer this question at length would involve a history of medical theories for past centuries. We should have to go into the nature of fevers and inflammation as held by our fathers and ourselves—to show how they held that such diseases were evidences of power rather than of weakness, and how they practically believed that if a small quantity of a medicine did good, double the quantity would do more. This task would be tedious. We may sum up by saying, that diseases were looked upon as invaders of a soil, and medicines as the weapons by which they could be annihilated—the one was supposed to counteract or neutralize the other—and by the free use of chemical terms the physician at last came, practically, to entertain the idea that the disease might be compared to an acid, the remedy to an alkali, and that by their mutual reactions a neutral salt might be produced, which would be innocuous ; and it followed, according to this notion, as a necessary corollary, that the active mischief in the system being thus neutralized, the body was freed from disease, and the patient was necessarily well !

How untenable these ideas were, it is unnecessary for us to demonstrate.

But, leaving generalities, we may fix our attention profitably on one disease, of which mention has already been made, viz. delirium tremens ; and examine, step by step, the reasons which induced physicians to risk the patient's life by poison, that he might not die from disease. Their argument ran thus :—

“Delirium tremens is a disease whose essence or chief characteristic is sleeplessness. If the patient do not procure sleep, he will surely die. If he sleep he will do well, for the disease is practically cured. The indication of cure is, therefore, manifestly to procure sleep. There is nothing which we know that has so powerful an influence in producing sleep as opium. Consequently, opium is the drug, *par excellence*, for the cure of the complaint. But experience shows that a moderate dose of this drug does not produce the sleep required—it would do so in a healthy man—therefore, it is argued, there must be an unusual amount of tolerance of the drug in delirium tremens ; and to get the same effect as would be produced on a healthy man we must vastly increase the dose. There is no danger of poisoning by opium, for the danger from the drug is counteracted by the tendency of the disease.” Figuratively, the physician increased his drug power, as an engineer would do his steam power, when he had to drive his locomotive up a steep incline.

This reasoning, promulgated by high authorities, captivated the minds of students for a long period.

After a time, however, experience showed that there must be some fallacy in the line of argument, for some patients who were sent to sleep by opium never awoke again ; others when they did awake died shortly afterwards ; others awoke just as bad as they were before ; and others were

never sent to sleep at all. The author is cognizant of cases illustrating all of these misfortunes.

Again, a close attention to the influence of opium showed that it did not always procure sleep in healthy people; nay, that in large doses (short of poisonous ones) it kept the patients awake. It became clear, therefore, that delirium tremens was not simply want of sleep; and opium was not always a sleep-giver.

As observation extended, it was evident that the phenomena of the disease resembled those of mania, of hysteria, of puerperal delirium, of insanity from mental emotion; and in all these it was possible to demonstrate that the essential cause of the symptoms was cerebral exhaustion. Other observations showed that loss of sleep was a frequent concomitant of loss of blood, excessive fatigue, fasting, and other debilitating agencies.

From these data the deduction was fairly made, that the essential nature of delirium tremens was cerebral exhaustion, and that this it was which produced loss of sleep.

In corroboration of this conclusion, it is to be noted that delirium tremens is most common in those persons in whom insanity is hereditary; and as we have already shown that hereditary disease indicates hereditary debility, it follows that in the children of lunatic parentage cerebral exhaustion is sooner produced than in others.

From these considerations the treatment of delirium tremens has been greatly modified, and digestible food, frequently administered, with or without the addition of stimulants, has taken the place of opium or other medicine, in the practice of most thoughtful practitioners.

But experience has shown that opium is really of service in many instances of delirium tremens. It has procured sleep, and the patient has awaked well, or nearly so.

Opium has proved equally efficacious in eases of exhaustion from loss of blood, &c.

But in these instances the drug has been combined with liquid or solid food, or other stimulant.

Consequently, it is argued, that opium does good when it acts in the place of, or as an adjuvant to, food ; and a comparison between it and aleohol suggests the idea, that, as a little spirit or wine may invigorate and strengthen the system, while a large amount may deteriorate or positively destroy the vital power, so may a small amount of opium do good, while a large dose would destroy.

The tendeney of this reasoning is to show that the physician must endeavour to find the limit beyond which the drug must not be administered.

Let us illustrate this idea by some imaginary eases. A man is dying of hunger,—he wants food, food will prevent his death ; but if too much food is given he will die of repletion. Another is dying of cold—warmth will restore him—but if he is heated suddenly, his extremities mortify and he dies of the remedy. Another is exhausted by labour, mental, bodily, or both, and gin, wine, or ale are taken ; they recruit his powers—but he continues to crave for more and more, and at last dies of aleoholie poisoning, or the depression which succeeds their use.

The circumstances connected with any ease of starvation would influence us in the administration of restoratives.

In like manner, the circumstances of every ease should influence us in the use of opium for delirium tremens, if we use it at all.

It may be laid down as an axiom, that no one would attempt to cure starvation, or frost-bite, by using an amount of food or heat which would surfeit a healthy labourer or burn a comfortable man. So, in like manner, we infer, that

when opium is used the quantity should never exceed what would be a poisonous dose to a sound constitution.

The effect of this reasoning has eventuated in these results :—

1. Delirium tremens may be cured by appropriate food without physic.

2. Such plan is less dangerous than the old opiate treatment.

3. That food is more important than physic.

4. That opium, when administered in moderate doses, assists the use of food.

5. That large doses of opium are positively prejudicial, as they have a direct tendency to produce death by narcotic poisoning.

6. The larger the dose of opium employed, and the less the amount of food given, the greater is the patient's danger.

The following observations of my friend Dr. G. Johnson are so apt that I have great pleasure in quoting them, premising simply that our results have been independently obtained. He remarks (in his inaugural Lecture on *Materia Medica*, 1857), "It has long been observed that those who are suffering from delirium tremens often exhibit a tendency to prostration, faintness, and even fatal syncope; so that a patient, while violently struggling with his attendants, has been known to fall dead from sudden failure of the heart's action. Within the last few years it has been found, that in nearly every fatal case of delirium tremens the muscular substance of the heart has undergone more or less of that structural change which is known by the name of fatty degeneration, and in this condition of the heart we find, I believe, a sufficient explanation both of the tendency to death by syncope, as a consequence of violent muscular exertion, and of the depressing influence which opium has

in some cases of delirium tremens. When opium is acting thus unfavourably, it appears to have no narcotic influence whatsoever; the patient continues wakeful, excited, delirious, but he grows rapidly weaker, the pulse becomes quick, small, and feeble; the pupils are contracted, the skin is bathed with a profuse perspiration, and if the opium be continued in large and frequent doses, the patient rapidly sinks, but remains wakeful and conscious, until perhaps within a few minutes of the fatal termination. These are cases in which opium appears to act as a powerful sedative poison upon a feeble fat heart, the narcotism or deep sleep which usually follows a large dose of opium being entirely absent."

Again let us examine how it happens that mercury has long been used as a remedy for inflammation, much in the same way as opium has been used for delirium tremens?

The grounds for its use have been the following:—In phlegmasia, it is said, there is a tendency to fibrinous effusion: mercury has a power to prevent or bridle this*—consequently, it ought to be used whenever there is adhesive inflammation, 1. To prevent the deposition of lymph; 2. To promote its absorption.

But more extended observation shows, 1. That serious adhesive inflammations are by no means uncommon where the sufferers are already under the influence of mercury, *e. g.* pericarditis. 2. That mercury converts adhesive into suppurative inflammation, *i. e.* a high into a low type.

* "The great remedial property of mercury is that of stopping, controlling, or altogether preventing the effusion of coagulable lymph, of *bridling adhesive inflammation*; and if we in our turn could always bridle and limit the influence of mercury itself, it would be a still more valuable resource."—*Dr. Watson's Practice of Medicine.*

3. That adhesive inflammations, as a rule, are recovered from *earlier* where mereury is not profusely used than when it is.*

Observation has not yet been carried sufficiently far for us to state the true value of this drug, and we abstain from speulating on it further. The author will only add, that every year he prescribes less and less of it, and that many of his friends do the same, and that all alike report that they are able to do very well without it, as a general rule.

We next inquire, Had the older physicians, who used the powerful (and *heroic*, as they have been called by some) remedies we have adverted to, any successes to boast of? Unquestionably they had, but the extreme looseness of their observations prevents us from forming any definite idea of their success, in comparison with that obtained by those whose plan of treatment has been less energetic.

Success is ever a comparative word in medicine, and it is measured necessarily by a fluctuating standard. There is every reason to believe that the success which pleased our forefathers would be considered by us as downright failure. Five-and-thirty years ago the author well remembers to have heard pneumonia and pleurisy spoken of as diseases for which there was little or no hope. Water in the head was

* It has long been supposed that mercurial purges stimulate the liver, and on this ground calomel has been used as a sort of counter-irritant, or eliminant in diseases of the lungs. This idea, however, has recently been rudely shaken by some experiments on dogs, in which it is demonstrated that such medicines positively diminish the biliary secretion in the majority of cases; and that excess of bile is rarely produced by this means. (Beale's "Archives of Medicine," No. 3.) If the office of the liver is simply to *separate* the bile formed in the blood, we cannot see how the amount can be increased by stimulating the bilions filter. We do not agree with this view of the liver's function; but the consideration must form an ingredient in our appreciation of the influence of calomel.

then considered as hopeless as hydrophobia is now ; jaundice was a terrible infliction, and few ever recovered from what was called croup. To be ill of anything, indeed, was no joke, as it involved at the very least a week's doctoring. At that period every recovery from brain fever, mania, typhus, or small-pox, was considered almost a miracle ; and though this state of things may not have existed to the same degree all over Britain, there was not an author who did not regard a cure in any of these complaints as a proof of his skill and an evidence of the justness of his treatment.

Now, on the contrary, we regard these diseases with comparatively little dread ; we do not ignore the danger, but we know its measure ; and while our ancestors were boasting of success in curing one, or, at the most, two out of three, *i. e.* from 33 to 67 per cent., we consider ourselves liable to animadversion, if, in the long run, we do not cure from fifteen to eighteen out of twenty, or from 75 to 90 per cent.

In days gone by, few patients recovered their health, after a phlegmasia, under many weeks or months of treatment.* At

* There is a graphic and most interesting paper in the *Brit. and For. Med. Chir. Rev.* for July, 1858, entitled "The Blood-letting Controversy," from which we quote the following passage, to show what are the ideas of "success" in treatment in the mind of one of Italy's chief physicians of the present day :—

"Acerbi gives a summary of 142 cases of pneumonia treated in the Hospital of Milan, with bleeding usually night and morning, and tartar emetic, four to eight grains daily. Of the 142 cases, sixteen died, or one in nine. . . . One robust countryman was bled nineteen times in twelve days, and took tartar emetic for ten days, when it was exchanged for kermes mineral. He survived ; but when he left the hospital, after sixty-nine days, he had œdema of the legs, diarrhœa, excessive pallor, and weakness. One strong country fellow, who had been cured (!) of pneumonia on the previous January, by eighteen bleedings, and who had been sickly during the intermediate four months, was re-admitted in May, on the 8th day, of a second

the present day many scarcely require a fortnight, few more than six weeks. We may judge still further of the ancient idea of success, by the relics of ideas still so prevalent amongst us, that some of them have been adopted as fundamental truths by the *Lancet* within the last three years.

About that period this journal, in reviewing a recent publication, remarked, "What would Dr. — and Dr. — say to its author's statement, that acute hydrocephalus was a comparatively curable disease?" The assertion that it was so, was, in the *Lancet's* opinion enough to damn the article. That Drs. A. and B. considered water in the head almost incurable was conclusive evidence that the writer, who said it was very amenable to treatment, was a presumptuous fool! A like scepticism remains at the present day respecting tubercle. Physicians of fame and standing still assert that that disease is beyond the reach of the healing art, and with curious pertinacity insist that Richardson, Thompson, and Turnbull *must* have been mistaken in their diagnosis of those cases they report as cured.*

attack. He was actually bled fifteen times in nine days, and took tartar emetic the while. He died on the twenty-eighth day, after having been bled thirty-three times during the two attacks. But Dr. A. had his successes. One strong, high-coloured countryman went out on the twenty-sixth day, after being bled twelve times; another in thirty-three days, after eight bleedings and twenty-four leeches. A pale sempstress was bled nine times, lingered on in the hospital for fifty-six days, falling into a slow consumptive fever. She was then, fortunately, transferred to the Infirmary for Chronic Diseases, where she was plentifully fed and comforted with wine. She left at the end of a month with a slight cough, but with a fine colour, joyous health, and in good flesh." Such a picture leads us to see at a glance how different is the standard of success by which Dr. Aعرbi measures the results of his practice and that by which we measure ours.

* A reviewer in the *British and Foreign Medico-Chirurgical Review*, No. 51, page 141, seems to have a vague notion that water in

A still greater incredulity exists respecting the subject of cancer. A large proportion of the profession yet look upon it as incurable. Their notion of the disease is, that it has a tendency to grow indefinitely, to return again after removal, and to destroy the patient. Incurability by other means than the knife or cautery is an essential part of their diagnosis, and any one who records a case in which a cancerous formation has spontaneously ceased to grow and ultimately withered, is looked upon as deficient in diagnostic skill!

Now it is clear that individuals reasoning thus must have a far different standard of success than have those they attack. Dr. — may treat fifty cases of water in the head

the head is another name for tubercular meningitis, and that where I speak of the former I mean the latter. I know not whence his inspiration is drawn, but I do know, for I have seen, that meningitis with purulent effusion may occur without any special head symptoms, and *per contra*, that children die with water in the head when there is no meningitis at all. No wonder that he doubts the possibility of curing a large proportion of cases of acute hydrocephalus, when he seems to applaud, patronize, and adopt the opinions of "our best authorities at home," amongst whom we presume is Dr. West, whose treatment for early symptoms is calomel, grey powder, for two or three nights, and Epsom salts twice or three times a day if the bowels are constipated, and who, when vomiting, headache, constipation, and a quick pulse are present, says that the main reliance is to be placed "on depletion, purging, and the administration of mercury" !—West on *The Diseases of Children*, p. 69.

There are, indeed, to my mind few things more instructive, though melancholy, than to see ease after ease detailed in which disease has run on unchecked by the measures adopted for its cure, and yet the physician persevering in the same plan of treatment himself, and teaching it authoritatively to others. I remember reading in the late Dr. John Armstrong's Lectures on Medicine, that every case of acute hydrocephalus that could be diagnosticated with certainty was pretty certain to be fatal. Dr. Watson (3rd edition) says nearly the same thing, viz. :—"When once the disease is fairly established, most of

on the old plan, and speak enthusiastically if he find five recover : to him such is "a great success ;" while another, using a different method, would think a mortality of 90 per cent. indicated a total failure both in theory and practice.

The average mortality in French hospitals from amputation of the thigh is 50 per cent., and a surgeon there prides himself by diminishing the average to forty in a hundred ; but the English surgeon is sadly disappointed if his average exceed 33 per cent.

Tested by this, let us compare the results of active energetic treatment with a plan which practically does nothing. Out of a large number of cases of acute disease taken promiscuously, the mortality of the former practice is about ten per cent. : of the latter, five. In other words, a

patients die, very few of them recover." Notwithstanding this, an idea of adopting any radical change in the treatment is never broached. Bleeding in one form or another, purgatives, calomel, and cold are alike the staple of Armstrong, Clarke, West, and Watson. Rush, Mills, Davis, Piorry, Cheyne, and others are quoted by Churchill, who himself writes in favour of the same plan. Surely when all these concur in the small chance of recovery on this system, it is at least worth while to try some other. The mortality could scarcely be greater, it certainly might be less. The reviewer alluded to tries hard to convince his readers that attention to the vital powers, rather than to the physical condition of organs, has long been the main text of medical authors ; surely he will be puzzled to show how it is so, when he sees so many authorities treat a disease of the brain, essentially strumous and the result of constitutional debility, by the most depressing means at their command ! White swelling, which threatens disorganization of the knee joint, should be treated by tonics, &c., for it is a form of serofula. Brain swelling, another form of struma, which threatens destruction to the nervous system, must be treated by draining away—something. Happy reasoning ! Anathema to the man who does not adopt the dogma. If in a weakly child the head is affected, weaken the constitution. If the knee is affected, strengthen it. If you do the former, the child can only lose its life ; if you do not do the latter, it may lose its limb !

doctor of the Heroic school has one death amongst every ten patients he attends with acute disease, while one of the modern school asserts that he has only one amongst every twenty.

It is clear that the former's boast of success is untenable, as compared with that of the latter.

We conclude, from the foregoing considerations, that the plan of treating diseased persons by means which would make sound ones seriously ill, is opposed as much by experience as by common sense and true philosophy.

The question now naturally arises, Is all medicine useless? Have the labours of our ancestors only sufficed to find out poisons under the guise of remedies? and the query receives considerable point if it be argued that all medicines are likely to make healthy men diseased.

To this we answer unhesitatingly, first, that the proper administration of medicines does a vast amount of good; secondly, that they should rarely, if ever, be used in doses sufficient to make a sound man ill.*

* This proposition has been seriously objected to by my friend Mr. Hunt, who has done me the favour of expressing to me his opinions at some length, and for which I here tender him my sincere thanks. His objections receive considerable weight from some observations made by Claude Bernard, and before alluded to, viz. that certain drugs do not affect an animal out of health in the same way as they do an animal in good condition, and that an amount of poison is borne by a diseased creature which would be deadly to a healthy one. This fact necessarily vitiates many of our conclusions, especially as to the dose of any medicine required in any particular case. It vitiates also the results of experience to a great degree, for the diseased condition of any two individuals is rarely identical, and an amount of a drug scarcely sufficient to affect one may materially injure another.

Further experience will be required ere this subject can satisfactorily be decided; but, in the meantime, Mr. Hunt's remarks deserve recording. "You will allow," he says, "that six grains of opium would not only make me ill, but possibly endanger my life; but I

Who can doubt, for example, of the value of quinine in diseases of malarious origin?—of the use of quinine, opium, and steel in neuralgia?—of alum in lead colic?—of iodide of potassium in mercurial tremors?—of steel in chlorosis?—of turpentine in hæmorrhages?—of kousso in tapeworm?—of ergot of rye in hastening parturition?—of opium in diminishing excessive secretion, irritability, and pain? Who now doubts the frequent value of colchicum in gout?—of

woke one morning and got out of bed to dress, and being suddenly seized with spasmodic lumbago, I swallowed within an hour six grains of good, fresh, solid opium. In two hours, being then free from pain, I rose and dressed, travelled about 115 miles by rail, and never slept, nor felt sleepy, nor sick, nor ill the whole way. I had no headache the next morning, but was perfectly well. A miserable sufferer I should have been that whole day, and the next, had the dose of opium been weighed in your scale. A quantity of mercury which would cure a syphilitic subject, improving his general health, and appetite, and spirits, brightening his eye, and clearing his dusky countenance, would make a sound man ill; it would depress, distress, gripe, and weaken him, and give him nervous tremors. Again: a dose of calomel and jalap which would make a healthy man ill for a time, would, if given to a man depressed, miserable, and despairing from congested liver, make him ready to jump for joy, and this without griping, making him feel queer, or even severely purging him. And once more, when a patient is ill, and the right medicine is antimony, he will bear one, two, three, or even six grains every twenty-four hours, and it will even improve his appetite (I have often observed it); but when he gets well he soon loathes it and turns sick; or if a sound man took it, would not he be ill enough? . . . Indeed, I hold that there are few medicines useful in disease which are not in some degree injurious in health. Instead of your words I would be more inclined to adopt the following: '*Medicines should never be used in doses sufficient to make the patient ill; but there are exceptions even to this.*'"

Although Mr. Hunt and I differ somewhat in our mode of expression, the difference is by no means fundamental, inasmuch as the aim of both is to keep the dose of any medicine employed within *safe* limits.

chloroform inhalation in convulsions ?—of creosote in vomiting ?—of lime-juice in rheumatic fever ?—of gallic acid in albuminuria ?—ammonia in bronchitis, &c. ?—arsenic in skin diseases ?

But in all these and other instances, we hold that the drugs must be administered in moderate quantities only. Medicines are means to an end, not weapons to fight disease, whose power may be indefinitely increased. Of the value of medicine, in the most extended sense of the word, we have a most profound confidence and belief. Of the abuse of medicinal agents we have a corresponding dread.

A few illustrations will serve to show our meaning.

Arsenic for skin diseases is most useful when used in such small doses (*e. g.* three minims of liquor arsenicalis thrice daily) that the patient feels no ill effects from it.

In fuller doses it is absolutely prejudicial both to the cutaneous eruption and the patient's general health. Of this I have now collected many cases. I have equally seen arsenic in moderate doses apparently cure ague—the patients have exceeded the dose, the stomach has been affected, and the ague has returned. My friend Dr. Collingwood has seen the same.

Iodide of potassium is another medicine which, when largely given to a healthy man, produces several local inflammations, *e. g.* of the Schneiderian membrane, of the faucial, laryngeal, mucous membranes, and sometimes even of the skin. Some are so susceptible of its influence that half-grain doses suffice to produce these effects. Now, a close attention to effects of this drug has convinced me that the dose to be employed ought always to be short of that which produces these distressing symptoms ; and I have also noticed, in many instances, an improvement follow a cessation of its use far greater than accompanied its employment. A

similar remark applies to the use of Donovan's solution, and to many other medicines.

Quinine is another medicine which, in large doses, produces in healthy people symptoms of a peculiar cerebral disorder, known as cinchonism. Twenty grains for a dose suffice to produce this effect in the generality of cases. The drug, it is well known, has long been used for ague. As we have yearly a vast number of cases of this disease in the various Hospitals in Liverpool, I have endeavoured to ascertain what, as a general rule, is the best method of using quinine, as to dose and time of administration. Amongst others, I tried scruple doses half an hour before the fit; on one or two occasions they staved off the access, but when I found one patient suffering from the fit of ague and the signs of cinchonism simultaneously I gave up the plan. The case referred to was the most violent of all the intermittents I have seen, the hot stage being accompanied by intense fever and almost maniacal delirium. A scruple of quinine arrested the fit during the first day, and he had no return for some days. The ague returning the same dose was used; it produced headache, and great "ringing in the ears," and deafness; but the disease continued unchecked, and the succeeding fit was the worst he had. He was subsequently cured by five grains every four hours.

Opium is another drug which, in large doses, is poisonous to a healthy man, but, as a general rule, one or even two grains may be taken without a worse effect being produced than would follow the imbibition of a tumblerful of brandy-and-water. Now experience shows us, that in these doses, or in others rather less, this drug is most useful; in grain doses it acts, in many instances, as a tonic—we have seen already that excessive doses are dangerous to life. These remarks, however, are not intended to apply to those cases

in which, by long use, the system gets so accustomed to the drug that large doses can be borne with impunity.

Alcohol is another article of the *Materia Medica* to which these remarks apply. Of the value of moderate doses few can doubt; of the prejudicial effects of large ones there cannot be two opinions.

Of mercury we may say much the same thing. Experience has demonstrated that small doses are far more efficacious in syphilis than the vast quantities used in days gone by; and the tendency of observers, at the present day, is to the belief, that a quantity of the drug, short of salivation, does more good than a larger dose. In my own experience I have seen the drug apparently of great utility, but I cannot charge my memory with a single instance where it has affected the gums. I have rarely seen occasion to continue its use longer than a few days, the sole exception being in infantile syphilis.*

* The following report of a discussion at the London Medical Society shows that the author's views are not peculiar to himself.

"Mr. Hunt said he had long been inclined to the opinion that the doses of medicine might be regulated on the principle of giving them so long as they produce therapeutical effects, and withholding them so soon as they give rise to physiological—*i. e.* injurious—effects. For instance, he did not believe that mercury does any good, but rather harm, when it begins to affect the mouth and gums. The same remark was probably applicable to arsenic, antimony, colchicum, iodine, and iron,—in fact, to nearly every medicine of an active nature. The utility of medicines depended much on our knowledge as to when their use should be continued or discontinued.

"The President, so far as his own experience was concerned, was disposed to concur with Mr. Hunt; and he believed that the general practice of the present day was tending in the same direction.

"Mr. Canton said that a case occurred to him in illustration of the correctness of Mr. Hunt's observation. First, however, he would remark that Mr. Hunt had not taken sufficient notice of the constitutional peculiarities of patients, which influenced their susceptibility

Of antimony, belladonna, strychnine, conium, aconite, ipecacuanha, prussic acid, sulphate of zinc, iron, and copper, nitrate of silver, acetate of lead, and a variety of other active remedies, we may say much the same thing, viz. that experience has shown that their medicinal value is most conspicuous when they are given in doses so moderate that the patient is only aware that he is taking medicine by the repeated visits of the nurse to administer it, and by the amelioration of his complaint.

to the action of medicines. Some years ago, he (Mr. Canton) operated on a woman, aged about forty, for strangulated hernia. There was apparently nothing to prevent recovery. Opium was given for twenty-four hours; but peritonitis set in. Calomel and opium were then given; and the peritonitis diminished. The patient, however, unexpectedly presented a feverish state, with *malaise*. He explained this by supposing that the mercury had done all the good that it could, and was now producing physiological symptoms. The symptoms ceased on the mere withdrawal of the mercury. He would ask Mr. Hunt whether he did not think it necessary that the patient's health should always be supported when being placed under the influence of mercury. He had for years been always accustomed to give mercury in the form of hydrargyrum cum cretâ, with quinine at the same time.

“Mr. Streeter agreed with the attention to the condition of the patient suggested by Mr. Hunt and Mr. Canton. But in some acute inflammations, in robust subjects, we must not be content with small doses. He would especially apply this remark to antimony and opium. These may in some instances be tolerated in large doses; and this he attributed to the difficulty of their entrance into the system in the conditions presented here. He agreed with what had been said as to the non-necessity of salivation in syphilis. The practice had been opposed, indeed, for many years.

“Mr. Lee thought the distinction drawn by Mr. Hunt between the physiological and therapeutical action was very important; and that there was a way of separating these effects by a selection in the place of introduction of medicine. If mercury were introduced through the skin in syphilis, the physiological effects were avoided, and the therapeutical alone were produced.”

We may wind up these observations by a few remarks upon the use of colchicum in gout. Twenty years ago it was almost universally taught in the medical schools that this drug should be used, and continued steadily, in such doses as to insure abdominal pain, purging, or vomiting; its use was then to be suspended, or the dose diminished. As a result of this doctrine many patients died, including the late Mr. Shaw, of Cheltenham, an accomplished surgeon, of vast experience and most extensive practice. Dr. Christison has endorsed this doctrine nevertheless with all the prestige his experience commands. But as far as my own limited experience has gone, I consider Dr. Gairdner's dictum more consonant with truth, falling in as it does with sound philosophical deduction. He says of colchicum, "Its effect in freeing the body from disease bears no adequate relation to its immediate visible and tangible, or, as it has been called, its physiological effect on the system. . . . Colchicum never more effectually relieves the patient than when it acts silently and peacefully without producing any evacuation whatever, or in any way disturbing the patient's comfort and ease." — *Gairdner on Gout*, 3rd edition, pp. 306-7.

It would be impossible to find any quotation more forcible with which to point the truth we have been attempting to expound, which we may sum up in few words thus:—

We believe that the principle of doing evil that good may come, is as false in medicine as it is in ethics.

We believe that this vicious principle has been adopted, unintentionally, ever since our science has been studied, and that medicine will never rest on a firm basis so long as this doctrine retains its hold on the minds of practitioners. Lest it should be objected that our opinions are new-fangled, and therefore unworthy of credence, we crouch under the cloak

of Sydenham, and say that our motto is none other than a translation of his Latin aphorism respecting a physician's duties, viz.—

“Primum est ut non nocere.”

CHAPTER XVIII.

HYGIENIC MEANS CONSIDERED.

Application of preceding remarks—Use of medicines—Each patient a separate study—A healthy peasant—His circumstances—How far he may be a standard for a townsman—Influence of exercise considered—Exercise is exhausting, and *per se* prejudicial—Must be proportionate to person's powers—Cases where it has been excessive—Rules for guidance—The dietetic value of alcohol in towns considered.

It is now time for us to call attention to the practical results which flow from the preceding observations. We have attempted to show that there is a certain force in operation in the body by which it is conserved during life and health in a certain definite condition ; that when that force is no longer present, the individual is in the condition of a dead body, and amenable to the laws which govern the inorganic world ; that there is a condition of the body in which it is not totally devoid of the vital force, and is not altogether under the influence of the inorganismal forces ; that this condition varies in different individuals ; that a departure from the healthy standard can readily be recognised ; that such departure manifests itself by alteration of function, of structure, or of both ; that *theoretically* it is difficult to consider that a departure from health can take place without the whole organism suffering, though we find, *practically*,

that disease may show itself in one organ only, without manifest disorder being recognised in other parts of the body. We have seen that diseased conditions of the body may originate simply from an excessive expenditure of vital force without an adequate restoration; that the presence of disease implies that the vital powers have been in some measure overcome by an extraneous force; that if such force is sufficient to overpower them altogether, death is the result, but that if such extraneous force is not sufficient to destroy life, the body is again restored to a healthy condition by the continued operation of the vital powers. And we have inferred that if the severity of a disease is proportional to the power of the extraneous force acting on the body, its *duration* must be proportional to that, *plus* the rapidity with which the vital forces are recruited after the foreign force has ceased to operate; and that, under all circumstances, health can only be restored through the instrumentality of the natural forces inherent in the healthy body.

If these conclusions are correct, it necessarily follows that the chief aim of the physician, when called upon to exercise his art, must be to bring back the vital powers of his patient to the healthy standard. This seems to be a self-evident proposition, but it has too often been lost sight of. Dr. Brown, the author of the "Brunonian System of Medicine," appears to have approached nearer to the enunciation of this doctrine than any other writer; but his theory failed, from the then current belief in the great power of medicines as absolute remedial agents, and not simply as *means to an end*. To many it may seem a very simple thing to say that the sole art of the physician is to bring back the vital powers of his patient to the standard of health, but in reality nothing is more difficult to effect. He has to deal with parts whose physical condition he cannot see, or which he could not

account for if he could see them—with diseases, the true nature of which he can only infer—and with organs so far removed from the surface of the body, that he can only influence them in a round-about manner. He has comparatively few means at his command, and many of those are possessed of properties he does not thoroughly know. He finds that the remedy which seems beneficial in one case is utterly powerless or positively prejudicial in another; that the individual constitutions of men are almost as numerous as the human race; and that, though certain general laws may be framed, they are subject to innumerable exceptions. Thus, the plan of diet an Esquimaux physician would lay down as likely to restore the health of one of his nation, would be certain, if adopted by the Englishman, to do more harm than good; and the laws which govern our healthful state in England do not obtain full sway in India. One man finds cold mutton the most digestible of dishes and a joint of lamb the most exquisite of luxuries; another finds in both a constant source of dyspepsia; and one revels upon veal and pork, which sends another into a miserable condition of suffering. The same is true of mussels, cockles, crabs, and lobsters. The old saying is in some cases literally true, that "what is one man's meat is another man's poison." Cod-liver oil, which restores one consumptive patient to health, cannot be borne by another, in consequence of the vomiting, sickness, anorexia, or loathing which it produces; and opium, which mitigates the pains of many, absolutely will produce severe stomachic suffering in others. I have met with one man on whom Epsom salts acted as a narcotic, and a lady on whom assafoetida acted as a cathartic.

Under these circumstances each individual becomes a separate study for the doctor, and general laws have necessarily but a limited range of authority.

I propose in the succeeding pages to consider the means we have for improving the condition of the body when from any cause the vital powers have been deteriorated. In doing so, we must first examine into those general facts which are more or less familiar to us all, and which, being based upon close observation and common sense, require no learned medical arguments to establish : and then we must investigate the special powers of those medicaments on which we are in the habit of relying as means for effecting cures in various diseases.

We shall see that, in the treatment of disease, "hygiene" has a far wider application and more vast importance than we have hitherto thought, and that any one who neglects its study has necessarily a most imperfect knowledge of the healing art.

For years we have flippantly attributed the success of Hahnemann's followers to the powers of nature, and the system of diet or hygiene they enforce ; yet we ourselves have been content to pass both these by, as almost beneath the notice of dignified orthodoxy. It is high time that a well-deserved reproach like this should be wiped away.

We have already adverted to the fact that we are positively unable to make a perfectly healthy man more healthy or more long-lived than Providence intended him to be ; no medicine or contrivance can hasten adolescence in the child, arrest it in the man, or recall it in old age. The very idea seems absurd : to entertain it for an instant is to exalt, in imagination, man to the rank of Creator. Man cannot create force any more than he can create matter, though he may do his utmost to employ, conserve, or economize such forces as the Almighty has placed at his command ; consequently, we may say, without any fear of contradiction, that there is no medicine in existence by which we can *directly* give a

person vital power. But as we do see those whose powers have been brought low return again to their former healthy condition, we conclude that there are means by which vital power may be restored, rebuilt, or regained. Whatever those means may be, they must act *indirectly*, for no druggist can keep "strength" bottled in his shop, to sell to his customers. If then they want strength, they must get it in some other way. What that way is, it is now our business to examine.

Our first duty is to take a perfectly healthy man, the *beau ideal* of his race, and examine all the circumstances by which he is surrounded ; our next to take a number of unhealthy men, and investigate how the circumstances in which they are placed differ from those surrounding the healthy man ; and we must then attempt to ascertain the influence of such circumstances. We must then examine how far a removal of obnoxious conditions is followed by improvement in the condition of the body, and whether there are any means for counteracting the influence of such prejudicial agencies as cannot be directly removed or escaped from.

In few words, we must examine hygienic and medicinal agencies.

The respective values of these influences it is difficult to estimate completely. Under one set of circumstances, hygienic means will restore health after medical ones have failed ; and under other circumstances, medicinal agents restore health which hygienic means alone have not been able to impart.

There can be no doubt that it is often judicious and necessary to combine the two, so as to make one supplemental to the other.

Now if we throw our eyes around us, and note the parts of the country in which there is the greatest amount of rude

health and the greatest average longevity, we shall find that such are to be found in rural districts, where there is a free circulation of a pure air, where the soil is gravelly or sandy, or where at least some complete system of drainage is adopted; that the healthiest of the dwellers in these districts have all of them much exercise in the open air, plenty of light, wholesome food, adequate rest at night, and a sufficiency of clothing to guard against sudden or prolonged inclemencies of the weather; that they have no great mental labour or intellectual harassments, and are as free as human beings can be from anxiety and care. If such people reside near the sea-side, we may fairly consider that their tenure of life, *cæteris paribus*, would be greater than if they were living far inland.

So much for positive conditions absolutely present; we must now add, that for the individuals to remain permanently healthy, there must be an absence of certain influences which we are in the habit of speaking of as poisons. There must be an absence of the poisons producing ague, dysentery, typhus, small-pox, scarlatina, measles, syphilis, and the like; the absence of intoxication, whether from alcohol or opium; and we may add, the absence of all mineral, vegetable, and animal poisons, and accidents to life and limb.

Under such circumstances, we can well believe that we should find abundance of healthy men and women—individuals whose health could not by any means be exalted.

Let us now take a couple of individuals from such locality, and place them in different circumstances, and note the result.

We deprive them of light by confining them in dark alleys and gloomy rooms, and surrounding them above with a vaporous cloud of smoke arising from myriads of chimneys; we deprive them of fresh air, compelling them to breathe

over and over again that which has passed through other lungs, or is tainted by vegetable or animal refuse, by small-pox or other malaria, and the like ; we provide them with houses whose cellars are damp, whose areas are undrained, and whose offices are habitually filthy ; we place them in some business where they have to inhale dust of various kinds, or even mercurial fumes ; we exact an amount of labour from them which habitually wearies them ; and we give them abundance of stimulants, but take away their appetite for solid food, and the capability to find nutritious fluids, such as good milk, &c. We do all or any of these things, and what is the result ? Loss of health, loss of strength, diminution of vital power, a shortening of life, and the imparting to the offspring a tendency to diseases, under one or other of which they often succumb, even before death has carried off the parents.

It requires no great acumen to demonstrate, first, that individuals in such condition are not in high health, and that their vital powers are diminished ; and secondly, that if we wish to restore them to health, we must either put them into the same condition they were at first, or that we must try and find something which will enable them to regain and conserve in a town the health which was their appanage in the country.

As the subjects of climate, change of air, choice of locality, and the like are freely treated by other authors ; and as, when such change is adopted, the patient is, as it were, given up by the physician, I shall not speak of them, but confine my inquiry to those contrivances which the doctor brings into operation to counteract the influences of town life, and which are at the best only an imperfect substitute for a rural existence.

There are many instances in which a physician feels

certain that change of air, absence from business, &c., will cure his patient ; but the patient cannot afford the one or the other ; the doctor then is called upon to find the best substitute he can for these.

I need not dwell upon the importance of efficient house and general drainage, or of large rooms, and when these are not available, of thorough and complete ventilation, especially of those rooms where many persons are congregated together, such as children's schoolrooms, bedrooms, nurseries, &c. ; of the necessity for dryness (*i. e.* an absence of such moisture in the domestic atmosphere as would arise from the daily scouring of stairs and bedrooms), of the advisability of comfortable warmth, of the necessity for good wholesome food, and the like : for these are points which would suggest themselves to the good sense of every one, and their importance has long been recognised.

Ere we inquire into positive facts, we must say a few words upon those we believe to be fallacious doctrines, and amongst the most prominent is the value of *exercise*, and the definition of *wholesome food*.

There is no single item in the subject of hygiene which is surrounded by more fallacies than that of exercise. The ideas generally connected with it may be thus summed up. "Experience shows," it is said, "that the most healthy men are those who go through a great deal of exercise ;" therefore it is argued, "exercise is essential to health ; and it follows, as a corollary, that a person who takes exercise must be benefited thereby." As a natural result of this reasoning, exercise is looked upon as an essential item in the treatment of all diseases attended with debility, and there are few who do not consider it one of the most potent of the incentives to appetite. The rural ploughman, it is said, comes in hungry for his dinner ; then how can an urban

gentleman hope to have any appetite, unless he has in some degree emulated the labour of the former ?

In accordance with this view, our books teem with observations upon horse exercise, carriage exercise, boat exercise, calisthenics, gymnastics, pedestrianism, and the like.

The prevalent idea running through the mind of each author appears to be, that exercise, of itself, insures strength ; and that it is as necessary to health as food is to the satisfying of hunger.

These conclusions are so very mischievous that they require a complete refutation.

The first question we have to discuss in the inquiry we propose is this—

What is exercise ? What do we mean by the word ?

Its derivation tells that it meant the constant training by which the muscular power of individuals was gradually developed ; more modern language tells us that the word is used for the mind as well as for the body ; and we speak of exercise of the brain or understanding as frequently as of exercise of the muscles.

But when it is said that exercise is conducive to health, it is generally taken to mean muscular exertion ; and a man who sits still and works hard with his brain all day is supposed to take no exercise ; while another who is walking from morn to night and never uses his brain at all, is said to take a great deal of exercise.

Now, as it is well known to all hard-reading students, that it is a relief to take physical exercise after mental exertion, and as mental exhaustion is far more “telling” on the constitution than bodily fatigue, it follows that intellectual exercise is more severe than corporeal. If so, and if exercise were good, as such, it would follow that brain work ought to be superior to muscle work.

But we all know that it is not ; we look upon the latter as superior to the former, because it produces less "wear and tear" on the nervous system. The former may make an intellectual giant, yet a feeble man ; the latter makes an artificial Hercules, yet a pigmy mind. With our respect for bodily vigour, we admire the Milo, and envy his thews and sinews ; while for Bacon, Milton, Newton, we have but a qualified esteem, for they let their muscles rest while they developed their intellect, and though never ailing were never athletic.

We accept all these things as facts ; we allow that mental exercise is too exhausting to be subservient to bodily vigour ; we adopt the word Exercise according to its general acceptation, &c. ; but there yet remains some farther inquiry to be made, viz., what is meant by the word *Health* ? —for it is one capable of two distinct interpretations. One individual uses it to express a condition of body in which there is not only no disease and no tendency thereto, but where there is the utmost possible power to resist injuries, or to recover from their effects, however severe, and this irrespective of the actual duration of life. To attain this condition, it is said that much exercise in a pure air is essential, and that exercise involving the muscular system alone. We do not deny the proposition, or object to the definition ; for it has often seemed to us that the individuals who have the best health in this acceptation of the word are those which most closely resemble the brutes. Claude Bernard helps us to a very significant fact on this subject. He says, "So exquisite is the nervous sensibility of dogs of the higher breed, that the slightest operations bring on fever and are attended with alarming symptoms. . . . In dogs of a more vulgar class how different are the results of similar experiments ! During the operation the animal

hardly attempts to move and scarcely seems to suffer, the appetite remains unimpaired, and the secretions normal. . . .

. . . . In the horse these differences are, if possible, still more strongly marked." (*Medical Times and Gazette*, Feb. 4, 1860.)

We cannot deny that the vulgar class of dogs have health, but we cannot deny that the high-bred dogs have health too, but the two have to be measured by a different standard.

This brings us to a second definition of health, viz., a condition of body in which there is no disease and no tendency thereto, and where life is prolonged to a great length, but where the power of resisting injury is small. Persons in this condition may fairly be compared to the high-bred horse and dog referred to by Bernard. We ask, Is exercise of the muscle absolutely essential to this condition?—can it be altogether dispensed with? There are two ways of answering the question. One by reference to the lower animals, the other by reference to men whose occupations are essentially sedentary, or who from various causes are compelled to inaction. We say that limpets, oysters, pholades, and other fish whose habits are to be stationary, enjoy as good health as other molluscs which are perambulatory; we say that a dormouse or other hybernating animal is as healthy during his long winter sleep as during his summer excursions; and we see that the stall-fed cow is as healthy as the one which is always roaming the pastures.

We see, then, that it is not a law of nature that muscular exercise is essential to a comfortable healthy long life.

We next turn to the human race, and inquire who those are whose habits are most sedentary? They are the lawyers, the dignitaries of the church, statesmen, university professors, and others, who scarcely exercise their muscles at all, but are habitually exercising their brain, and it is in these classes precisely that we find the greatest number of in-

stances of a "green" old age—Lord Lyndhurst, Lord Campbell, Lord Brougham, Lord Palmerston, the Archbishop of Canterbury, the late Bishop of Durham, are all specimens, and by no means rare ones, of this class. On the other hand, we note that habits of daily toil, even with abundance of food, do not insure longevity, or a green old age.

But we go a step further, and recall such instances as we know where indolence has been enforced. A case from Dr. Abererombie, quoted by Dr. Watson, Lecture 31, comes apt to our purpose. A girl, æt. 20, becomes completely paraplegic, having power over the head alone. Here exercise was physically impossible, yet the Dr. says, "she lived in that state without any change of the symptoms, and *her general health continuing good for about twenty years.*" She died at last of low typhus, and the brain and nervous system were found apparently healthy.

There are, therefore, we conclude, two distinct standards of health. To the one, few if any inhabitants of large towns can attain, to the other, the majority can reach, no matter how extensive the city.

A few words are necessary to point out that strength of body is not necessarily a synonyme with health, or a proof of a sound constitution. The idea is a mischievous one, for it leads the phthisical to take long walks or other exercise with a view of strengthening the muscles, whereas in reality it diminishes their vital power. I refer elsewhere (p. 377) to the frequency with which galloping consumption follows upon successful training, and where extraordinary and successful muscular exertion has been followed within a few days by fever or consumption.

Does exercise benefit all individuals? or is exercise in *the town* to be taken as the equivalent of exercise in *the country*?

In answering this question, we ask what the real effect of

exercise in the country is ? It produces a brisk circulation of blood, a rapid expenditure of the old material of the body, a vigorous appetite, a good digestion, a perfect aëration of blood, and consequently, a rapid rebuilding of the body ; it insures, in fine, an energetic and constant change from old and effete particles to new and healthful ones.

But exercise, even in the most healthy atmosphere, is *exhausting*, when the individual is not recruited by food and rest. The willing horse, the active sailor, or the powerful swimmer, have all of them been known to die from an excess of labour. *Exercise, then, per se, is prejudicial, and it does good only when it promotes an appetite which can be allayed by sufficient food, and produces a vigorous circulation of blood, in air sufficiently pure to insure a perfect aëration of that fluid in the lungs.*

The necessary inference from this is, that exercise in a town is not the equivalent of exercise in the country, and that it is positively prejudicial unless it promotes the appetite and the digestive powers, and unless (a proviso necessary in towns where poverty is rife) there is a sufficiency of food obtainable to satisfy the appetite existing.

The foregoing inference is one which is abundantly fortified by experience. Numbers of people have come under my care, in the Liverpool Northern Hospital, and subsequently in the Royal Infirmary, whose sole complaints have been rheumatic pains, which I had no difficulty in ascertaining were due to "over work." Compared with what the rural labourer goes through, their exercise has not been excessive, but it has not been accompanied by commensurate food, appetite, or digestion, and it has exhausted them. Office lads, shop boys, messengers, and others, including even seamen, whose avocations are most active, soon succumb when the appetite fails. Domestic servants, whose activity is pro-

verbial, are, as a class, less healthy than their more indolent and luxurious mistresses. I have known eases where healthy ladies have come from the country into town, and imported with them their usual habits of active out-door exercise, but after a time it has positively done them mischief; instead of promoting appetite, it has diminished it, and instead of insuring digestive power, it has actually induced dyspepsia; but with diminished exercise the appetite and digestion have improved, and the patients have enjoyed apparent health again.

The following cases have recently come under my notice. They illustrate well the prejudicial effects of a false estimate of the value of exercise:—

Mr. R., æt. 26, of spare frame, and about six feet high, consulted me for an acutely painful abdominal affection, of some years' standing. The following was the history I obtained. Of healthy family, he had himself been free from any serious complaint until the age of eighteen, or thereabouts. He was then a druggist's assistant in London—growing fast, standing in the shop for twelve or fourteen hours a day, eating sparingly, and sleeping indifferently. From frequent contact with the counter he had occasionally swelled testicle, which was acutely painful (*vide* remarks on pages 122-125), but which rarely lasted beyond three or four days. After these attacks the testis was reduced below the normal size, and there was spermatorrhœa. He never had a venereal affection. During one of these attacks he put himself under medical treatment; and amongst other things a large quantity of mercury was administered. He was not salivated. Little alteration took place in his condition except for the worse, and at the age of twenty-two he went to his home in the country broken down in health, and unfit for work. Since that time he had simply been assisting his

father (a surgeon) to dispense. He had occasionally expectorated a small quantity of dark blood, apparently from the throat.

As the affection of the abdomen was clearly myalgic, I inquired into his daily habits. They were as follows :—He rose early, about six, had a sponge-bath, dressed and came down stairs to read till breakfast. He had tried walking at that period, but was obliged to abandon it, as it made him worse. At breakfast he ate little. He then went to the surgery to make up medicine for about an hour and a half ; after that, walked out for a similar period ; dined at twelve, having little appetite, and eating sparingly. In the afternoon came another spell at the counter and another walk ; reading in the evening, and bed at nine. Bed was the chiefest luxury he had, and he often felt as if he would like to go to rest twice or three times during the day.

His extremities were always cold, the mental faculties were benumbed, the respiration was sighing, the circulation feeble, digestion impaired, the bowels torpid, and flatulence common ; in fine, there was every mark of constitutional and local debility. The plan of treatment was readily deduced.

1. To relieve the present sufferings.
2. To diminish the muscular fatigue.
3. To increase the constitutional power.

It is unnecessary to enter into detail further than to say that an increased amount of rest and a diminution of exercise formed the main ingredient in the cure. The recovery, however, was very slow, as the deterioration of his constitution had been considerable and of prolonged duration.

Mr. O., æt. 30, consulted me to ascertain whether he had spermatorrhœa. The symptoms he described were those of myalgia, affecting principally the muscles of the back. He

had a most distressing impediment in his speech, and like most confirmed stammerers, was thin and weakly. His health had obliged him to leave off business. He was doing everything which his advisers had recommended to recover his health, but unsuccessfully. On finding the urine, &c., healthy, I inquired especially into his daily habits, and found that he was accustomed to walk about the docks, quays, and landing stages for nearly six hours a day, under the impression that he was thus benefiting himself by air and exercise. I recommended him for the next week to amuse himself with light reading, in the recumbent posture, and abstain from all exercise. At the end of that period, the alteration in his appearance, voice, manner, and even in the stammer, was most remarkable. He seemed a new man, and expressed great surprise that so small a matter should have done so much for him. I have seen him once since then, and found him fat, flourishing, in excellent health, and stammering very little.

The next case is less striking, but equally important. Mrs. N., æt. 67, had suffered for many years from myalgia, which had been mistaken for hepatic and cerebral disease. The treatment she had undergone pulled her strength down, and this, combined with advancing years, produced anasarca and great depression of spirits. The former was cured by tonics, &c. ; the latter continued much the same. I ascertained from observation that she was always worse in the evening, that symptoms of exhaustion were apparent shortly after noon, and that she got up early, took upwards of an hour to dress, and came down stairs to breakfast. I recommended the simple plan of breakfasting in bed, and only coming down to dinner. Since that, life has been enjoyable. A number of similar cases are given in my work on "Myalgia."

There is no doubt that, as years increase, the strength fails ; and thus habits which serve to promote health in youth may be the source of severe suffering in old age.

The most remarkable case which has come under my notice, as illustrating the exhaustive nature of exercise, is the following :—

Mr. E., of spare frame and great activity, after many years of harassing mental labour, found his mind give way at the age of forty-two. After being in confinement for a few weeks, he returned home. Though his mind was restored, he was in a deplorable state of debility, unable to stand or walk without tottering. His doctor now ordered for him a most profusely liberal diet, and an absolute repose of body and mind, giving at the same time steel and cod oil. Under this plan he improved considerably, gained flesh, and became of ruddy complexion. As it was now thought desirable for him to have some exercise, he was allowed to be out of doors for ten minutes at a time ; and as his food was given hourly during the day, the exercise was directed to be between his meals. Everything went on prosperously under this plan, until one day when he walked about a mile and a half to a concert, sat it out, and then returned up-hill to his home. Next day he began to suffer from fainting, and there was such complete collapse that for three days his life was despaired of. By extraordinary care and the lavish use of stimuli, he came slowly round, but a month elapsed ere he regained the ground he had lost. He has since then had another relapse ; but on this occasion it was from excessive (for him) mental exertion.

Here, as in a great number of cases, it will be noticed that the debility came *on the day after* the extra exertion, and not on the day itself. In some instances that have come

under my care, the effect of excessive exercise has been shown on the *second* day after it has been taken.

The exhausting influence of exercise shows itself more or less in all organs of the body, and upon the constitution generally. When very excessive, it will produce typhus;* when less severe, it simply induces prostration of strength, lassitude, debility of the heart, brain, stomach, &c. Our chief business at present is with the last. Excessive exercise, we say, destroys for a time the appetite, and interferes materially with the power of digestion. This fact is familiar to every pedestrian, to many a man of business, and active female. There is a period of the day at which they feel hungry, and know they could eat a large dinner; but if, from any cause, they are unable to satisfy their appetite, the sensation of hunger gives way to faintness; they feel, they say, that they are "past their food," and when it is set before them, they are able to eat only sparingly. But if they take a short rest, or commence the meal by the use of a glass of wine or other stimulant, the effect of exhaustion is counteracted, and the appetite returns.†

* "Typhus used to be very fatal to the hard-working medical students of the Borough Schools. I have known the ablest students die of it, but I never knew an idle fellow of the class to suffer from it."—Dr. Nottingham.

In like manner we may say hard *thinkers* suffer more from gout, *ceteris paribus*, than those who rarely think at all.

† My friend Mr. Nisbet has furnished me with the following case, which is specially useful as indicating a good means for overcoming the exhaustion consequent on a day's fatigue, which prevents a dinner being enjoyed:—

Mr. T., æt. 56, was for many years accustomed to dine late. He walked to and from his place of business about four miles in all, took no lunch, and came back quite exhausted. In former years he was ready for a dinner, and enjoyed it; but now he could scarcely bear the smell of it. All he did was to lie down for an hour's rest, and

We see a similar state of things in horses who have been racing, or have had a long journey : they are, to use the expression of grooms, "off their food ;" but the experienced ones know how to restore the appetite by giving such nutritious drinks as ale and porter, which I have seen in Ireland rendered more stimulating by the substitution of whisky-and-water.

But it would appear, as a general rule, that the digestive power suffers sooner than the appetite. Thus it is a common occurrence for a man or woman to go all the day, from eight in the morning to five in the evening, without food. During the whole of this period they have been transacting business, it may be, or otherwise actively occupying themselves ; and, as usually happens to business men, the work is terminated by a walk home, to insure them a good appetite for dinner. Individuals thus circumstanced have appetite ; but if they indulge it, it is followed by indigestion, or else—a common occurrence—a quantity of wine or other stimulant is taken to whip up the digestive powers.

How much the meal overpowers these individuals is shown in the frequency with which such dinners are followed by more or less profound sleep. The influence of the preceding exercise upon the digestive power is readily recognised in such cases, *for the sufferer from dyspepsia will find that he can eat more at and digest better after a one o'clock dinner than after a later one, and that with the former he will require less stimulant, and will not be weary for sleep.*

Having thus recognised exercise or exertion as being then take a light supper. He slept badly, and had little appetite for breakfast. He was recommended to take a cup of good strong tea and a slice of bread-and-butter ere he started for home in the evening. He did so, and he finds that he can now dine with the same relish that he did formerly. Such cases are common.

positively prejudicial when excessive, inasmuch as it interferes in an especial manner with appetite and digestion, which it ought to promote, our next inquiry must be directed to ascertain when or what exercise is to be considered as "*excessive.*"

If we turn to our dictionary for the meaning of this word, we find it to be, "beyond due limits"—"in excess." We adopt the latter, and say, that exertion or exercise is excessive when it is "in excess;" *but in excess of what?* Of the average amount, or in excess of the individual's powers? In common parlance, the first of these significations is the one adopted, and we say that such and such labour is excessive only when it is far beyond the average amount undertaken by the generality of mankind. But when we are discussing a medical point, we must adopt the second signification, and consider that the *word has reference to the patient's powers.* Thus we should say, that an ordinary day's work was very excessive exertion to a man who had bronchitis, influenza, or other weakening disease, or who had had his strength pulled down by loss of blood, hunger, or protracted disease.

It is the general adoption by physicians of the first signification of the word "excessive" which has led, and still leads, so many persons astray upon the subject of exercise.

All agree upon *excessive* exertion being prejudicial, but they adopt as a standard the average work of mankind, and *not the patient's power.* The practical result of which is, that an individual is often recommended by the doctor to use an amount of exercise which is excessive for him, though it is inconsiderable for other people. I have known patients directed to walk a certain number of hours per day—say two or three—with the idea that it would improve their condition; yet they have got steadily worse, and have improved

immediately upon giving up their exercise altogether. I have known others directed to increase their exercise from time to time, until they have been at last unable to take any, by being confined to bed. I have known the stomach to indicate exhaustion when the man was perfectly unconscious of fatigue: severe indigestion was the result, and yet the patient was recommended to take a walk to prepare the stomach for its work! In none of these instances, however, did the exercise *seem* to be excessive, *i. e.* beyond the powers of the generality of mankind; but *it was excessive* to the individuals, for it was *beyond their strength*.

When once the powers of an individual are made the standard by which to judge of excess, it is clear that we are no longer in the region of comparative certainty, but are thrown upon a sort of irregularly sliding scale. Of the degrees of this scale the following will serve as examples:—

Mr. H., æt. 62, is exhausted by ten minutes' conversation, by half an hour's listening to reading, or by having to hold a book while reading himself. Mr. S. is always painfully exhausted by half an hour's walk, though he looks healthy. Mrs. L. was thoroughly "knocked up" by a drive in a car of four miles. Mrs. J. had intense dyspepsia, and was so weak as to be confined to her own room. As long as she was perfectly quiet, the digestion was fair; but the visits of friends, and the conversation consequent thereupon, were too much exercise for her, and the digestive powers were temporarily suspended entirely. This state of things might be mitigated by the free use of champagne. Mr. H. was so weak, that the exertion of walking some thirty yards prostrated his powers so completely, that he was unable to think or to write clearly for some hours after, and loss of appetite and indigestion followed. Mr. B. was exhausted by putting coals on the fire. Mr. J. had exhaustion, vomiting,

and indigestion from an hour's driving, but gradually recovered his powers, until he could do as other people, and digest and enjoy solid food. All are familiar with the frequency of death caused by the simple exertion of getting out of bed to go to the night-chair, during the early convalescence of fever; and I doubt not that many can recall cases like the following:—

Miss R., an overgrown, delicate girl, had epidemic influenza, for which she was treated by Epsom salts; these acted freely, and she became extremely languid, and was confined to bed. Her friends now visited her, and under the cheerful influence of their presence she sat up in bed, chatted merrily, ate heartily of chicken, and then lay down and died. One man has come under my notice who had suffered for years from bleeding piles; he was thoroughly blanched when they were tied. No special means were adopted for restoring his powers beyond keeping him in bed: but as his appetite and digestive power had gone, this did not improve his condition. About four days after the operation he died in the act of turning over in bed. Mary —, aged about 22, died during a fit of laughing; her heart was fatty; not a fibre was found healthy. She had been for some time greatly addicted to intemperance, and had been very drunk the day before. I have known many patients with bronchitis, phthisis, &c., die very unexpectedly of pure exhaustion, from walking up the hospital stairs to their wards; and others from simply walking about one hundred yards on level ground. Mrs. T., aged 64, had an attack of diphtheria, but was so much better on the third day that she walked up and down stairs, and from room to room, frequently, under the idea that the exercise would do her good. The next day she was so very prostrate that she could hardly speak audibly, and the debility steadily in-

creased for a fortnight, in spite of the most generous diet, tonics, and a free use of wine. I am at present attending a lady who is free from all organic disease, but who is so weakly, that the exertion of going up one pair of stairs unassisted will confine her to her room for a week. She attributes this debility entirely to the exercise she was recommended to take while at a fashionable watering-place.

The most important point connected with the subject of excessive exercise is one which is, unfortunately, almost universally ignored, viz., that the prejudicial effects of exertion are to be looked for *after* it is over, and not during its continuance. When we say *after* we do not necessarily mean immediately afterwards, for that any one would recognise; but we wish to call attention to the fact that fatigue to-day may be followed by exhaustion to-morrow, and in some instances this may not be noticed till the second day afterwards.

I have long had my attention called to this, and could give many instances of it from my own practice, but Miss Nightingale, in her very admirable "Notes on Nursing," has put the same idea so well that I prefer quoting her words, each one of which I most cordially assent to.—"One hint," she says, at page 30, "I would give to all who attend or visit the sick, to all who have to pronounce an opinion upon sickness or its progress. Come back and look at your patient *after* he has had an hour's animated conversation with you. It is the best test of his real state we know. But never pronounce upon him from merely seeing what he does or how he looks during such a conversation. Learn also carefully and exactly how he passed the night after it."

"People rarely if ever faint while making an exertion. It is after it is over. Indeed almost every effect of over-

exertion appears after, not during, such exertion. It is the highest folly to judge of the sick, as is so often done, when you see them merely during a period of excitement. People have very often died of that which it has been proclaimed at the time has done them no harm." "As an old-experienced nurse, I do most earnestly deprecate all such careless words. I have known patients delirious all night after seeing a visitor who called them 'better,' thought 'they only wanted a little amusement;' and who came again, saying, 'I hope you were not the worse for my visit,' neither waiting for an answer nor even looking at the case. No real patient will ever say, 'Yes, but I was a great deal the worse.'

"It is not, however, either death or delirium of which in these cases there is the most danger to the patient. Unperceived consequences are far more likely to ensue. *You* will have impunity, the patient will *not*; that is, the patient will suffer, although neither he nor the inflieter of the injury will attribute it to its real cause. It will not be directly traceable, except by a very careful, observant nurse. The patient will not even mention what has done him most harm."

I can scarcely add weight to these words, yet I may record, that I have myself seen delirium for a day and a half, with vomiting of green bile, come on after a conversation in which a recovering patient sustained her part to the pleasure and almost wonder of her visitor. Thrice had the lady such relapses ere the cause of them was acknowledged. I have repeatedly seen vomiting produced by the indiscreet visits of friends to very weakly patients, and I have seen as much prostration and sickness produced by *listening* to a conversation or to reading as from the patient talking herself; and on looking back to an attack of typhus fever I can well remember, that what I felt as the greatest an-

noyance was the necessity to appear to attend to a chapter in the Bible, not a word of which I could make out clearly ; and to have an old Welsh nurse droning in my ear all day long the results of her experience, and expecting me to give an assenting word every five minutes.

To the healthy these are trifles, to invalids they are all-important.

In discussing this subject, it occurred to us to make some investigations upon the subject of gymnastics, training athletes, &c. We came upon the following facts :—All young men are not capable of being trained as oarsmen, or runners, or boxers ; some break down during the first week, others during the second, others, again, “last out” for a period of six weeks, and then suddenly break down. One case has come under my own notice, in which a very highly-trained athlete, with muscles of extraordinary power, died suddenly of phthisis after a fortnight’s illness ; and another, in which the stroke oar of his College became, in a similar period, a perfect wreck from the same cause. He recovered from the disease with a cavity in the left lung, and utterly unfitted for any business or profession. A third man had acute phthisis from running a race against time. I have met with apprentices who, though slowly inured to heavy work, have been compelled to give it up at the age of nineteen ; and with seamen whom their work has exhausted and not strengthened ; and every general knows that many of his army are habitually knocked up by forced marches, while others can stand them almost with impunity.

If there be constitutional debility, exercise beyond a certain point increases it, and no gymnastic contrivances can give to a delicate individual the vigour of perfect health.

This being so, it is clear that an amount of exercise of which one man may be absolutely unconscious, may suffice

even to kill another. It is equally clear that the prejudicial influence of the exertion will be in direct proportion to the debility of the patient.

The sliding scale, then, which we have for a guide, is one having for one extreme, "exercise conduces to health ;" for the other, "exertion is a cause of death."

With such a scale, it is manifest that exercise cannot be indiscriminately recommended as a means of restoration to health.

May we not go further, and say, that as exertion carried beyond the bodily powers conduces to disease and death, so a cessation from exercise suspends the downward tendency ? Thus *rest* becomes almost as important as *food*.

To this conclusion a number of experiences induce us to come. All know the powerful influence of "tired Nature's sweet restorer, balmy sleep," in recruiting us after the fatigues of a day ; its influence, when hunger is not verging into famine, is independent of food. Simple rest from labour has a similar result. The tired pedestrian throws himself on the ground, when, overborne with fatigue, he scarce can make his way ; no inn is at hand, and his own store of food is exhausted ; he lies down for a few minutes, sleeps, perhaps, for a few moments, and then rises again, conscious of refreshment and renewed sense of power.

Horses, dogs, and other animals do the same. For those who are originally strong and healthy a short rest suffices ; to the weak and feeble a far longer repose is necessary. On this point the experience of horse-keepers is very decisive, and I am told that huntsmen find the same in packs of dogs : a few can be "hunted daily," a majority thrice weekly, but some few can only stand the fatigue once or twice during the same period.

We come, then, positively to the conclusion, that there are

instances in which we must attempt to re-invigorate the vital powers, by adopting a plan which would be positively prejudicial in conserving them at a first-class standard, viz., by rest and repose—cases in which we must prohibit the smallest amount of exertion, and where we must appear as the encouragers of absolute indolence.

But how simple does this become when we throw our considerations into the form of an aphorism, thus—*If the physician wishes to increase the vital powers of his patient, he must be as careful in husbanding those which are present as in trying to increase them.*

In illustration of this I could give numerous cases, in which patients have been relieved of months and years of suffering, by simply adopting the habit of resting on their bed for a period of one, two, or more hours during the day. Even where there is no illness, but only weariness, and fatigue at night from the ordinary feminine household duties, the individual can get through the day with comfort to herself, and with increased efficiency for others, if this custom is invariably adopted. The posture chosen should be the recumbent one, and the head should be low.

Many cases illustrative of this fact may be found in my work before quoted. One of the most interesting I venture to reproduce.

M. I., æt. 27, of delicate appearance, came under my care for pain and tenderness along the whole of the back. She was a housemaid, had an easy place and kind mistress. She was chlorotic, had no appetite for food, lived chiefly on tea, and was extremely weak. The pain was so severe that she could not sleep: contact with her body-linen was productive of great suffering, and it required all her energies to go through her day's work. I found that the abdomen and chest were almost as sore as the back, and that she had

cramp in most of the muscles of the trunk, at one time or another.

I prescribed tonics and rest, but she got worse to such a degree that she could scarcely endure any movement of the body.

She now left her place, took lodgings, lay in bed all day long, abandoned medicine, and in six weeks was quite well.

Since recording that, I have met with very many others of a similar kind.

Now, the whole of the remarks we have made turn upon the effect which exercise produces upon an individual patient, and it may naturally be asked if we can suggest any natural and simple means for ascertaining the effect of exertion upon any one. I doubt whether any absolute rules can be laid down : the following are approximations to the truth :—

1. All exercise is prejudicial in patients who are weak and feeble.
2. Exercise is prejudicial when it produces the idea of exhaustion at the time or subsequently.
3. It is prejudicial when it is followed by loss of appetite, indigestion, or both, at the time or afterwards.
4. When anorexia, flatulence, palpitation, nervous irritability, sleeplessness, consumption, diarrhœa,* menorrhagia, chlorosis, &c., are present as prominent signs of the state of the constitution, exercise is far more likely to do harm than good, by aggravating the diseases present.
5. In the above-mentioned conditions, rest is of far more service than exercise.
6. When exercise is resorted to, and a moderate amount does good, it should always stop short of fatigue.

* Exercise generally increases diarrhœa, and I know that it occasionally produces it. (J. C.)

Our next subject of inquiry is, How far can the *diet* of the rural population be adopted with advantage by townspeople? Ere we answer this question, we must recapitulate some of the differences existing between a town and country population.

I think it may fairly be taken for granted, that the average amount of work undertaken by a countryman is equivalent to that undertaken by an urban labourer. But there are points in the history of the former to which it is well to call attention.

Taking the case of agricultural labourers, we may give the following as an outline of their day's work. It begins about four or five in the morning and finishes at seven or nine, according to seasons. They fetch the cows, milk them, take them back; feed and groom the horses; then plough, harrow, sow, dig, plant, hoe, churn, thrash, winnow, cut hay, cart it, make up straw for market; feed pigs, poultry, calves; tend sheep, wash them, clip them; and at stated times they mow grass, make hay, cart and stack it, reap wheat, &c. The ingathering of the harvest is the most laborious of all their occupations, both as regards the physical labour it involves, and as regards the duration of their employment, and the short period of rest allotted to them. During this period, our own country is visited by many labourers from the sister isle, who share with our peasantry the fatigues of the harvest.

As far as I can ascertain, it is not usual for master farmers to allow their labourers any amount of malt liquor, day by day, under ordinary circumstances, or if they do, the quantity is limited, but during the time of harvest there are few who do not allow a very liberal supply. Still further, I have been informed by farmers, that it pays them better to allow their Irish labourers a sufficiency of ale, in addition to their wages,

than to pay them their bare money, and give them an unlimited supply of buttermilk. I scarcely need go into the experience of railroad contractors, and the contrast noted between the Frenchman's work on his meagre diet, and his subsequent performances when he adopted the diet of the English navy; enough has been said to show, that experience has shown to British farmers, railway contractors, and others, the utility of adding an alcoholic stimulant to the ordinary food of their labourers during times of unusually great exertion—an exertion supposed to be *excessive* for their average amount of strength, even though they live habitually in good air, and are accustomed to fatigue.

The labour of the denizen of the town is rarely so prolonged as that of the countryman, it rarely extends over ten hours, and is severe or otherwise according to circumstances; but though when we compare work with work there is little difference between the actual amount done, *there is a vast difference between the powers of the respective parties to do it*. The rural labourer as a rule is habitually strong, the town one is habitually weakened by influences independent of his work, and he is, therefore, almost daily in the same position as the agriculturist is during the harvest period only. He requires something beyond what the countryman usually lives upon.

The following conclusions we think may be relied on:—

1. A town population is not so robust and healthy as a rural one.
2. A town labourer is more exhausted by his daily labour than is an agriculturist; and, consequently, he requires a greater amount of nourishment.
3. As solid food in towns is expensive, and labour has frequently a direct tendency to diminish the appetite for it,

the townsman is under peculiar temptation to have recourse to alcohol in place of food.

4. In moderation the use of alcohol is of considerable service ; it is not only in itself a substitute for solid food, but it assists in evolving the digestive power for the latter. The use of alcohol in excess is as prejudicial as is gorging the stomach with an excess of food.

5. A labourer who is unable to take alcohol, or who abstains from it in every form, requires a larger quantity of solid food than his neighbour who takes beer, &c.

6. A townsman may live comfortably on the same diet as a countryman, provided he is not called upon to do much work.

7. The laws apply with greater force to the town-born and bred than to those who come directly from the country.

8. We know of no substitute for alcohol in its two qualities as food and stimulant.*

If there be any truth in the foregoing rules, it will be seen that we cannot hope to restore a debilitated individual to health, simply by imitating the exercise and diet which serve to keep the robust countryman in good condition. A

* As an illustration of the nutritive properties of alcohol and opium, the following case, which was reported to the author by Mr. Slack, an unusually close and original observer, may be cited :— A middle-aged woman came under his care during the temporary absence of a friend. For two years she lived entirely upon opium and gin-and-water. Her chief symptoms were frequent, almost daily sickness, and epileptic fits three times a week. The bowels were not opened during the whole two years. At her death, the abdomen was so distended as to appear ascitic. This was due to the coating of fat, four inches thick, in the abdominal walls. There was no obstruction in the intestinal canal, and no fæcal or other accumulation within it.

A case more extraordinary it rarely falls to the physician to record.

most of experiences point to the same conclusion : some patients are totally unable to endure a milk diet, in consequence of the acidity, flatulence, heartburn, and indigestion it produces ; others can digest it well enough, but they gain no strength from it—they sink lower and lower in vital power from day to day, until wine, or some other stimulant is added, and an animal food supplants the farinaceous and milk diet. Some find all diet flatulent except that which may be called purely animal ; while others loathe all flesh meat, and can only digest vegetables and milk. From these considerations we conclude, that although it is advisable and necessary, as a general rule, to endeavour to surround a patient with all the circumstances which conduce to make a countryman healthy, yet that there are special cases in which such rules must be departed from, and where a plan purely artificial must be resorted to.

CHAPTER XIX.

MEANS FOR RESTORING VITAL POWER.

Means for improving the vital powers—Cod oil—Influence of oils in the animal economy—Healthy and unhealthy fats—Cream—Almonds, eggs, soups—Periods between meals depend on patient's condition—Rule for guidance—Raw meat, as Russian preserve—The medicinal value of alcohol—Case—Various forms of alcohol considered—Iron—This will produce salivation—Case—Bitters, their value considered—Carbonate and spirit of ammonia—Opium—Tannin.

IN estimating the means we possess of improving the constitutional powers, when from any cause they have been reduced, we must place, foremost in the rank, the hygienic measures we have already briefly alluded to—change of air, a pure atmosphere, rest from labour, pleasant occupation, good diet, and, when possible, a fair amount of comfortable exercise in pure air.

Next to these, though by a long interval, come those medicines to which the name of tonics has been applied. We will not enter into the strict literal signification of the word, but merely state that we use it to designate a class of remedies whose employment seems to favour the patient's restoration to health and strength. As we have said before, they do not directly increase the patient's vital force, but they afford, in some way or other which we cannot explain,

a material assistance to the existing power, by means of which it is augmented towards the healthy standard.

Of all the medicinal tonics, none are equal to certain animal oils, and upon the whole the cod-liver oil may be considered the best.

It is somewhat interesting to speculate upon this fact, and inquire whether there are any circumstances which throw light upon it.

The first consideration that strikes us is, that there is scarcely an animal, however minute, that does not contain a notable quantity of oleaginous matter: from the gigantic whale and towering elephant to the tiny louse and the water-flea,—all are furnished with a considerable quantity of fat; and this not as an animal soap, or in a sort of emulsion, but in isolated masses of varying size, sometimes in a distinct structure, as in adipose cellular tissue, and sometimes floating free amongst fluids or in cells containing other matter, *e. g.* the hepatic. Butter is a constituent of every form of milk we are acquainted with; it is essential to the infant. Still further, we see it in some measure connected with nutrition and food: when the stately stag is in its best condition it abounds with fat, and as from various causes its strength wanes, the quantity of its fat declines. In man, too, it is to be noted that consumption, a disease which, more than any other, evidences a want of vital power, manifests itself, almost uniformly, by emaciation sooner than by any other single sign; and that, in advanced stages of this disease, one of the first signs of improvement is an increase in bulk. But there is one point of difficulty in pursuing this subject, namely, that there appear to be two distinct kinds of fat or oily matter, one of which appears to be the evidence of a bad condition rather than of good. Thus,

as the goose of Strasburg loses health, his liver gains fat ; and as the consumptive man loses fat and flesh from under his skin and elsewhere, he accumulates it in his liver, and sometimes in his kidneys, bones, and arteries. In the same way some fat people are very weak constitutionally, while others are active and strong. In one case that came under my notice, a lady of immense size was suffering apparently from fatty heart, and was extraordinarily weak, yet under the use of cod-liver oil she became much stronger and at the same time stouter.

As yet the chemist has not been able to distinguish why one oil is healthy and another the reverse.

The beneficial influence of cod-liver oil on the debilitated human frame is very marked. The following cases will serve to show its value as contrasted with other tonics :—Miss L. C., æt. 13, was suffering from erythema nodosum, painful spine, and general debility ; steel, quinine, porter, wine, and animal diet were tried fully, yet no improvement was apparent during six weeks ; at the end of that time cod-liver oil was commenced, and she was convalescent in a week. Similar cases are common.

I have no personal experience of other animal oils, with some few exceptions ; but I understand that whale and seal oil have been used with good results.

I can gain no reliable information respecting animal fats, such as suet, beef, fat, lard, bacon, &c., when taken internally by individuals in delicate health, but I am acquainted with many who prefer the use of mutton suet boiled with milk, and taken warm, to the use of cod oil.

As far as I can ascertain, the vegetable oils have little if any influence for good when taken internally ; whenever I have tried them they have acted as aperients, and have done

positive harm. If they are to be used they should be suspended in mucilage, and converted into a sort of emulsion or milk ; they are then far more readily digested.

But the value of cod-liver oil as a tonic is necessarily limited by the powers of the stomach to digest it. The number of those who are unable to take it is considerable, amounting at least to one out of every four patients ; consequently these must be deprived of the influence of an animal oil, or some other means must be taken for introducing it, or some substitute adopted. At an early period the idea was suggested that cod-liver oil would be as useful if introduced through the skin as when given by the stomach. Experience confirmed the notion ; but patients and their friends complained of the abominable smell this plan entailed ; consequently physicians tried to ascertain whether other oils would not answer equally well when rubbed through the skin. Experience upon this point is somewhat deficient, yet, as far as it has hitherto gone, it goes to prove that olive oil, almond oil, and lard are of equal efficacy with the fish oils. I have myself seen many, and known more instances, where inunction of lard or olive oil has been followed by the happiest results, and under circumstances where it was morally impossible to attribute the improvement to other causes.

In connexion with this I may refer to the fact pretty generally recognised in certain manufacturing districts—Leeds, for example—viz., that in wool manufactories, where much oil is used, and where the dress is more or less completely saturated with oil, the workpeople are generally healthier and fatter than those who work in linen or cotton factories.

In practice, however, it continually happens that one thing fails us after another, and it becomes necessary to fit

“a new string to the bow.” We need not go far to find a good substitute for cod-liver oil when it cannot be taken internally.

Cream is a fluid containing a large amount of animal oil, and would naturally suggest itself in the place of the more disagreeable fish oils. It has the peculiar advantage of being in a state of natural emulsion, the oily particles floating in a saccharine solution containing much casein. It has the rare merit of being palatable, even for children, and its nutritive properties are undoubted, seeing that delicate infants can be brought up on cream and water alone.

Though there is reason to believe that much of its nutrient property depends upon the oil it contains, we have not found that butter answers as well as cream. Many patients are unable to take much, if any, of the former, who can take the latter well.

In young persons, *e. g.* those under ten years of age, cream alone may be administered ; but in elder individuals, or those to whom the flavour is disagreeable, it may be mixed, very advantageously, with certain materials, whose effects are either to make it more invigorating or more palatable. A medical friend tells me that his favourite addition is tincture of iodine, three or five drops for each dose. In my own practice I have never recommended anything beyond the addition of pounded blanched almonds, which converts the cream into a sort of cold custard, and leaves a pleasant flavour in the mouth, besides making it more nutritious.*

* A few years ago Liebig pointed out that the difference between finely-powdered almonds and water and milk was so inconsiderable, that it was scarcely to be detected by chemistry. Since that time a gentleman came to call upon me, who informed me that for some eight months or thereabouts he had subsisted entirely upon a daily allowance of a quarter of a pound of blanched almonds and a pint

An elderly patient who suffered much from indigestion and vomiting, could take this mixture better than any other thing he tried.

There are, however, cases in which the prostration of strength and the weakness of the stomach are such, that it is necessary to add some stimulant to the cream. The best, and certainly the most palatable, is a small quantity of brandy. This combination is generally well borne by the most fastidious stomachs; and in cases of phthisis, marasmus, or simple debility, its value is very conspicuous.

Some few stomachs, however, reject it as being too rich; in them it appears to favour sickness and bitter bilious eructations. When this is the case, rum and milk, a well-known and very popular mixture, may be used instead.

Whenever there is much debility, stimulants must be used freely with the food; their effect is to give temporary power to the stomach, and to enable it to digest food which it might otherwise reject.

Next in value to cod oil and cream comes egg beaten up with wine or brandy, which may, in addition, be diluted with water, or mingled with milk or cream. This is generally very digestible, easily taken, even when there is no appetite for solid food; it is palatable to the taste, and leaves no "stickiness" or clamminess in the mouth afterwards.

In seeking for some good substitute for cod-liver oil, cream, &c.—one which might be more readily taken, and which

and a half of milk. His appearance betokened high health. He was in the habit of walking twelve miles daily, and was in every respect a vigorous man; his age was about thirty. From these observations I have been led, on one or two occasions, when I have had long mountain or other pedestrian excursions, to take a few blanched almonds in my pocket, to eat on the way, and I have been surprised to find the amount of nourishment there is in even a small quantity of them.

would more universally agree, my attention was accidentally directed to glycerine—a drug which has long been known, but which has hitherto been comparatively little used, on account of its nauseous flavour and smell, and frequent impregnation with lead. Now, however, when Price's Candle Company have found a way by which to procure it sweet, tasteless, scentless, and pure, direct from palm oil, these objections to its use are at an end. Its physical properties are sufficiently well known to need no description here. To whom we owe the credit of first introducing it into medicine, as a substitute for cod oil, I do not know. The earliest notice I have found is, that Dr. Crawcour, in New Orleans, used it with that view in 1856, and that his success was so great that the new drug entirely superseded the old in the course of a very short time. It was introduced to my notice by Mr. Ricketts, one of the house pupils of the Liverpool Royal Infirmary, who had seen it used for children by a practitioner in Newcastle. I was not long in finding that its virtues were far superior to those of any other tonic I knew; that it was equally useful for adults and children, and that its sweet taste made it generally acceptable; and that, as it mingled readily with other fluids, it could be given with steel, bitters, quina, wine, ale, or porter. I tried it in a variety of cases where cod oil had previously been taken, and where I had given every tonic I could think of without beneficial effect. In the majority of these its effects were immediate—almost magical—it seemed as if I had been giving food to a starving creature, so marked was the effect; and not only has the result been satisfactory to myself, but the patients have been so conscious of the good they have experienced from it, that they have watched the bottle jealously, so that a fresh supply might be insured ere the first one had become exhausted.

Of course we cannot expect the same effect in all—for some patients do continue to get weaker and weaker in spite of our best efforts—no one can expect to find an “Elixir vitæ” in any medicine; and if he does so, he is certain to be disappointed.

Glycerine, like cod oil, occasionally purges; when it does so it may be administered with laudanum.

The dose I have found sufficient is about nine drachms daily, which may readily be increased to twelve.

The preceding may be looked upon almost as much articles of diet as medicine, and so deemed unworthy a place here. We do not think so, however, inasmuch as food itself has the same character as medicine; it is simply “means to an end”—that end being health; and food and drink thus come into the category of medicines as soon as any patient is ill and low.

We have already indicated that there are various degrees in debility. In some the patient can digest solid food, and has an appetite for it; in the majority, however, the appetite is wanting, and the loathing of animal food intense. Glycerine, or cod oil, may be an appropriate medicine for the former; for the latter, such medicines as cream, egg, wine, &c., are more appropriate. Whenever, indeed, there is a distaste for solids, nutritious fluids must be adopted, and beef-tea, chicken or Scotch broth, ox-tail, calf's-head, hare, or turtle soups, must be adopted, with or without wine or brandy, as the case may be. Calf's-foot jelly, isinglass, blancmange, &c., in a fluid state, are all useful; and where the clamminess these leave in the mouth is complained of (and sometimes this is so disagreeable that patients refuse to continue diet), milk may be administered, in which beef fat, mutton suet, or sweet lard has been boiled, with a minute

quantity of arrowroot to thicken it, and encourage the incorporation of the animal oils.

In all cases where the debility to be overcome is great, a very close attention must be paid to the times at which nourishment must be given. There are few physicians who cannot recollect instances where individuals have sunk into an eternal sleep, in consequence of having been allowed to sleep too long without nutrition; and others where, from some peculiar notions of parents, friends, or nurses, patients have been thrown seriously back by the withholding of food beyond a certain time.

To a man in health, who can eat a hearty breakfast or a large dinner, there is no difficulty in fasting for eight hours, or even more; some few can even fast with impunity for twenty-four hours, and only take one solid meal in the day: but to one who is in ill health, a fast of three hours is depressing, dangerous, and possibly fatal. In some cases food has to be given every half-hour, sometimes even oftener, and the sole result to be noticed for many hours or days may be, that the patient gets no worse.

There is no general rule for the "times of administration" of food or medicine—each case stands on its own merits. The nearest approximation to a generalization is this: the larger the amount of food that can be taken at a time, the longer is the interval which may be allowed to elapse before more is required.

There is another article of diet we may mention here, which may well deserve the name of a medicine, inasmuch as it is unpalatable in idea, though not nauseous to the taste. It is one which has long been popular in Russia, and has recently been introduced into France. It consists of the flesh of beef or mutton reduced to a pulp. The raw meat

is thus prepared : all fibre, veins, arteries, and cellular tissue are carefully removed ; the flesh is then scraped with a knife, or rasped with a rough grater. The material thus prepared has an elegant appearance, looking like confection of roses reddened by acid. To prepare it for use, however, it is well to add to it some preserve—the syrup of orange, confection of dog-rose, or red currant jam. Thus mixed it is known in Paris as Damascus preserve : it may be more correctly spoken of as Russian preserve. The material is extremely digestible ; very delicate infants have been brought up upon it, when they have been unable to take any other form of nourishment, including breast-milk. I have myself used it with great advantage, both in children and adults, where they have been unable to take solid cooked meat in any form. The quantity administered daily has been at first three dessert-spoonfuls. Nor is it without interest that I recal two cases to memory which seem to corroborate the value of this article. One was a man suffering from diabetes mellitus, who was getting steadily worse, in spite of every treatment. He informed me one day, that he had found that he was better for raw beefsteaks than anything else, and begged for a full supply, which he took with great relish for the rest of the time he remained in the Hospital. The second was a man far advanced in phthisis, who had been vomiting everything he took for about three weeks. On my repeating an oft-asked question, whether there was anything he could fancy for diet, his answer was, that he should particularly wish "to be allowed some *raw tripe* for dinner !" His request was granted, but he died ere he could avail himself of the permission. The request, however, being made, seemed to show that the stomach recognised it as a very digestible form of food—as

it doubtless would be, as its pepsin would help it to digest itself. I have also become acquainted with an elderly lady who was on one occasion almost dead from the debility consequent on bronchitis, and who vomited up all the food which was given her. She was at last told to take rasped beef and port wine in equal quantities, a teaspoonful at a time. This was retained on the stomach, and was her sole nourishment for three weeks, the dose being increased gradually till she could take an ounce at a time.

All the things we have mentioned, to which, were we writing an elaborate treatise, many others might be added, have a direct tendency to improve the vital powers when they are enfeebled. But, as is well known to all practitioners, they may be given with an unsparing hand, without the patient benefiting by them at all. It becomes necessary, therefore, that other materials be employed simultaneously with, or supplemental to them.

The first we would mention is one that we have before alluded to as an article of diet, but which requires a few additional observations as an article of the *Materia Medica*—viz., alcohol.

There can be little doubt in the minds of unbiassed and experienced physicians, that alcohol, in what may be termed medicinal doses, acts as a tonic as well as an article of food. We have already given some proofs of its value in the last respect; we now give some proofs of its tonic or strengthening properties. 1. A medical friend, when in London, on visiting a family had his attention drawn to a child two years old, who seemed in the last stage of marasmus, fretting all day long, with the bowels disordered, and the teething irregular, and so shrunken that the skin of its abdomen might almost be wrapped round it. Several eminent medical

men had seen it, and it had been taking various medicines for several months, but without good effect, and death seemed to be inevitable. While listening to his friend's tale of woe, he handed a teaspoonful of whiskey toddy, which he was at the time partaking of, to the child, to the utmost consternation of the mother, as such things had been specially forbidden by the other doctors. The child sucked it in greedily, and with his eyes asked for more ; it was given, and the relish for it was so marked, and the improvement in a few minutes was so decided, that the hint was followed up, and for three months the child lived almost entirely on whiskey toddy. By the end of that time the symptoms had all given way, a healthy appetite returned, and the child recovered perfectly ; and it is a remarkable and interesting fact that, during the period of returning health, the child enjoyed the mixture so much, that he would not go to sleep without a small bottle of it, which he nursed like a doll. But when recovery was quite complete, the child loathed the sight and smell of the toddy, and even cried if he was in the room with it. Another child, two years old, had marasmus, for which all remedies had been tried without success ; as a last resource the doctor ordered it wine and water, or spirits and water well sweetened ; the child would not take them, however. Beer was then tried, but failed too. The parents were then recommended to try some particular Scotch ale ; this was relished, and the patient began to mend directly. For the first fortnight nothing was taken but the ale, and the daily allowance was a pint ; at the end of that time there was appetite for solid food, and in about six weeks the little patient was perfectly restored. As in the previous case, there was the utmost enjoyment expressed for the ale during recovery, and the child was so particular, that no other ale would it take ; as soon, however, as it was well, it disliked

the ale so much that it could not bear the sight of the bottle. The following cases are very important, as showing the value of alcohol in cases where it has hitherto been supposed to act as a poison.

An elderly gentleman, who had resided several years in Jamaica, and lived very freely there, on his return to England lived very abstemiously. Shortly afterwards, however, he began to suffer severely from prurigo senilis, for which he consulted a number of medical men, and visited sundry watering-places, without relief. Total abstinence from alcoholic drinks was most rigidly enjoined and carried out. In despair of success, and being perfectly miserable, he now abandoned all medicine, and took to "drinking" again as freely as in youth. To his great surprise he shortly found himself perfectly well, without a vestige of his old complaint, or any new one in its place.

My informant, Mr. Nisbet, to whom I am indebted for an account of this and of many other cases, told me that he had met with many cases similar to the above, in old publicans who had retired from business and become abstemious in old age. They suffered from prurigo severely until they resumed their ordinary allowance of alcohol and good living.

The case of a Scotch lady has also been reported to me, who was said by many eminent surgeons to have cancer of the tongue, and to whom extirpation had been frequently proposed; the lady firmly declined this, and at last abandoned the hope of cure. As she was a very abstemious woman, some friend suggested the use of whiskey toddy as a medicine; the advice was adopted, and the lady was soon perfectly well.* 2. I have satisfactorily ascertained, from a

* *Apropos* of this case, I may mention some others, in which a similar disease has been recovered from. I was called in consultation to see a case, supposed by the medical attendant to be a cancerous

series of clinical observations in the wards of an hospital, that any aromatic or bitter tincture containing the usual quantity of alcohol will operate as a tonic, increasing the strength, health, appetite, &c., quite irrespective of the vegetable which gives the name to the tincture. If there be any difference to be detected, it is in favour of the warm, spicy tinctures, such as cinnamon and cardamoms. Still further it is to be noted, that, if equal doses are given, the value of a tincture is increased by the alcohol, used in its preparation, being in excess of the prescribed quantity. 3. An aqueous infusion of any herb, used as a tonic, is not equal to the tincture of the same duly diluted with water. 4. Such tonics as steel and quinine are not so serviceable without alcohol as with it. I have repeatedly administered these united or

affection of the tongue. I doubted greatly whether it was anything more than syphilitic ulceration; and the patient having the benefit of the doubt, was treated by iodide of potassium and tonic medicines, with generous diet. The tongue was well in a fortnight.

Mr. W. had an affection of the tongue, said to be cancerous. For this he went to London, and saw many leading surgeons; amongst others, the late Mr. Bransby Cooper. All confirmed the diagnosis, and recommended extirpation of the organ. He declined this, and placed himself under the care of a homœopathic physician. Of his plan of treatment I know nothing, but the gentleman recovered perfectly.

I was, on another occasion, consulted respecting the propriety of operation in a case of cancer of the lower lip; the patient was an elderly man, a fisherman. There was no doubt about the diagnosis, but it was agreed to leave the disease alone. It ceased growing shortly afterwards, and six years after the man was in good health, without any other trace of disease than simple induration of the lower lip.

Twelve years ago I was consulted by a lady, *æt.* 60, respecting a lump in the right mamma, which had all the character of scirrhus. Nothing was done to it beyond the continual application of belladonna plaister, and subsequently cotton wool to keep it warm.

separately, and have seen no good result from them until some tincture has been added. The immediate effect produced has been so well marked that there is no room left for doubt. 5. Persons apparently dying from loss of blood, or asthenia in any form, can be recovered by alcohol alone—we know of no substitute for it. 6. I have known individuals, who have been most conscientious abstainers from alcohol, make the most careful and determined efforts to get well without using it in any form; but, though prolonged for weeks, their efforts have been unsuccessful; a moderate and judicious amount of alcohol has then been taken, with immediate good effects. 7. From carefully conducted observations on children, in private practice, I have ascertained that wine is a very efficient substitute for such medicinal tonics as quina and steel; and that in a great number of cases porter is an equally good substitute for cod-liver oil. I have at present under my care two delicate children aged

After a while the nipple became much retracted, and the extent of the hardness equalled the half of a small lemon. At the end of two years the growth began to wither, and a line of demarcation was drawn between it and the healthy mamma: this continued slowly to increase, until at the end of five years the whole mass dropped out, a perfectly black and shrivelled mass. The breast is now quite well, and resembles a fleshy ring. No bad symptoms have ever occurred. The lady at the present time seems a model of health and activity.

There is a case reported in one of the American journals, in which a cancerous affection, of many years' standing, of the face of a physician, in whose family the disease was hereditary, was completely cured by a bread-and-milk diet. I cannot at the moment, however, find the original report for reference.

These cases show clearly, either that the diagnosis of cancer is not so clear as is commonly supposed, or that the disease has not that uniformly fatal tendency that has been assigned to it. A few observations on this subject will be found elsewhere.

four and two years respectively, in which alcohol is of essential service. All tonics have been tried in succession, but none have proved equivalent to brandy and water sweetened, or wine and water, according to the children's fancy. For many days together they seem to live on the mixture alone; at other times it seems to promote the appetite. Without it—and its use is often suspended—the children become pale, languid, fretful, and take no food worthy of the name; on resuming it their health seems restored. They seem perfectly conscious of the value of the medicine, and repeatedly ask for it to be administered, though they evince no inclination to go beyond the prescribed quantity. One morning the eldest refused to get up till he had some hot brandy and water; it was given, and he ate a heartier breakfast after it than he had done for a long time; and the improvement was not confined to that day or even to that week.

To show that the *habit* of taking alcohol is not one which necessarily grows upon persons, I may add that these little people sometimes loathe it as strongly as they have done cod oil, and refuse to take it entirely. I mention this, for many seem to have a fearful dread of prescribing alcohol for children and others, lest they should contract the *habit* of taking it. If such reasoning were valid, we ought never to prescribe beef and mutton to our poor patients, or a cessation from labour to a working man, for both are luxuries for which there is a propensity to form a habit for liking, and which they cannot enjoy without detriment.

Lastly, the stomach will digest food, milk, cream, cod oil, &c., if administered with alcohol, when it is utterly unable to do so without such stimulant.

The amount of alcohol to be given for a dose, the choice of the alcoholic mixture, and the frequency of administra-

tion, must be left for the doctor's decision in each particular case : it is well, nevertheless, to add a few general remarks upon the subject.

1. The physician must keep his attention fixed upon the *effect produced*, rather than *on the amount* given.

2. It is not judicious to use the stronger preparations of alcohol when the weaker ones will answer as well.

3. The effects of spirits are more rapid and fugacious than those of wine, and those of wine than those of porter and ale.

4. It is rarely advisable to administer spirits or wine without combining them with fluid or other nutriment—*e. g.* cream, milk, egg, soup, bread-and-butter, &c.

5. Special wines and spirits serve special cases better than others. No wine arrests or relieves sickness better than champagne ; and no spirit in this respect excels brandy. Whisky I have known to injure the milk and produce vomiting in the infant. But there is no spirit that answers better in typhus. Mr. Nisbet, who was for many years House Surgeon of the Paisley Fever Hospital, tells me that in three thousand cases he never used any other stimulant than whisky-and-water sweetened. He has subsequently had abundant opportunities for seeing the *wine* treatment so common amongst us, and he is decidedly of opinion that spirit and water is preferable to port and sherry or other wines, and far less expensive. Gin serves specially for nurses, cases of bronchitis, and atonic dropsy. Port wine is useful in diarrhœa. All the dark wines are prejudicial in gouty subjects ; and in them ale is better than porter. The French and Rhenish wines have not sufficient alcohol in them to be stimulants in atonic dyspepsia. Porter answers better than wine when there is emaciation and debility. In speaking on this subject to a friend, who occasionally has much bodily fatigue from pedestrianizing, and who generally

has a great deal of harassing mental labour, he made a remark which, from my own experience, I can fully endorse, viz., that after mental labour there was craving for wine, but after corporeal exertion the longing was for ale or porter; in both cases a stimulant was wanted, but a larger expenditure of fluid had taken place in the latter than the former, and a compensating draught of fluid was as necessary for the body as the stimulant was grateful. He considered this explanation the true one, for if only wine could be got conveniently, when he wanted ale, he would mix it with water to dilute it largely.

6. Aleoholic drinks, when taken hot, with or without spices, are more stimulating than when taken cold. Whenever, therefore, the circulation is languid and the surface cold, as in chronic rheumatism, they may be administered this way with advantage.

When we speak of the medicinal and dietetic value of alcohol in its various forms, it is impossible not to make some reference to the various views which have been held by distinguished men respecting its utility in acute diseases.

The late Dr. Todd, no small authority, gave it in large quantity and with a good average of success. Mr. Higginbottom, of Nottingham, himself a good authority, on the contrary condemns the practice, and affirms that alcohol does more harm in disease than good.

Where such men take views so opposite to each other the natural tendency of the mind is to consider that both are right to a certain extent, and both wrong to another certain extent, and that there is some middle way which is safest.

No one can doubt, I think, that individuals are sometimes brought back to life from the verge of the grave by the unsparing use of brandy or other stimulant. I have a vivid recollection of the value of wine administered to me during

an attack of fever. I have seen children and adults recover health and roses under the medicinal use of wine, and I have known a continued indulgence in gin-and-water cure renal dropsy when other measures entirely failed.

All these are positive evidences of good. On the other hand, a careful examination has demonstrated to me that many diseases may be recovered from without the use of alcohol at all. The complaints of infancy and childhood are generally managed without the administration of wine, &c., and the veterinary surgeon treats his patients much in the same way. In parish practice, too, in pauper hospitals, and in many infirmaries where the doctors have a conscientious scruple about using fermented liquors for patients who cannot afford to get them after they go out, the amount of success is about the same as in cases where alcohol is given more freely. I have myself of late years been steadily diminishing the amount of wine, ale, and spirits ordered for my hospital patients, until the quantity issued daily for thirty averages only twelve ounces; and I cannot see that the success of my treatment has been at all curtailed.

Yet I am a very strong advocate for the use of tinctures, and I have ordered even as much as a bottle of rum per day for an old sailor who had pneumonia; on it he subsisted for three months, but he died at last: without the rum he would, I believe, have died at first.

Taking these things into consideration, together with what we have before advanced, we are justified in concluding that alcohol in proper doses is tonic, stimulant, and feeding; that it will keep up life when, probably, nothing else would; but that it is not always necessary, and may sometimes even be prejudicial.

On talking with a medical friend on this subject, he told me that he had recently been attending a midwifery case,

in which there had been considerable loss of blood, and a tedious exhausting labour. As the woman seemed to be in danger of sinking, brandy and laudanum were administered, in what he considered judicious doses, and continued at stated intervals; but their use was not attended by improvement; on the contrary, the symptoms began to assume a typhoid type, the tongue became brown and dry, the teeth covered with sordes, the respiration hurried, and the pulse increased in frequency. At first these symptoms were read as indicating the necessity for a larger amount of the stimulant, and an increased dose was given accordingly. The patient, however, continued to get worse, and then, as a matter of precaution, all stimulants were abstracted. Within a few hours a marked improvement occurred, and convalescence was established without any return to alcohol or laudanum.

Shortly after hearing this case, another equally striking occurred in my own practice. I was called in consultation to see a lady, *æt.* 38, who was suffering from bronchitis. The whole of the left lung was choked up, and a large portion of the right; the expectoration was abundant, solid, and purulent, resembling that of phthisis; there was total anorexia, and much flatulence; the dyspnoea was extreme, the lips were livid, the skin cold and clammy, the pulse almost imperceptible, and the voice reduced to a whisper. A fatal termination seemed imminent. Stimulants were ordered freely, and such nourishment as could be taken. Day by day passed without material change, the patient at one time seemed better, at another worse; at length death appeared so close that the sacrament was administered to her, and after it, her relatives stood round in momentary expectation of her departure. Instead of this, they heard her faint voice saying, "I am not dying, give me

some bread and milk." She took it, and then expressed a desire that "the doctors would treat her like a baby, and give her no more stimulants." Her wish was complied with, and from that period her recovery was steady, rapid, and complete; the sole dose of any stimulant taken afterwards, being half a teaspoonful of compound spirit of ammonia to dissipate some painful flatulence.

It would be very easy to cite other cases in which the administration of brandy-and-water has been followed by the same results as were brought about in the preceding one by its being withdrawn; but they would be useless for our present purpose, which is to show that stimulants, however useful in the main, may occasionally prove prejudicial in those very cases where their employment seems specially indicated.

The question then becomes important—How shall we recognise the prejudicial influence of alcohol in the treatment of disease? and as this involves a knowledge of what the prejudicial effects are, we must commence our inquiry by a review of the effects of what has been designated "Alcoholism."

Speaking generally, and guarding ourselves by stating that alcohol has not the same effects on all, we say—

That spirits given largely to young children impoverish the blood, and produce a tendency to hæmorrhage and purpura.

That alcohol in excess will produce coma, followed by collapse or extreme exhaustion.

That a debauch is followed by sickness and stomach and headache, the latter being produced apparently by an impairment of vitality in the brain.

That continued drunkenness has a tendency to impoverish the blood, rendering it insufficient to nourish the brain and other tissues of the body.

That a consequence of this is the condition called delirium tremens.*

In delirium tremens we recognise evidence of deficient vital power in the nervous system, the skin, the muscles, the heart, and frequently in the stomach.

We conclude, then, that the prejudicial effects of alcohol are to be recognised by disorder of the nervous system, of the stomach, of the heart, of the blood, and of the system generally. In children it occasions feverishness.

Are there other signs in disease? Yes, a few. Those who have hooping-cough will often find that the imbibition of a glass of wine will invariably bring on a fit of coughing. An asthmatic will often find that his paroxysms are induced by wine or any other alcoholic stimulant. A patient with bronchitis will occasionally find that stimulants "tighten his chest." Another one suffering from eczema or lepra will find all fermented liquors irritating to the skin, and this *not* from sympathy with the stomach; for to my certain knowledge the effect is produced when wine is taken in enemata. In some cases of typhus, a glass of wine will aggravate the fever and bring on delirium; in sore throat, wine will sometimes bring on pharyngeal spasm; and I have met with many instances in which even the moderate use of brandy-

* My friend Dr. Nottingham informs me that he has made several post-mortem examinations of individuals dead with delirium tremens, and that he was greatly struck with the very pale and exsanguine condition of the brain. It was clear that the delirium had arisen from too little blood rather than too much, or from some alteration in the quality of the blood as regarded its nutritive powers. This state of pallor is noticed by Dr. Todd—*Acute Diseases*, p. 445.

He tells me that he met with a similar condition of the brain in an individual who had been addicted to taking enormous doses of laudanum.

and-water has brought on a recurrence of spermatorrhœa which had previously been cured.

We conclude, then, that there are signs by which the prejudicial effects of alcohol can readily be recognised, whether in health or disease, by any observing physician.

Unless, then, we have the presence of these signs we have no right to conclude that too much alcohol has been used in any instance.

We turn to Dr. Todd's reported cases, and we see no such prejudicial symptoms ; on the contrary, we find that almost all the phenomena recorded impress us with the belief that the alcohol administered was of service.

We are bound, therefore, to agree with the conclusions of the Doctor that brandy is a very useful therapeutic agent.

Yet when we ask ourselves, Might not the same results have been brought about by other means, *e. g.* by the use of medicinal tinctures, quinine, steel, opium, ammonia, &c., we are bound to express a belief that they might ; and thus we agree with Mr. Higginbottom.

But we cannot imagine any intelligent physician so far pandering to the amiable weaknesses of the teetotallers, as to refuse to use brandy when he thought it superior to quinine ; consequently, we consider that the safest course to steer is, for the physician to use alcohol in all its forms with the same philosophic precision as he would use opium. He will never then fall into extremes. My own practice for a long period has been, never (if I can possibly avoid it) to administer stimulants without some form or other of liquid food ; and so far as my observation has gone, this plan seems to reduce the amount of stimulant necessary to produce the effect desired, to one-half what would otherwise be required.

Next in value in the list of those medicines which seem to

have a decided influence in improving the condition of the vital powers is *iron*, in many of its forms.

It has long been known that this metal exists in the frame, and physiologists have enforced the fact on the memories of students, by exhibiting in their lectures knitting-needles, wire, &c., made from human blood. Chemists also have informed us that in certain diseases the normal quantity of iron in the blood has been found to be deficient. From these data the inference was natural, that ferruginous preparations would be of great service in those diseases and others allied to them. But long before chemistry was able to suggest this idea, iron had been empirically employed, and chalybeate waters had enjoyed a reputation superior to any other; and it is certain that this character was not undeserved.

Few persons, if any, have now any doubt of the value of iron as a tonic; but there is still much doubt respecting its effects, and the best mode of employing it. Some hold that it actually modifies the condition of the blood, and through that the whole system; others, that it simply acts like alcohol, quinine, and other tonics, and improves the general health and strength without any special primary action on individual parts. We have long been inclined to the latter opinion, but the subject would scarcely repay a controversy. As to the *best* mode of employing it much may be said. The question naturally hinges upon the word "best," for it has many significations. What is the best preparation in a *general sense* differs much from what is the best in a *particular case*: we have to consider circumstances, taste, and the nature of the complaint. We will give a few illustrations of our meaning.

An individual, suffering from over-work and town influences, requires a tonic, and steel is the one we prescribe;

every preparation is tried, and, at last, as they all fail, he is sent into the country to some chalybeate spa, where, under the use of the water, he gets rapidly well. The dose of iron he takes is small, infinitely so compared with what he took before, yet it does what the other could not do. For such class of patients, then, we say that chalybeate spring waters are the best ferruginous medicine. But if the patient is unable to leave town, the use of such waters would be of no avail, and the steel must be employed in larger doses. The soluble preparations are more generally adopted than the insoluble ones ; and the tincture of the sesquichloride stands at the head of the former, and it thus becomes the best preparation under these circumstances.

But some patients object to the acid taste and harshness that this tincture leaves in the mouth, and some children will not take it ; we have then to find out other preparations which may replace it. The number of these is considerable ; among the best are the saccharine carbonate, the vinum ferri, and the citrate of iron. Where pills are preferred the sulphate is a good preparation ; and the most useful medicine I have met with in chlorosis is one which Dr. A. Guy told me of as having been hereditary in his family for three generations, namely, five grains of the *dried* sulphate of iron and five grains of extract of gentian, three times a day.

One very pleasant form of taking steel is to add two drops of chloroform to twenty minims of tincture of the sesquichloride of iron ; mix with about two ounces of water, and then stir up, adding five grains of carbonate of soda. This should be taken at once, ere the hydrated oxide has time to accumulate in mass. In some instances I have used the tincture of the sesquichloride in combination with compound spirit of ammonia, and with good results.

In cases of dropsy, whether from disease of the heart,

loss of blood, or simple debility, I have known the potassio-tartrate of iron succeed when other ferruginous preparations have failed.

Some practitioners, wishing to combine the good effect of iron with that produced by other tonics, &c., have given it in combination with quinine, iodine, valerianic acid, phosphoric acid, and the like; but although theory would seem to favour the idea, experience demonstrates that the value of the iron is not perceptibly augmented by such combinations.

But while speaking of the influence of iron on the constitution, we must not omit to notice one result occasionally attending its use, viz., salivation. The following case came under my notice in 1853, and is of sufficient importance to be recorded fully. John G., æt. 45, had been suffering from gout, and was in such a debilitated state that tonics were administered. The tincture of sesquichloride of iron was selected, and twenty minims given three times a day. At the end of a fortnight he began to complain of a sore mouth and stiffness under and behind the lower jaw. As he had never taken any mercury little heed was paid to the symptoms, and he continued to take the steel. In a few days more, however, there could be no doubt that the man was salivated: the parotid and submaxillary glands were swollen, hard, and very tender, the mucous membrane of the month was pale, flabby, and ulcerated, the breath *very fetid*, the smell resembling the "fætor" said to be peculiar to mercurial salivation, and the amount of the saliva secreted was excessive. As the closest investigation could detect no probability that mercury had been administered, the fact was considered certain that the iron had caused the salivation. The idea was endorsed by the result; for a solution of tannic acid was used as a wash for the mouth, and was always expelled, after

rinsing the mouth, *as ink*. The blackening of the tannin solution continued for six weeks.

Since that time I have met with four other instances where iron has produced salivation.

We must next say a few words about a class of medicines in very common use as tonics or invigorators, viz., bitters.

Of these we have a considerable number in the *Materia Medica*, of which the most prominent are the *inchona* barks, the quassia wood, the *strychnos* nut, the gentian root, and *cherayita* stems. Other names will suggest themselves to the reader.

What is their true value? How much do we know of them?

We know that quinine, beoberine, salicine, are all very bitter, and that they will cure ague, and unquestionably act as a tonic. The beneficial influence of quinine on the vital powers is undoubted. Opium, too, is bitter, and it has, like quina, an influence over ague. Bitters, too, of various kinds have been popularly used to provoke an appetite by "whipping up" the flagging powers of the stomach.

Here, I believe, our knowledge ends.

With a view to test the subject more closely, I have experimented on various bitters in my own person, and closely compared in others the influence of such remedies as iodide of potassium when used with bitters and without. I have taken infusion of gentian, &c., in doses of eight ounces at a time, and other infusions in like proportion, but in no case have I been able to recognise the smallest effect.

What is true of infusion is not, however, true of tinctures, but their virtues, as we have before remarked, depend more upon the alcohol they contain, than upon the vegetable extractive it is mingled with. I find no perceptible difference between a bitter and a "warm" tincture, except that some

stomachs will endure spice and loathe bitters, and others act directly the reverse.

This estimate of the value of bitters is very contrary to that generally held, but it is, I believe, trustworthy.

The next tonie I would refer to is one which is more commonly classed as a stimulant, viz., sesquicarbonate of ammonia. It has long been used in the later stages of bronchitis, typhus, or other disease, when the vital powers have been in immediate danger of failing; and in some cases it has been administered in combination with quinine. It occurred to me, that if it were useful when persons were dying it might be equally efficacious when their health was simply failing. I consequently tried it in a case of chronic rheumatism in an old man, to whom I had been for some weeks administering a variety of tonics. He found more advantage from it than from any other medicine. Encouraged by this result, I began to use it on a large scale, and soon found that it might fairly take a high rank amongst strengthening remedies. There was at first some difficulty about the dose: five grains agreed well with some, while others were made sick by it; three grains I ultimately found was the best *routine* dose. As I administered it with water alone, there was no doubt about the effects being due to the ammonia, and not to the "vehicle" it was dissolved in.

The transition to ammonia with alcohol was very natural after this experience, and I instituted a series of experiments on the value of the common sal volatile (spt. ammon. aromat.), and soon found, that in bronchitis, atonic dyspepsia, the chronic catarrh of old age, and in general debility, the spirit of ammonia was superior to the simple sesquicarbonate. The dose should vary from half a drachm to double or treble that quantity. It may be administered in milk with more satisfaction than in any other form.

There are many other drugs spoken of as tonics, such as the salts of manganese, zinc, the mineral acids, strychnine &c. ; of these, as yet, my experience is too limited to enable me to give a very decided opinion. Each time I have tried them they have disappointed my expectations, and under these circumstances the encouragement to persevere is small.

But there are some other medicines, not usually classed as tonics, which deserve a close consideration. Amongst these may be mentioned tannin or tannic acid and gallic acid ; I was induced to try the efficacy of the former, in consequence of hearing that in Sweden the value of cinchona barks was tested by the tannin they contained, rather than by the amount of quina in them. At first I administered the drug in combination with quinine, but found that the mixture was both unpalatable and indigestible. I subsequently used it alone ; and in one very remarkable case of phthisis, with profuse expectoration of blood, the man recovered under its use so completely that the cough and expectoration entirely ceased. Five grains was the dose used, and it was given three times a day ; at the end of three months, however, the influence of the medicine ceased, and the man slowly declined. After death a cavity four inches by two was found in one lung, quite dry, and coated internally by a smooth membrane. The rest of the lung, the other lung, the heart, liver, peritoneum, intestines, and spleen, seemed to be perfectly healthy, though very pale and exsanguine.*

Since that time I have habitually used tannin as a strengthening remedy, and have found it very useful ; sometimes, curiously enough, it acts as an aperient, and has to be discontinued or combined with opium.

* I have met with other cases similar to the above, where death has arisen from pure "decline," without tubercle ; some are referred to in preceding pages.

Gallie acid has appeared to me to be inferior to tannin, but it is very serviceable in albuminuria, and can be continued for a long period.

In consequence of the influence turpentine has in preventing sea-scurvy, and curing it when present, and also in controlling hæmorrhage in incipient phthisis or in the hæmorrhagic diathesis, I have made some experiments upon it. In one instance, a case of dysentery, it seemed to act as a tonic, but I could not in any other occasion satisfy myself that it was of any service. The dose I employed varied from half a drachm to a drachm daily.

Another medicine, whose influence for good is considerable, is chloroform in solution; chloric ether as it has been called. The first case in which I employed it was that of a seaman, recently arrived from the coast of Africa; he had incessant vomiting, and his skin was harsh and yellow; he had suffered both from yellow fever and dysentery a few years before, and had recently had what he termed African fever; both the liver and spleen were slightly enlarged, the bowels were regular, the heart and pulse very feeble. After vainly trying to benefit him by other means, I ordered chloric ether and laudanum, simply to relieve the sickness; this it effectually did, and I intended then to give quinine, but the man so urgently requested that he might continue his medicine without change, that I acceded to his request. The result justified his wishes, for he steadily improved, and went out of the house perfectly well at the end of six weeks.

It may be argued, however, that as the medicine contained laudanum as well as chloric ether, it is possible that its beneficial effect might have been really due to the opium. It will, therefore, be well for us to see how far this idea is borne out by experience, and to inquire what is the influence of opium on the vital power.

The subject is full of difficulty ; for, although there is no drug with which we are more familiar, its *modus operandi* has never been satisfactorily explained. We shall approach it best by considering the actual effects produced under different circumstances, and the analogy existing between it and other drugs whose place is recognised.

The first fact that strikes our notice is, the influence which opium has on a fasting man : under its use the pangs of hunger are abated, if not entirely suspended, and there is reason to believe that life is prolonged in the same proportion, though there is no absolute proof of this.

Again, we see that opium relieves those pains which accompany a dying condition of the body, *e. g.* senile gangrene ; it equally relieves the pain of tic where there is much debility.

There is no remedy so useful in allaying the effects of immoderate loss of blood, and its influence is seen in pulmonary hæmorrhage as well as in uterine flooding.

We have already seen how secretion is increased in quantity by an enfeebled condition of the vital powers, and how much debility promotes "irritability" of all organs. We may now notice that opium checks secretion, and diminishes irritability—presumptive evidence of its being favourable to vitality.

We have also adverted to the fact, that sleeplessness is often produced by deficient vital power in the nervous system, and we know well the influence of opium in removing this condition in typhus, ordinary debility, and other conditions.

Still further ; I have been informed by those who have had personal knowledge of the fact, that opium taken shortly before death retards the loss of vital heat, and postpones post-mortem rigidity. In one instance, this occurrence, with

a continuance of colour in the face, led to the belief that the individual was in a "trance," and not dead.

I have myself had considerable experience in the use of opium in bronchitis and consumption, and have seen many individuals improve greatly under it. And in one very bad case, the patient's recovery could be attributed to nothing else.

Case 1.—Henry J., *æt.* 20, had consumption, the upper part of both lungs being implicated, but as he came under my care only during the absence of a medical friend, I cannot give details of the progress of the disease. I saw him one January; he was then expectorating about a pint and a half of pus daily, sweating profusely, and too weak to leave his bed, and his life seemed fast ebbing when my friend returned. Six months afterwards I learned that he was perfectly well, apparently strong and healthy, and quite able to go about his work. The cure, as far as could be ascertained, was due to the use of opium alone, in doses of about four grains daily.

Case 2.—Mrs. H., *æt.* 55, came under my care at the Northern Hospital for bronchitis; there was much asthmatic wheezing, copious expectoration, great debility, and perfect anorexia. She was treated by carbonate of ammonia with tincture of orange, and by compound styrax pill three times a day; at the end of ten days she was sufficiently well to leave the house; she took with her a box of pills. Three months afterwards she came to my house, looking well and rosy and much increased in flesh, and declaring herself stronger and better than she had been for years. She had been taking nothing whatever as medicine except the opiate pills, in whose influence for good she had unbounded faith.

Case 3.—Mrs. P., *æt.* 35, whose hair is prematurely grey, consulted me for a distressing fainting sensation, and a constant

craving for food night and day. Digestion was perfect, and all the functions were regular; the heart seemed to be feeble, and she was taking large quantities of wine, ale, or brandy, to stave off faintness. Prior to my seeing her she had been using aperients largely: I recommended a variety of tonics, an abstinence from purgatives, &c. She was too weak to go out into the air; the cold douche was tried, and did good for a short period. At the end of a month her condition was worse than when I first saw her; all medicine was then abandoned, with the exception of a compound styrax pill every four hours: under its use the craving for food diminished; the faintnesses were relieved; she began to sleep soundly; her spirits revived; she was able to go out for fresh air. She then went home again, and continued to take the pills until she felt well enough in a fortnight's time to give them up.

I may add, that the lady felt fully persuaded that if she took opium it would kill her; and this she repeated more than once while taking the styrax pills.

The reason I have adopted this preparation of opium in preference to any other is, that after long experiment I have found none which produces so little prejudicial effects; most patients take it without feeling headache or sickness, or having constipation of the bowels; and, as in the last case, they may take it without knowing that it contains opium; and this is no small recommendation, as some individuals have an almost unconquerable aversion to the idea of taking that drug.

In conversing on this subject with a friend who has had considerable experience with the insane, he assured me that he had come to consider that, with them, opium was as good a tonic as quinine.

Case 4.—Mary P., æt. 24, after being under my care in the

Liverpool Royal Infirmary, with general debility, for which no definite cause could be detected, and for which all the tonics I could think of had been tried in turn, was at length treated by crude opium, a grain three times a day. Improvement was perceptible in three days, and was very decided in a week. She then complained of the drug affecting her head and making her feel tipsy, and the dose was reduced one-half; the improvement steadily continued, and she was able at last to leave the hospital well. As no other plan was being followed simultaneously with the opiate, I was unable to attribute the effects described fairly to anything else. The drug did not produce constipation, great drowsiness, sickness, or *headache*, but it seemed slightly to confuse the intellect; it certainly improved the appetite.

The foregoing considerations lead us to the belief that opium acts beneficially on the vital force. We are strengthened in the conclusion by comparing it with alcohol, whose operation we have already referred to. The effect of a moderate dose of opium closely resembles that produced by a glass of punch or wine, and laudanum and alcohol are occasionally substituted for each other with advantage. Opium also resembles quinine in its occasional influence in cutting short an ague fit; and, as in the case above recorded, I have seen it act as a tonic after quinine, steel, and cod oil had been used in vain.

Against all this may be objected the characters presented by opium eaters and smokers. Surely, it is argued, the drug cannot be favourable to vitality, when it withers the body and seems to transform it into a living corpse.

The argument, however, is untenable, for it has reference to the abuse of the drug, and not its careful employment. No one denies (with the exception, perhaps, of some devoted adherents to the total abstinence movement, and even they

allow that alcohol may be used medicinally) the beneficial influence of wine, ale, or spirits in certain doses ; but every one also knows how a debauch on alcohol is followed by as much subsequent suffering as a debauch on opium, and that there is little real difference between the habitual spirit drinker and the confirmed opium eater.

As regards duration of life, there seems to be no difference between the two.

We may adduce, in conclusion, a consideration too hypothetical to have been embodied earlier, viz., that inflammation is now recognised as an unusually rapid consumption or waste of tissue, and that opium counteracts this to a considerable extent ; consequently, we infer that its influence is more favourable to life than the reverse.

Amongst the means employed for giving strength or tone to the system, *baths* of various kinds have long been popular, and sea-bathing is considered the best of all.

It is somewhat difficult to estimate the real place of these means in therapeutics, inasmuch as the benefit attributed to one thing may, in reality, be due to another. Thus, the individuals who place implicit faith in a dip into the ocean during spring-tides, rarely take into consideration the change of air that such bathing necessitates ; and yet that this has a great deal to do with any improvement in the health is apparent, for those who go to the sea-side and do not bathe, are quite as much benefited as those who do. Similar remarks apply to those who frequent certain watering-places for the benefit of bathing, and who put their confidence in Bath, Clifton, Buxton, and other waters in England, and in the various spas of Germany and France.

Of course I do not include in this category such waters as those of Harrogate, or Aix-la-Chapelle, whose sulphurous ingredients give them special properties ; or those of Carls-

bad, and others, whose virtues are due to the quantity of free carbonic acid they contain.

Nor must it be forgotten, that when visits are made to watering-places, the pilgrims are not contented simply with the external use of baths, but that they use the water copiously as a drink ; one of the natural effects of which is, to promote a rapid change of the particles composing our body.

The only way by which we can fairly ascertain the real value of baths as strengthening remedies is, to investigate their effects when used in towns by townspeople, and in country or sea-side places by residents.

Four kinds of baths are spoken of generally : plunge, shower, sitz, and warm bath ; to which we may add simple sponging.

The influence of the plunge-bath varies with the manner of its use : any one who simply dips the body, dries it, and then dresses, feels a sensation of warmth—a pleasant glow, and this is supposed to promote health. There is, however, grave reason to doubt the truth of the conclusion, for a similar glow can be produced from other causes, when no such advantage can be argued for. Thus, any one who will slap any part of the body vigorously once or twice, will experience as great a glow in the parts struck as will the bather, and he will see that the skin becomes as red in the part as it is all over the body after the plunge into cold water. A similar glow can be produced by friction, by the use of a hot bath, by exposure to the sun's rays, to a hot fire ; in all these cases it is certain that a larger amount of blood than is usually present is brought into the skin, but that of itself has no definite effect upon the general health. The glow, then, so eulogistically spoken of by bathers after a dip in cold water, must be considered as an *evidence* of health

rather than a source of improvement. The plunge-bath, however, is much more frequently used as affording individuals facilities for swimming, diving, &c. In this way it does good, by encouraging athletic sports, and strengthening the muscles by frequent practice. But if any one is delicate to start with, the exercise may be carried too far; and fatigue, cramp, faintness, or actual vomiting, results. The shower-bath appears to be of decided service in some affections of the nervous system, as in headache and hysteria; of its efficacy in preventing and controlling epistaxis, I have seen too many instances to doubt. Beyond this we are scarcely warranted in going. I have seen numerous instances in which shower-baths have done much harm, by the fright they occasion, by the coldness and languid circulation they produce in the weakly; and much discomfort is often complained of from the fatigue of undressing and dressing in a cold room. Carried to excess, as we have seen it on some occasions, it is depressing in its effects, and reduces the heart's power considerably.

The sponge-bath is open to the same remarks, and we may say of it as we can say of the preceding, that it is spoken of as pleasant and invigorating by those who are strong, but that it is positively debilitating to those who are already weak.

In proof of the preceding remarks, we may adduce the following cases:—Miss S., *æt.* 25, sent for me, in the absence of her own medical attendant, to consult me respecting a distressing faintness, languor, and coldness, which she experienced daily at the breakfast table. I ascertained that she was suffering from chronic phthisis, and was very weak. On inquiry into the history of her proceedings, I elicited the following facts:—It was winter, yet the lady had no fire in her room; on rising from bed, she stripped off all her night-gear, and standing up, sponged the whole body over

with cold water ; the chest was thus treated for a longer period than the rest of the body ; the process lasted about ten minutes or so. The bath had been recommended to her when first she began to be ill, two years before, and she had used it daily ever since. After the bath, she dried herself diligently, and proceeded to dress. The articles of dress having been in the room all night, were of a temperature of about 45° ; and as she had no "glow" after the bath, she felt quite as cold when dressed as she was before. She was so weak, that two hours elapsed ere she was ready to leave her room. Neither before nor during that period did she take any nutrition, but she did not feel faint until she came down stairs. It was clear that her symptoms arose from simple starvation by cold and want of food, and that the effect of the bath was to reduce the natural warmth of the body to a ruinous extent.

The use of the bath was now suspended ; a fire was recommended in the bed-room ; some warm rum-and-milk was taken a short time before she got up ; the dress was warmed ere it was donned, and the natural result was, an increased feeling of comfort, and less consciousness of faintness and debility. The lady was not strengthened, but the weakening process was arrested.

Miss B., *æt.* 7, came under my care, one very cold March, for extreme debility, which manifested itself by deadly coldness of the surface, blueness of the hands and arms, a marble-like pallor of the skin, &c. I found that she was habitually thinly clad, in the style so fashionable amongst many families, and that every night and morning she had a cold bath. I recommended the discontinuance of these, the use of warmer clothing, and every possible contrivance for keeping up the animal heat. Improvement was soon apparent, but so

thoroughly did the child seem starved, that six weeks elapsed ere she was perfectly well and comfortable.

Mrs. P., æt. 35, and Miss M. C., æt. 30, were simultaneously under my care for extreme debility, accompanied by transitory hysterical attacks of fainting and unconsciousness, or talking nonsense; they were too weak for a shower-bath, and I recommended in its place cold sponging. The influence of this, for a few days, was extremely beneficial, and the attacks were suspended. At the end of a week, however, the sponging did more harm than good, and aggravated the symptoms on every occasion.

Of the influence of sponging in relieving feverishness I need not now speak.

The influence of warm or hot baths on the general health seems to be small; they heat a person thoroughly, however, and thus may do good at times, but if prolonged they occasionally produce prostration and temporary faintness. The influence of sea-bathing on the sea-side residents differs in no respect from that of fresh-water bathing; nor can the youth, or other dwellers in a town like Liverpool, where they can have salt or fresh water bathing, according to their fancy, find any difference between the effects of one bath and the other, as respects health. Swimming is more easy in the salt than in the fresh-water bath, but the skin feels most comfortable after the latter.

There is, however, one point connected with all baths which it is necessary to refer to. The idea of bathing implies a subsequent drying process, and this, a considerable amount of friction of the skin. It is assumed in this country, that cleanliness of the surface is essential to health, and, as a consequence, our youth are taught indiscriminately to be prodigal of cold water in washing the whole body frequently.

In the main the direction cannot be considered a bad one, for it does no very great harm, except to a few individuals. It is, nevertheless, true, that it is founded on a fallacy. Nature has covered us all over with hairs, and each hair is furnished with two oil-glands, for the purpose, apparently, of keeping the hair well greased; our skin, too, is profusely supplied with sweat-glands, each of which pours upon the surface of the body a thin film of oil, which keeps the skin smooth, supple, and soft. We may consider the presence of oil on the surface of the body to be a natural provision for a definite purpose, from the following considerations:—The negroes, and other aborigines dwelling in very hot climates, have universally a far more oily skin than the inhabitants of cold climates. Mansfield Parkyns, in his travels through Abyssinia, found that the best protection from the effects of solar heat was, to keep the skin constantly bathed with butter. The Jews, originally an Oriental race, had laws given to them, imposing the utmost cleanliness, yet the anointing with oil was a luxury. We find from the Gospels, that it was a mark of respect to any one to anoint their feet *after* they had been washed. We find in the Constantinopolitan baths, that anointing with oil habitually follows the bathing, drying, and shampooing. The same plan obtained in Pompeii and amongst the Greeks. If, then, the presence of oil be a provision of nature, and it is a practice amongst Oriental nations to supply it artificially when it has been forcibly removed by bathing and friction, are not we manifestly wrong in enjoining its removal as rapidly as it is formed? The foregoing considerations have induced me to give very close attention to the effects of baths on the skin of those who indulge in them. In the majority of cases nothing particular is noticed; but in those instances in which there is much irritability of the skin present, with

much natural dryness, bathing, and its subsequent skin-friction, habitually make it worse. One gentleman, whose surface seemed to be always desquamating, tried all forms of bathing, with only an aggravation of his suffering ; at last he gave up the use of water entirely, except to his hands and face, and found great relief from the abstinence. An elderly lady informed me that she had been obliged to give up bathing completely, as it, and the subsequent friction, always induced a pruriginous eruption. Another lady came under my care for eczema of the face, which she attributed entirely to indulgence in sea-bathing. She informed me, too, that she had suffered much from a very irritable condition of the skin after each bath, which she was at first unwilling to believe could come from a luxury she enjoyed so much ; at last she was compelled to give up her bathing, and from that period the whole skin had returned to health, except that of the face.

While on this subject, the pedestrian or other traveller may well remember his experience of baths and bathing, or washing after a day's toil. As long as he is perspiring the skin is comfortable ; but when this secretion is washed away, and the surface dried, there is a sensation of heat, dryness, and harshness, which continues until the perspiration again breaks forth. In some this condition is sufficiently marked to give rise to the idea of erysipelas supervening, and I know two or three individuals to whom this has so frequently happened, that they shun all ablutions after great exposure to heat.

In considering the real value of the various forms of medicines we employ, there is one class which we cannot pass by without extended notice ; they are used for their special rather than for their general effects, and from their apparently definite action they have received the name of *specifics*.

A consideration of this subject involves four points: the meaning of the term; the *modus operandi* of specifics; our selection of them; and the doses in which they should be used.

1. The word specific is meant to designate a medicine which in the main is so precise in its effects that we can predicate them, or one which produces a definite curative action upon any particular disease.

Thus, ergot of rye is said to have a *specific action* on the uterus during parturition, and quinine and colchicum are spoken of as *specifics* for ague and gout.

2. An examination into the *modus operandi* of specifics involves us in a wide inquiry. We have to ascertain why mercury is supposed to be a specific against syphilis; quinine and arsenic against ague; sarsaparilla against "secondaries;" colchicum against gout; iodine against scrofula; sulphur against scabies; opium against pain; aconite against rheumatism; strychnia against paralysis; lemon juice against acute rheumatism; iodide of potassium against periostitis; bromide of potassium against enlarged spleen; assafœtida and musk against flatulent spasms; and bismuth against painful dyspepsia. Why ergot of rye accelerates parturition; why belladonna dilates the pupils of the eye; why camphor is a specific against priapism, and if held continuously in the mouth is equally specific against cynanche; why guaiacum is said to be equally specific against quinsy; quinine against tic; turpentine against internal hæmorrhage and purpura; alum against lead 'colic;' fresh vegetables against scurvy, &c. &c.

We will not stop to inquire whether all these we have named really deserve the name they have received, for that would involve a dissertation which would extend this essay beyond reasonable limits. Let it be taken for granted that

some of the list are worthy of the name. Can we approximate to the reason why their effects should be specific? Let us endeavour to do so by systematizing our knowledge. We know (1) that certain mineral poisons accumulate in some organs more than others, and we infer that vegetable poisons do the same; and assuming that there are malarious poisons we infer that they are not exceptions to the above rule.

(2) We believe that a poison so accumulated in any organ affects its functions, &c., more than those of other organs which contain a less amount.

(3) We believe that an organ whose functions are interfered with in one way by poison or drug, may also be influenced in another way by another drug or poison.

(4) We infer that if we can find any substance whose action on an organ is contrary to that produced by another drug or poison, we may *comparatively* neutralise the effects of both.

From this train of reasoning we come to the opinion that specifics act by modifying the condition of the organism in an opposite way to what it is, or has been, modified by the cause of disease.

The older idea that specifics entered the blood and tissues, and there sought out the mischief-makers and destroyed them, is clearly untenable.

Quinine may cure ague, yet the poison remains in the system, and may appear again when the drug is suspended. Mercury may seem to cure infantile syphilis for a time, yet after a period the symptoms will again break out. Colchicum may keep gout in check and prevent a fit, yet it cannot be said to annihilate the poison entirely, or even to neutralise it completely.

This idea receives corroboration from the facts we have already referred to, viz., that a large dose of colchicum will have less effect than a small one, and that a fit of ague will come

on even when the patient has all the signs of cinchonism. If the specific destroys or neutralises the poison this could not happen, for the larger the dose the more complete the destruction should be, and it is just the reverse.

3. Concluding, then, as we cannot fail to do from what has gone before, that there are a certain number of drugs which have special actions and produce definite effects, it becomes a matter of importance to ascertain the principles which should guide us in the selection of any of these special medicines under any given circumstances. Two leading principles offer themselves to our notice ; the one sanctioned by time and prolonged experience, while the other is of recent origin. To the former the name of allopathy has been given, to the latter homœopathy.

As the latter is proposed to us as an amendment on the former, we will consider its claims the first.

Without going into the history of the theory, or the changes which have taken place in the practice of its professors since it was first promulgated, we may say that the following are the doctrines taught by the new school. They hold that two diseases from opposite causes cannot coexist in the body ; that drugs produce diseases in the same way as do the small-pox and other miasms ; that as we recognise ordinary diseases by their symptoms, so we must recognise drug diseases by the symptoms they produce ; and that the superinducement of a drug disease puts a stop to the disease arising from another source. The next doctrine is the one which has given the name to the sect. The followers of Hahnemann hold that it is the best plan to use a drug which shall produce symptoms similar to those characterising the disease for which it is prescribed (*ὁμοίος πάθος*, the same suffering). It is also held that the dose of the drug employed must be sufficient to establish a disease of lower intensity to

the one already present. Beyond this the doctrine is not now carried, the transparent absurdities of its early days being now generally abandoned.

The observations upon which the doctrine is founded are, shortly, the following. Blisters which produce external inflammation are used to cure internal phlegmasiæ. Snow is applied to a frost-bitten part to restore it to life. Heat is used to take away the pain of a burn. Arsenic and iodide of potassium, which will in excess produce cutaneous eruptions, are employed to cure eczema, lepra, and the like. An argentine solution, which will produce inflammation for a time in a healthy eye, will cure an inflamed conjunctiva. Opium, which has been known, when taken largely, to produce delirium tremens, has long been the most popular drug for its cure. Laudanum has been taken ere now by those who indulged in drink, to produce a temporary sobriety; and brandy or ether, which in large quantities will produce coma, has been used to keep alive those who are comatose from too much laudanum.*

* A young girl was brought into King's College Hospital about sixteen years ago, who had taken an ounce of laudanum twelve hours before her admission. I was then a clinical clerk, and took special interest in the case. The house-surgeon at first used the stomach pump, but nothing was found; he then injected an ounce of liquor ammoniæ in a pint of water. She was subsequently bled from the jugular to four ounces; had sinapisms applied to the legs, and turpentine enemata to the rectum; the soles of the feet were slapped by a wet towel, and she was made to inhale oxygen; but she got steadily worse, and in six hours after her admission seemed to be sinking rapidly. As I had, when a schoolboy, tried the effects of inhaling ether, I proposed the remedy for adoption; it was tried, and the result was an instant amelioration of the symptoms; the coma became less profound, and the pulse became perceptible at the wrist. The inhalation was kept up at intervals for two hours, and two ounces of spirit of sulphuric ether were inhaled; at the end of that

Turpentine,* which will in many produce hæmaturia, will cure it in others. The use of aperients in diarrhœa and cholera has frequently been advocated by the orthodox of the old school, and by the same individuals opium may have been used to "open the bowels." Belladonna, it has been averred, which produces in the healthy redness of the face and constriction of the throat, is specially serviceable in erysipelas of the head and cynanche; and various accounts are referred to, where the use of snuff has cured sneezing, ipecaeuana vomiting, and where ergot of rye has prevented a miscarriage.

time the circulation was vigorous; the breathing was strong and regular; the power of swallowing had returned; she was sensitive to "fleeing" of the soles of the feet, and the comatose condition had merged into profound sleep. She took the poison on Saturday night, and awoke to consciousness on Wednesday morning. She suffered, however, for three months subsequently from the effects of the ammonia and turpentine and sinapisms.

* John P., æt. 30, a marine, came under my care at the Liverpool Northern Hospital, with hæmaturia. He told me, that about two years previously, while he was carrying with another man a box containing two sixty-eight pound shot, he fell down, and the box "at top of him," striking him in the left hypochondriac region. From that day he had passed much blood with his urine. He had been in various hospitals, without success. The constant drain had enfeebled him, but beyond this, and the hæmaturia, there were no tangible signs of disease. Being desirous to test the influence of turpentine (which is so useful a remedy in hæmorrhage generally), I ordered him twenty-four minims daily. The bleeding ceased at once; but on the fourth day strangury was much complained of, and the drug was discontinued. In three days hæmaturia reappeared. The turpentine was again exhibited, in doses of five minims, three times a day. Under the use of this the bleeding disappeared; no strangury was produced, and at the end of three weeks from the resumption of the turpentine, the man was discharged cured; having been, for a week prior to his leaving us, without any medicine, or any return of the hæmaturia.

In addition to these, much ingenuity has been expended to prove that quina produces symptoms like ague, colchicum the signs of gout, and antimony the signs of fever.

To any impartial inquirer it is marvellous how any one could build up a theory from so meagre an array of statements.

A very short investigation shows that the observations relied on are not facts. Blisters aggravate acute inflammations; ice at zero will not restore a frost-bitten hand; heat only takes away the pain of a burn by insuring the more rapid death of the part originally injured; opium is not the best cure for delirium tremens or intoxication, nor alcohol for poisoning by laudanum; quinine never yet produced the symptoms of ague, or colchicum those of gout; savine ointment never yet healed a sore made by the application of cantharides, nor did the use of antimony overcome the nausea induced by tobacco. Diaphoretics do not cure sweating, nor are purgatives the most certain cure for diarrhœa.

The dogma, then, of Hahnemann cannot be supported on rational grounds, or by a rigid appeal to experience.

This abegnation is of wider application than is generally supposed, for it applies as distinctly to tenets held before homœopaths existed as a sect, as to those current amongst them now.

Let us glance at a few instances in which practitioners of the old school have attempted to cure disease by using means which produce similar effects to the disease. Measles, small-pox, scarlatina, produce heat of surface and a rash upon the skin, and patients have been stewed in a manner calculated to make the skin hot and red if it had been cool. Rheumatic fever is attended with sweating; the patients were treated with diaphoretics. Diarrhœa, dysentery, and cholera have been, and still are by many, treated with aperients.

Convulsions have been treated by copious bleedings (which produce them); and we may say, on the authority of the late Dr. Goode, that coma from inanition has been treated by bleeding and purgation. What more common at the present day even, than to give expectorants for bronchitis in which expectoration is already excessive, and to starve "a cold," which of itself produces a feeling of shivering and debility. How many are there who would consider themselves insulted, if they were to be classed as homœopaths, who nevertheless consider that cutting a vein in the arm is the best cure for a broken vein in the lungs, and a hole in the *temporal* the appropriate remedy for a hole in a *cerebral* artery, and a depressing dose of antimony the proper medicine during a depressing fever.

If, then, the "imitation of nature" theory be untenable, is that more trustworthy which has been designated allopathy? Is it, as a general rule, judicious during illness to employ means which produce an effect on the organism directly opposed to that produced by the cause of the disease?

We have already answered this question pretty fully in the affirmative, so far as relates to diseases of poison origin, in Chapter IV. ; but we may strengthen the position there assumed by some further considerations. Pain and the passage of galvanic shocks keep an individual awake, green tea does the same, and these, experience tells us, are the best means to restore a person who is comatose from opium; and conversely, opium, which stupifies, is one of the best drugs we know for the relief of pain. Opium generally diminishes secretion; and experience proves its value in diarrhœa, diabetes, erysipelatous, and even in bronchitis. Fainting is staved off by stimulants. Brandy gives a temporary courage, and conversely, sudden fear makes a drunken man sober. The effects of tobacco, antimony, hydrocyanic acid,

snake poison, &c., produce intense depression ; stimulants given with unsparing hand will counteract this, and assist in preserving life.

We have already shown that the sweating skin and profuse secretion from the lungs in bronchitis are more successfully treated by roborants and tonics which tend to dry the skin, than by copious warm libations which would keep it moist. We know that we attempt to relieve local plethora by driving the blood away ; chordee by camphor rather than cayenne ; and scurvy by fresh vegetables instead of stale provisions. For a rigid os uteri we prefer opium to ergot ; and for vomiting, chloroform, brandy, and champagne are better than ipecacuan, antimony, or other emetics. Astringents cure more cases of diarrhœa than do aperients ; and when a corrosive poison has been taken opium is superior to cantharides. A lady who has been brought to the verge of miscarriage by exercise on foot is more frequently cured by rest on a sofa, than by jolting in a carriage or riding on horseback. And if we wish to keep awake we prefer green tea to laudanum or whisky toddy.

The only exception to this law which occurs to us is, where a physician gives wine or other stimulant to a fever patient. Once it was the common practice to give antimony and febrifuge mixtures, which produced a depressing effect, to those who were ill with fever ; but a more prolonged experience has led most practitioners to doubt the correctness of the practice. The argument now runs thus : fever is the result of a depressing agency ; it is itself exhausting in its effects ; and this it is which must be opposed, and not the mere symptoms which seem to indicate increased power. Such symptoms as heat of skin, &c., are still treated by cold sponging, airy rooms, &c. The exception, therefore, is more apparent than real.

We conclude, therefore, that in his search for some means for alleviating any particular disease or symptom, it is more rational and more consonant with an enlightened experience to seek amongst those things which would produce an *opposite* rather than an *analogous* effect.

4. We next come to speak of the dose of any medicine which ought to be administered when an appropriate selection has been made.

On this point there is much difference, both in principle and practice. Some specifics are used by practitioners as if it were their duty to give them with a lavish hand ; while others are used very sparingly. Thus, in acute rheumatism, the patient is recommended to take as much lime-juice as he can, while in gout the amount of colchicum given is reduced to the very smallest quantity available.

This difference, however, did not always exist, nor is it attended to by all even now, for many persons still use all specifics as if it were impossible for the patient to have too much of a good thing. Hence we hear occasionally of individuals dying from an over-dose of colchicum, used for the relief of gout ; of skin diseases induced by the use of large quantities of iodide of potassium, employed for secondary syphilis ; and we have heard, in France, of a patient dying from an over-dose of quinine, given for the cure of a malarious disease. There are few who have not known instances of the abuse of mercury and arsenic.

In cases where specifics are employed, there is no general rule by which the amount of the dose can be regulated. Each stands on its own merits, and careful empiricism alone can teach the requisite quantity. Experience hitherto has demonstrated that lime-juice in rheumatism can scarcely be given in too large a quantity ; that ague requires about twenty grains of quinine per day, for a week together ; that

two-grain doses of iodide of potassium suffice in periostitis ; that mercury in indurated chancres will produce its specific effect, without giving rise necessarily to salivation ; and that colchicum in gout does more good when it does not produce vomiting and purging, than when it does ; while for the relief of pain, the dose of opium has, during its continuance, steadily to be augmented. So it is with all medicines—the amount must ever be proportionate to the individual, and the effect to be produced.*

* The remarks made by Hufeland respecting the doctrines of Hahnemann may be appropriately introduced here. They are evidence of great mental sagacity (I quote them from Fletcher's Physiology, edited by Dr. Drysdale and Russell, Edinburgh, 1842). He says, The beneficial consequences to be expected from this system (homœopathy) are—

1. This system will make physicians more attentive to the somewhat neglected semeiology.
 2. It will make the young physicians more attentive to diet.
 3. It will shake the belief of many physicians on the necessity for such immense doses of medicines as are at present given.
 4. It will introduce more simplicity in the making of prescriptions.
 5. It will lead to a more certain proving and acquaintance with medicines, which it has already done.
 6. It will direct attention to the preparation of medicines.
 7. *It will in no case do positive injury.*
 8. It will give the system more time to rest, and to recover itself undisturbed.
 9. It will immensely decrease the expense of the cure.
- II. Injurious consequences :
1. It may be apt to lead the less educated physicians to a symptomatic treatment.
 2. It will, if universally prevalent, injure the fundamental studies of medicine.
 3. It may introduce the most dangerous carelessness.
 4. It will make the physician the dispenser, &c. . . .
 5. It denies in its principles the efficiency of the *vis medicatrix nature*, &c.
- Since Hufeland's time, it is unquestionable that the olden medical

practice has been altered in the way he indicates, and that it is still undergoing change; it is equally true that the professors of the new doctrine have, in the main, fallen into the errors Hufeland foresaw; and we have ladies, clergymen, lawyers, traders, asserting their equality as physicians with the regular professors; nor have the more shining lights amongst the homœopathists been able to retain an ordinary amount of confidence, without modifying materially both the principle and practice of their early days. We believe, that in the course of time homœopathy will die out, but it will not do so until thoroughly rational principles of medicine are taught in our schools, and enforced in our practice. Competition amongst rival schools and professors will, we think, do far more good to medicine than that spirit of ancient *Guildism* which taboos all original research and all new doctrines, and which would transform us into Medical Trade-Unionists, tied down to respect and adore the past rather than to improve the present and adorn the future.

CHAPTER XX.

COUNTER-IRRITANTS.

Are there local means for improving the vital condition of parts of the body?—Counter-irritants—Popular notion respecting them—The question put—*Pros* and *cons*—The action of irritants—Proof of cutaneous absorption—Irritants applied to surface affect deeply-seated parts—Blisters, &c., really useful—Under what circumstances—Rules for guidance—Superiority of definite ideas over superficial notions.

WE have hitherto been speaking of medicines which, when taken internally, seem to have an influence in increasing or improving the vital force generally. The subject is not yet exhausted, but it would swell out the book to an unnecessary size were we to dwell upon it at greater length. We propose now to investigate whether there are any means for restoring or improving the vitality of particular parts when it is low. This will lead us to discuss the subject of counter-irritation generally, and its true position in the medical art.

I think we may fairly assume, after what has gone before, that there is deficient vitality in any part which is on its road to death, as contradistinguished from a state of health. An ulcer of the leg and the parts around,—a chilblain, produced by a degree of cold, which, if more intense, would have produced mortification—an organ, or any part, in a state of

chronic inflammation—the throat in diphtheria, the skin in erysipelas, a swelled gland in a scrofulous child, a strumous ulcer of the larynx, and the conjunctiva in scrofulous ophthalmia, are all of them proofs of deficient local vitality.

If we inquire what there is in common to all these, we shall find that there is, in all, a deficient circulation through the blood-vessels, and an increase in the quantity of the blood contained in the part. The capillaries are increased in size, and healthy nutrition is diminished.

This being so, we infer, that if we can reduce the enlarged capillaries to their healthy size, and restore the circulation to its natural state, we shall *pro tanto* improve the condition of the part. We can effect this purpose in two ways—one, by using mechanical contrivances; the other, by employing chemical stimulants.

Experience tells us, that the condition of an ulcerated leg is improved, and the part cured, by the patient laying it up on a level with his body, so as to favour the return of venous blood. It may frequently be cured by “strapping” alone, which, to a great extent, empties the vessels of their superfluous blood, and prevents its re-accumulation.

In my own practice, I have known steady pressure by india-rubber cure a white swelling of the knee. The same will promote the cure of chronic, and even acute orchitis. Pressure, too, has been considered serviceable in cases of cancer of the mamma. The mechanical pressure produced by the gradual drying of collodion will, in the majority of cases, cure erythema or erysipelas at once, and there are some cases recorded where a similar application has rendered small-pox pustules abortive. Mechanical pressure will cure a chilblain; and a head aching with the intensity so common after losses of blood, is comforted by the use of a tight bandage round the temples.

But there are parts to which such mechanical contrivances are inapplicable ; we cannot compress an inflamed lung, or even an inflamed urethra, or vagina in gonorrhœa ; nor can we by any contrivance compress the conjunctiva in strumous ophthalmia.

We must then examine whether there are other means by which the same object can be effected. Two readily present themselves to our notice. One, a class of drugs which, when applied to the skin, have a tendency to shrivel it up, and make leather of it, and go by the name of "astringents ;" the other, a class which, when applied to the healthy skin, irritate and inflame it, which are classed as stimulants, acrids, or irritants.

The former have not much influence for good, and though occasionally used, are little trusted to.

The latter are of very general application. What do we know of them ? We know that when applied to such transparent parts as the web of a frog's foot, or a bat's wing, they first produce a contraction of the capillaries, then the blood in them subsequently becomes stationary, and ultimately there is a great distension of the vessels, a great increase in the quantity of blood in them, and an almost complete stoppage of the usual blood current through them. We know, that if used in excess, acrids will absolutely destroy the parts to which they are applied ; when applied in moderate quantity to parts already inflamed and weakened, we know that they produce severe pain for a short time, sometimes an increased discharge, and then we commonly see that the part shows a tendency to improvement. The vessels are swollen and contain less blood. This improvement is commonly transient, but in some instances it continues until the part has recovered its healthy condition.

It is somewhat doubtful whether we must attribute this

to a change in the *blood-vessels*, or in the different condition of the parts they supply,—the *solid tissues*, as they are commonly called ; but we accept the fact, that local stimulants, within certain limits, help, temporarily, to restore vitality to weakened parts, just as much as general stimulants, like alcohol and ammonia, give temporary power to the whole frame.

A host of illustrations might be brought up to prove this ; we pass them by to remark, that all stimulants have not an equally beneficial effect. Sulphate of zinc is preferred before sulphate of copper, and nitrate of silver to cantharides. This leads us to infer, that the nature of the stimulant must be considered as well as its irritant property, and to conclude that when a good effect is produced it is brought about by some other influence than that of simply provoking capillary contraction.

Be this as it may, all allow that local stimuli affect beneficially those parts which, from any cause, have had their vitality impaired.

We shall next investigate the bearing of this fact upon the doctrine of *counter-irritation*. I cannot do this better than by reproducing a short essay read before a branch meeting of the British Medical Association and printed in the *British Medical Journal*, July 24th, 1858 :—

There is at the present day a wide-spread doubt respecting the doctrine of counter-irritation generally, and the use of blisters particularly. It is argued, and very justly, that if blisters act simply as derivatives or revulsives, it would be the most judicious plan to apply them at a considerable distance from the diseased spots ; and yet, as a general rule, experience proves that their value is in proportion to the *nearness* of the counter-irritant to the part affected. But still greater doubts are entertained about the doctrine, “ that

the supervention of one disease is efficacious in curing another." In endeavouring to clear up these doubts, we must inquire into the following points:—1. Is the dogma above referred to *true*? 2. Do blisters, &c., really do good in internal diseases? 3. Do they act beneficially because they are counter-irritants; or can their effects be more rationally accounted for in another way? 4. Are there any rules to guide us for their application?

That the dogma is true *to a certain extent*, there can be no reasonable denial. We are many of us familiar with the phenomena of metastasis in disease. I myself have seen a white swelling of the knee get suddenly well, while the lungs have as rapidly become affected fatally; both phenomena taking place in the same fortnight. Hydrocephalus may be replaced by cervical abscesses. I have seen erysipelas in the foot get well *pari passu* with the invasion of phrenitis; then the erysipelas has reappeared, but in the calf of the leg, the head symptoms getting well; the disease has again left the leg, and invaded the peritoneum; and has again left this to settle over the shin-bone. I have seen recovery from jaundice followed by a cutaneous eruption, and gout in the stomach replaced by gout in the toe. Swelled testicle may supervene on cessation of gonorrhœal discharge; and suction of the mamma in a woman, recently confined, will produce uterine contraction; pneumonia will sometimes terminate in some critical discharge;* and a monthly hæmoptysis may replace the usual uterine flow. Other instances will occur to many of my readers.

On the contrary, however, there is abundant proof that the supervention of a second disease may occur without any

* *Vide* Dr. Boling's remarks on the use of antimony in pneumonia, p. 330 *ante*.

beneficial influence over a preceding one. Thus, ulceration of the bowels will not cure pulmonary consumption; gout in the right will not ameliorate gout in the left foot; diabetes will not cure ascites from diseased liver; injury or traction on the mamma will not produce contraction of the uterus before the normal time for parturition; erysipelas of the skin of the face will not prevent its affecting the brain. I have known epileptic patients to be terribly burned or scalded without benefit to the complaint. Sore-throat will not cure syphilitic lepra, nor will an irritant to the urethra cure swelled testicle; pruritus vulvæ is compatible with increasing uterine disease, and nettle-rash with ulcer of the stomach; and we may add, that setons, moxas, issues, once so common and so vigorously supported on theoretical grounds, are now, when common sense and close observation are in the ascendant, rarely employed, few persons, if any, being able to rely upon them.

Although we do not hold that the dogma is universally or even generally true, we will grant, for the sake of argument, that there is a limited amount of truth in it, and we then ask if it can explain the *modus operandi* of counter-irritants? Does it explain why a blister will increase an acute disease, and cure a chronic one? why a blister to the side in chronic pleurisy will do more good than a brisk cathartic, *i. e.* a blister to the bowels? Why a blister to the head in typhoid coma will rouse a patient who was utterly insensible to the presence of a bed-sore? And lastly, if the doctrine be true, ought it not to lead us to use counter-irritants in every disease, no matter what its nature?—a plan the absurdity of which none of us could fail to see.

There being, then, grave reasons for considering the ordinary doctrines respecting counter-irritants, or revulsives, to

be untenable, it becomes necessary to inquire whether their operation may not be explained in some other way. The present doctrine is mysterious, and makes great demands upon our medical faith, or rather credulity. In seeking another, we must carefully follow the dictates of observation, analogy, reason, and experience.

I propose to commence by a consideration of the action of certain agents when applied to the skin. We shall then be in a position to deduce some law or principle of action applicable to counter-irritants generally, and to show the practical superiority of the new doctrine over the old.

Without further preface, then, we inquire, what is the action of certain well-known agents when applied to the skin? We begin with arsenic, whose presence can be so well detected by the chemist. Experience tells us that, in the form of arsenical paste, it produces a deep slough of the part to which it is applied; and that, notwithstanding the influence it has upon this tissue, a portion finds its way through the skin, and is thus absorbed into the system, the largest portion remaining in the solids nearest to the slough, while a smaller portion passes into the blood, and with it to all parts of the body, sometimes in a fatally poisonous quantity.

The effects of the poison are most intense in the immediate vicinity of the application, but are severe elsewhere: where a smaller quantity of arsenic is employed, its influence is felt only in the part and its immediate vicinity. Thus Taylor relates a case of a man who accidentally used some arsenical ointment to his anus for piles; next day, both the anus and scrotum were inflamed, many pustules were formed, and the matter they contained yielded arsenious acid on analysis. Pereira relates another, where a woman used an arsenical ointment to the scalp. It produced great swelling

of the head ; and in about six or seven days, enlargement of the ears, and of the glands of the jaw and neck. The face was in a sort of erysipelalous inflammation ; and, in addition, there were vertigo, fainting, vomiting, ardor urinæ, &c. In a few days more, the hands and feet were covered with pimples, but she recovered ultimately.

Here, then, we have distinct proof of an irritant being absorbed, and operating *principally* in the vicinity of the original application, and more moderately elsewhere. We see another illustration of the same fact in those cases where local palsy arises from local contact with lead, without there being any other distinct sign of the operation of the poison on the system generally.

Taylor records cases where bichloride of mercury, topically applied, has produced violent local symptoms in the first place, and severe intestinal disease in the second. Pereira gives others where the nitrate of mercury, used locally as a caustic, has been absorbed, with fatal effects on the alimentary canal. Tartar emetic, in the same way, when applied to the skin, produces first a local effect ; but, in some few instances, it produces a secondary effect, such as nausea and vomiting. In like manner, I have met with instances in which croton-oil liniment applied to the skin has produced purging, and this not only in the person rubbed, but in the rubber. Mr. B. told me that friction with this material had been recommended, and that his wife used to rub it in, but had to give it up, she was so much purged by it. He was in every way unaffected. On a subsequent occasion, however, he was narcotised by the local use of morphia ointment.

We do not, however, confine our observations to caustics and irritants : we may refer to milder remedies, which, when applied to the skin, have, firstly, a definite action on

the neighbouring parts, and secondly, on the system generally.

Dr. Ward, of Manchester, in 1809, called attention to the ease with which opium might be introduced into the system, and produce its characteristic effects by means of friction on the skin. I have myself had much experience of laudanum, morphia, and other epithems ;* and have repeatedly noticed,

* A. B., æt. 4; had intense ear-ache, with scarlatina; pain cured by the local use of morphia ointment (gr. iv. to ʒj); and child narcotised—no internal medicine used.

C. D., man, 30; lead colic very severe; morphia by the mouth useless; relief by morphia lotion (gr. iv. to ʒj); man intermitted its use occasionally, to ascertain the real value of the application.

E. F., man, 45; the same experience as the preceding.

G. H., lady, 60; intense spasmodic pain of stomach from indigestion; all remedies taken internally failed; complete relief always followed the application of an epithem of pure laudanum to the epigastrium in about thirty or forty minutes.

I. J., lady; 35; had dysphagia from myalgia of pharyngeal muscles; relief from the use of morphia ointment was complete.

K. L., boy, æt. 14; inflammatory pleurodyne; pain checked completely by an epithem of pure laudanum.

M. N., boy, æt. 7; vomiting for three days; signs of intestinal obstruction; epithem of laudanum; immediate relief; bowels opened next day without medicine.

O. P., man, 64; intense sciatica; cured by painting the limb over the painful spot with tincture of aconite; no internal medicine employed.

Q. R., lad, 12; very severe frontal tic; complete relief from morphia ointment; recurrence of pain from exposure; influence of local narcotics gone.

S. T., man, 64; intense public myalgia; relieved in two hours by a belladonna ointment.

U. V., woman, 18; severe pain in spinous ligaments from gibbous distortion of back; relief first from morphia locally applied, then from belladonna.

W. X., girl, æt. 19; intense general head-ache; not relieved by internal medicines; cured by the use of morphia lotion to scalp in

first a local, subsequently a general effect. The late Mr. Shaw of Cheltenham was in the habit of treating sciatica by the application of a plaster composed of opium, belladonna, colchicum, and resin, to the whole of the lower extremity; and he invariably found that it relieved the local pain in the first place, and affected the system in the second. Applied near the eye, belladonna produces a local effect only, as the absorbing surface is small, and the part soon dries; but when applied to the os uteri on a larger surface, and kept constantly moist, constitutional effects often follow the local ones.

I have been informed of one instance in which a young man was affected with very severe characteristic symptoms of poisoning by belladonna, in consequence of the profuse application of the drug to the penis and scrotum to relieve the pain of chordee.

I next pass on to a substance which we can trace by the eye—nitrate of silver. I know a gentleman whose face has been rendered of a blue or slate colour by the continued application of very strong argentine solutions to the unbroken fauces; the hands do not partake of the same tint.

There can be no doubt of the facility with which mercury may be introduced into the system through the skin, as inunction is habitually resorted to whenever a very rapid salivation is required.

I have already adverted to instances in which the action three days; lotion produced a slight cutaneous eruption, like that produced by the use of linseed-meal poultices.

Y. Z. Value of turpentine cutaneously applied. Lady, æt. 30. Hæmaturia, excessive nausea and vomiting; some malignant disease of kidney expected; all internal remedies useless, and produced vomiting. Turpentine liniment rubbed over the back twice daily; hæmaturia cured in thirty-six hours, and all other symptoms abated.

of lead, locally applied, has been manifested by local palsy, without any general effects upon the system. There are many others in which its cutaneous absorption has been followed by general effects.

From these facts, I consider that we may enunciate the following law, viz. :—*Any material capable of being absorbed through the skin acts primarily and most energetically on the spot to which it is applied, and on the parts in its vicinity ; and secondly, and more mildly, on the system generally.*

We may next inquire whether the most popular counter-irritants form any exception to it. I will begin with cantharidine. There is abundant proof of its local vesicating powers. There is tolerably good proof also that it is absorbed, and produces irritating effects on the neighbouring tissues. Thus we learn from experiment,* that blisters applied to the thorax and abdomen of dogs and rabbits will produce redness and absolute inflammation of the pleura and peritoneum, in patches distinctly corresponding to the vesicated surface of the skin. My friend Dr. Cameron has seen, after death, vascularity of the pleura in men, corresponding with blisters applied to the side a short time before death. He has met with cases in which a friction-sound has followed their application to the thorax within twenty-four hours after their use, no such sound having been audible before. Another physician has seen a patch of lung inflamed, of the precise dimensions of a blister applied to the side. I myself know an individual in whom the use of a blister is always followed by crops of boils, which begin in the neighbourhood of the vesication, and spread far and wide. Pereira has seen eczema and ecthyma from a similar cause. Sometimes the absorbed

* Dr. Nottingham, of this town, tells me that he made a series of experiments, many years ago, which distinctly proved this. He has recently repeated them with like results.

vesicant produces extensive inflammation and gangrene of the skin—an occurrence most common in children and other delicate persons in whom the skin is thin, and cutaneous absorption active. Of the ultimate absorption of the cantharidine into the system, and its influence on the kidneys, I need not speak, as the facts are more or less familiar to us all.

In like manner, iodine paint has a direct local action on the part to which it is applied; and its presence may subsequently be detected in the urine, as I have ascertained by direct experiments carried on under my direction by Mr. Davies, the late junior house-surgeon of the Liverpool Northern Hospital. The same may be said of turpentine epithems: the material is absorbed, and acts directly upon the parts below (as on the intestines, when it is applied to the abdomen for meteorismus), and may subsequently be found in the breath and urine. Ammonia operates in the same way: mustard we cannot well trace, though there is no doubt of its absorption through the skin.

From these considerations, we infer—1. That the counter-irritants commonly in use are *direct irritants to the part to which they are applied*; 2. *That their acrid principle is absorbed, and acts in the milder form of a stimulant in the immediate neighbourhood of its introduction*; and 3. That it enters the circulation, and affects distant organs.

To make our meaning clear, let us take nitrate of silver for an example. When rubbed for a long period on the well-wetted skin it produces a slough; or when used more sparingly, as in erysipelas, it acts primarily as a *vesicant*; but a portion of it is absorbed, and diluted by the cutaneous fluids; thus the inflamed skin, smeared over by the caustic, becomes permeated by a material analogous, say, to a five or ten grain solution of the caustic.

By this it will be seen that we attribute the effects produced by blisters to the amount and influence of the material absorbed, and not to the vesication, "derivation," "counter-irritation," "revulsion," "diseased action," &c., which they cause on the surface of the body. We infer that, if the irritant absorbed meet with a recently or acutely inflamed tissue, it will increase the mischief; while on the other hand, if it meet with a tissue in a state of atonic inflammation, it will do good.

I believe that counter-irritants operate on deep-scated tissues in the same way as stimulating lotions, &c., do upon superficial parts. Thus where the vessels of the face are in a state of active inflammation, as in eczema faciei, a weak solution of the bichloride of mercury will aggravate the evil greatly; but where the vessels are in a state of passive congestion, as in chilblain, the same solution is of signal service.

In a healthy eye, the daily use of vinum opii, or other irritant, would produce inflammation. In the same eye, in the early stage of ophthalmia, a stimulant would increase the mischief; while at a later stage the surgeon would use it, with full confidence of success, to bring back the organ to its original healthy condition.

Again, we know that if we use a blister to an acute bubo, we increase the intensity of the inflammation; whereas the same remedy, applied to one in a chronic condition, will effect, in many instances, its speedy cure. The same may be said of iodine paint.

If we turn to surgical authorities for their experience of inflammatory affections near the surface, we read similar observations. Is the knee-joint *acutely* inflamed?—blisters are said to be "inadmissible." Is the disease *chronic*?—we then read, "Blisters are as serviceable in the chronic as they

are detrimental in the acute disease. Is a sprain recent, the assiduous use of rubefaciens augments the pain, the inflammation, and the subsequent danger of disease of the joint. Is the sprain old, the same rubefaciens will promote a restoration of the parts to a healthy state.

Other examples might be cited, drawn from experience in such diseases as gonorrhœa, eezema, eethyma, gout, abscess, ulcer, and the like ; but I think it scarcely necessary to adduce more evidence to prove that the stimulation which is prejudicial in the early stage of inflammation may be, and generally is, of the greatest service in the latter stage ; and that this is equally true, whether the stimulant be *directly* applied by the hand of the surgeon, or *indirectly by cutaneous absorption*.

Let us now run rapidly over a few diseases in which blisters are empirically employed, and endeavour to see whether these remarks are applicable to them.

1. Blisters near the eye do harm in the acute stages of iritis, ophthalmia, and scleritis. They do good in the later stages, when the disease is chronic, provided they are not placed too near the globe.

2. Blisters to the throat are almost invariably prejudicial in the early stages of erup.

But such stimulating epithems as turpentine, are of great service when a patient is suffering from such an atonic condition of the throat, &c., as is found in diphtheria.

3. Blisters do harm in the early stages of pleurisy, pneumonia, and pericarditis. They do good in the later stages — at that period, in fact, *in which, could direct means be applied, we should employ a solution of sulphate of zinc or of nitrate of silver to the inflamed surface*.

4. Blisters occasionally do good in bronchitis. When they do, the advantage gained is not immediate ; it rarely begins

until twenty-four hours after the blister has risen, and when the cantharidine has had ample time for absorption and for circulation through the blood-vessels.

This view of the action of blisters in bronchitis is borne out by the advantage derived occasionally in that complaint by the internal administration of such stimuli as turpentine, balsams, warm gums, essential oils, arsenic, iodide of potassium, and other drugs, which permeate the system, and have locally stimulating effects. A blister will do as much harm in bronchitis in the early stage, as will alcohol, copaiba, and myrrh; and as much good in the later, as will wine, ammoniacum, ammonia, and polygala.

5. Blisters are positively injurious in peritonitis, and in all its stages; we have seen that they will actually produce the disease in dogs and rabbits. This is accounted for by the thinness of the abdominal parietes.

6. They are equally injurious in recent gonorrhœa and orchitis. They are very serviceable in chronic clap and orchitis.

7. Blisters to the sacrum, and copaiba internally, have a very beneficial influence upon leucorrhœa.

8. Blisters to the head have a decidedly stimulating effect on the brain in the coma attending typhus or hydrocephalus.

In other words, *blisters are prejudicial when the absorption of their cantharidine or stimulating principle brings it into contact with an actively inflamed tissue. They do good whenever that principle meets with an organ in a state of chronic inflammation, such as would be treated by direct stimulation, were it on the surface of the skin.*

We may now say a few words respecting the influence of blisters in relieving simple pain. Their effect is very problematical—1st. Because the number of cases in which

such relief is given are infinitely small ; 2ndly. Because when relief occurs, it is or may be referrible to some other cause. Thus, for example, I have repeatedly seen blisters applied to the side for pleurodyne which has been mistaken for pleurisy ; and as the result has been satisfactory both to the patient and the doctor, the vesicant has had the credit of the cure. But when a blister is so applied, it necessitates the patient lying in bed, and giving absolute rest of the side ; and this it is to which the cure is really due. That this explanation is the true one may readily be proved by any careful observer, for if, instead of applying a blister in these cases, he will strap the side firmly with *two* layers (for *one* does not give sufficient support, and allows too much play for the thoracic muscles) of adhesive plaster, he will cure the pain, even without enforcing rest in bed.

A blister applied for the cure of myalgic pains rarely, if ever, does good, unless it compels the patient to lie in bed. I have, however, seen muscular cramp (phantom tumours) chased from spot to spot all over the abdomen by the application of cantharides ; in which case we have a right to assume that the stimulating principle removed that debilitated condition of the muscular fibre upon which the cramp depended. I have only been able to satisfy myself of a blister having relieved local pain in one instance. The case was one of neuralgia of the scalp, occurring in a patient who was very weak and low from secondary syphilis. The blister used was only an inch in diameter ; it was renewed three times ere the pain went entirely.

If blisters have any influence in removing serous effusions, and of this I entertain no doubt, it is in consequence of their stimulating effect on the diseased membrane, which, *under the influence of debility*, poured out the secretion. A proof of this is to be sought in the beneficial influence of

iodide of potassium and other irritants used internally in chronic pleurisy, ascites, and ovarian dropsy.

If there be any real foundation for the foregoing conclusions, we ought to be able to apply them to other counter-irritants besides blisters. Let us give to each a few words.

Boiling water vesicates the skin readily, but experience proves it as a general rule void of therapeutic power.* Why? Because its influence is confined entirely to the spot to which it is applied.

The actual cautery rarely if ever does good, *unless where it is used for diseases which have their seat so near the surface of the body that the stimulating effect of the heat reaches them readily*. Whenever the diseased portions are deep-seated, it is a matter of great doubt whether the actual cautery is of any more use than an issue or seton would be; and that, to say the least, is very problematical.

The potential cautery, or caustic issue, is by the majority preferred to the actual cautery, or to the use of a seton. We explain this, by supposing that a large portion of the caustic is absorbed, and acts as a direct stimulant to a greater depth than either of the other two forms of counter-irritation.

I have, however, heard another explanation given respecting the *modus operandi* of caustic issues, from more than one observer. They say, it is now established as a fact, that whenever such issues do good in internal diseases, it is not during the time when the issue is recent, but at the period when it is healing. Consequently it is argued, that the issue does not act either as a local stimulant, or a counter-

* Dr. Beddoes was relieved in fits of angina pectoris by hot-water blisters.—J. C.

irritant, but that when it heals, there is a propensity in any neighbouring diseased tissue to heal too. Whichever explanation of the use of issues is adopted, it removes them from the category of true revulsives.

Turpentine is an especial favourite in tympanitis. It is applied extensively to the distended abdomen in fever and other affections, and generally with success. Why? Because it is absorbed through the skin, and acts as a local stimulant upon the atonic bowels, without producing at the same time distressing cutaneous soreness, or without disordering the stomach, as it is apt to do when administered by the mouth. Its prolonged use produces purging.

Iodine, in its various forms, is a counter-irritant of great efficacy, and is useful in direct proportion to the nearness with which it can be applied to the diseased parts. It is especially serviceable in enlarged bursæ and ganglia, in buboes, in nodes, and in rheumatic affections of the knee, ankle, and wrist joints. That it is absorbed through the skin, and enters the circulation, we have already demonstrated. Equally certain is it that its valuable properties are independent of its producing vesication.

Ammoniacal, terebinthinate, antimonial, crotonic, or other stimulating embrocations, liniments, or ointments, are only serviceable where there is a sluggish or atonic condition in the circulation in the parts below those to which they are applied. Thus, in acute gout, "linimentum ammoniæ" and friction are intolerably painful; yet, when the gout is chronic, they are not only serviceable, but pleasant. So in rheumatic pains, where the joints are hot and burning, no such liniments can be borne; and yet, where the joints are cold and the circulation very languid, their stimulating property gives great relief. This explanation receives corroboration from the fact, that the patient experiences in the latter part of

his complaint as much relief from internal warmth and stimulation as from external.

From this point a very interesting branch inquiry springs, which well deserves attention. If it be true that the influence of counter-irritants depends upon the absorption of the stimulating material, and its direct action on the parts below, it follows that an introduction of the same material into the system by the mouth would have a corresponding effect, provided it could be used *in such quantities that the amount so introduced into the affected part would equal that introduced by direct absorption.*

We have shown that such is really the case in bronchitis, where certain stimulants taken by the mouth are equal in value to that absorbed from a blister. There are, however, very few other instances in which it is possible to introduce by the mouth the required local quantity, on account of the immediate operation of the irritant upon the stomach ; but we constantly find medicines used internally, whose action corresponds to the counter-irritants used externally. Thus, while the surgeon vesicates the penis externally for the cure of gleet, he gives cubebs, copaiba, &c., internally ; while he applies iodine paint to a diseased joint, he gives the same remedy by the mouth ; while he employs turpentine epithems to the abdomen for tympanitis, he uses it internally as an enema, and gives at the same time some more palatable essential oil by the mouth. We apply a blister for chronic pleurisy, and with it as strong an internal dose as possible of iodide of potassium, of whose stimulating properties no one who has noticed its influence on the nostrils can have any doubt.*

* The reason why we employ an irritant externally, and a drug which acts more or less as a local stimulant or irritant on every part of the body to which it is carried, internally, for the purpose of

Again, if it be true that chronic inflammations are benefited by the action of stimulants absorbed through the skin, we ought to find that a similar effect can be brought about by the introduction of an equal quantity of the material into the part—*via* the stomach and blood. Practically, we do so. We find that iodide of potassium, when taken internally to excess, produces a condition in the mucous membrane and in the skin allied to inflammation: in other words, it produces a stimulating effect. As a stimulant we find it doing good in secondary syphilis, when the symptoms are characterized by great debility, ulceration, &c. It is equally useful in skin diseases accompanied by want of tone; and, on the other hand, it is prejudicial whenever there is an acute or recent inflammatory condition present. Arsenic, another local stimulant capable of absorption, and whose presence

forcing an *absorption*, is a problem of difficult solution, more especially because we have been so long accustomed to use certain drugs to stimulate various organs to increased secretion—*e. g.* blue pill and calomel to increase the secretion of the liver; juniper, &c., to increase the secretion of the kidneys; squills to promote secretion from the lungs, and croton oil to increase the secretion from the bowels.

We ask ourselves instinctively, are both these classes of facts true? Do irritants or stimulants (for taken in this sense the words may be used vicariously for each other) promote absorption at one time and secretion at another? We turn to experience for an answer. It tells us that under the local use of iodine paint, inguinal buboes are more readily dissipated than by any other plan; that the same may be said of swelled testicle. We frequently see enlarged bursæ and joints distended by effusion, reduced remarkably by the use of cutaneous irritants. We see distended ovarian sacs reduced considerably by the use of iodide of potassium internally, and the use of iodine externally. We see hydropericardium, hydrothorax, and pleuritic effusions of inflammatory origin diminish in amount under the same plan; and all these facts seem to demonstrate that irritants do, under certain circumstances, promote absorption.

On the other hand, the influence of a grain or two of tartaric or citric acid placed upon the tongue in producing increased flow of

may be demonstrated in every part of the body after a few doses have been taken, acts much in the same way as the iodide of potassium. Copaiba and the turpentine generally are used on the same principle in bronchitis and gonorrhœa; the stimulating portion being absorbed, and acting locally on every part of the body, including that diseased.

In like manner cantharides have been given internally for such diseases as would be treated with stimulating lotions, if they were seated near the surface; as, for example, catarrh of the bladder, and seminal impotence from deficient secretive power.

The next point to which we must turn our attention is, the *duration* of the good effected by a blister, when a definitively good result follows.

Those who have much experience with external inflammation, the influence of iodide of potassium, taken internally, in increasing the flow of nasal mucus, the effect of a blister to the skin, producing increased secretion from the *rate mucosum*, the effect of irritating mucus from a ruptured bowel in producing increased secretion and inflammation of the peritoneum, with the other facts we have before mentioned, prove that irritants will stimulate to increased secretion.

Can we reconcile these facts? Can we explain why cantharidine, which produces increased secretion from the outer surface of the chest, produces increased absorption from the inner? That it is not a simple transference of fluid, a sort of suction through bones, muscle, and skin, may be readily proved by using iodine paint, so as not to vesicate in place of the blister, and noticing that a similar result follows.

To say, as do the homœopaths, that the explanation is to be sought for in the law of nature, "*Similia similibus eurantur*," is simply to state the facts in Latin words instead of English, and to remind us of the old explanation for water rising in a pump, viz., that "nature abhorred a vacuum."

The true explanation, and one that will apply to every instance we have brought forward, is yet a desideratum.

tions, such as ophthalmia, tonsillitis, gonorrhœa, and ulcers generally, are fully alive to the fact that the application of a stimulant *once only* is not sufficient for a cure. They can see day by day the enlarged vessels or thickened membrane reduce in size, so long as the daily stimulant is used; but when this is suspended, the progress towards health is often suspended too. Vinum opii has daily to be used to the eye, turpentine to the abdomen, zinc or other solution to the urethra, and gargles to the throat, to insure perfect success. Each application does good, but no individual one effects the cure. This is not, however, universally true; for we do find occasionally, that one single application of a powerful stimulant suffices to bring back the vessels to a healthy state. Now, is not this precisely what occurs when the stimulation is applied to internal organs by the medium of cutaneous absorption? It is, I believe, a well-established fact, that in chronic inflammation of the knee-joint, a *series* of blisters are as useful as are a *series* of dressings to an ulcerated leg: each successive one does good, but none positively cures. It is the same in chronic pleurisy, glect, or gonorrhœa. The same may be said of the use of repeated vesication in consumption. Each blister is of service, but one is supplemental to another. At the same time it is to be observed that, after one stimulation by a blister, the diseased parts may commence a change which will continue until it reaches health, just as one single injection into a hydrocele will frequently eventuate in a radical cure, though many such injections are occasionally needed.

But blisters are exceedingly sore and painful applications, producing far more lasting inconvenience than the simple application of caustic to an ulcer; and they consequently have a limit to their utility, that limit being the patient's endurance. We are too apt to reason thus:—"I have used

a blister once, and it seemed to do good; but the patient was soon afterwards almost as bad as ever, and therefore I will not try another." We do not, however, argue thus when we dress a sore with "unguentum resinae," or apply zinc solution to an inflamed eye; and yet the cases are strictly parallel. The parallelism of the two being assumed, let us try whether we can extract therefrom a rule of guidance. If we ourselves had an ulcer, every application to which was followed by severe pain and inconvenience for a period of at least three days, and yet produced only a temporary good, should we pertinaciously continue to apply the dressing? or should we endeavour to effect a cure by other and less severe means? For my part, I should prefer the milder plan.

And if blisters, to effect a cure of some internal inflammation or the like, demand a frequent repetition, ought we not to judge in a similar way? Should we not prefer to use milder remedies before going to those of greater severity? If so, a blister, instead of being the first, will be (to use a prevalent metaphor) one of the last of the shafts fired by the doctor; he will exhaust his other remedial armoury ere he has recourse to vesication, instead of resorting to the former only when he loses confidence in the latter.

If the views we have been endeavouring to enunciate are true, corollaries of great practical importance may be drawn from them. If it be true that counter-irritants or blisters act as direct local stimulants in internal inflammations, and are beneficial only when those inflammations are asthenic or chronic; and if it be true (as experience shows) that such inflammations, &c., on the surface of the body, are rendered worse by low diet and depressing remedies, while they are improved by generous diet and tonic medicines—are we not driven to the conclusion, *that the use of counter-irritants*

is incompatible with the antiphlogistic regimen ; and that to use a blister externally, without a judiciously stimulating plan internally, is contrary to sound, rational, and philosophic medicine ?

What is true of blisters is equally true of caustics (when used to form issues), and of rubefacients ; but it is unnecessary to pursue the subject further. We may fairly then conclude—

1. That there is no essential difference, except in degree, between the action of caustics and counter-irritants generally, when applied to the unbroken skin.

2. All caustics, irritants, and other materials applied to the skin, are absorbed in greater or less quantity. They act primarily on the parts to which they are so applied ; secondly, on the neighbourhood ; thirdly, on the system.

3. That blisters, &c., are only useful in those cases in which stimulants would be locally applied by the surgeon, if the parts diseased were on the surface of the body, or within reach of his hand.

4. That blisters, &c., are not essentially different in their *modus operandi* from such stimulants as iodide of potassium, arsenic, copaiba, the warm balsams, essential oils, resins, &c., except in degree. They only differ in the manner of their introduction.

5. That blisters are useful (in appropriate chronic cases) in proportion to the nearness of the diseased organ to the blistered surface.

6. That as a general rule blisters have only a temporary influence ; and that where they are really necessary and useful they require to be repeated.

7. That the application of a vesicating irritant or stimulating material externally involves the idea of there being

local or systemic debility in the sufferer, to correct which such stimulant is applied.

8. That counter-irritants of all kinds are physiologically incompatible with low diet, antimonials, purgatives, or other depressing remedies ; inasmuch as it is manifestly absurd to stimulate locally, and yet depress generally.

9. That the law to guide us in our use of blisters is this :—Whenever we should use a stimulant to an internal organ, *if we could reach it with our hand directly*, we may expect to find a good result from the use of such counter-irritants as cantharides, *which will reach it indirectly*.

Startling as these views may appear to many, I believe that they will be found more trustworthy than the older doctrines, which referred the curative value of derivatives, revulsives, cauteries, issues, irritants, rubefacients, and the like, to the power they possessed of producing a new disease on the surface of the body, and thus destroying the old. The fundamental point of such doctrine was, that the super-vention of one diseased action prevented the continuance of another. This dogma was the father of homœopathy ; notwithstanding which, we still respect it as if it were founded on the everlasting hills of truth. It is high time to cast it away, as being devoid of truth, and contradicted by daily experience.

Here, again, we alight upon the fact that the influence of a plan of treatment is capable of explanation by referring to the effect it has upon the vital powers, and that such explanation is far more consonant with sound sense than are theories which start from false statements and are bolstered up by false experience.* Following out these views, any

* In connexion with this subject, Dr. Noble stated at the meeting where the preceding essay was read, that he had seen an instance in

one can soon learn to appraise blisters at their full value, and he will not have his confidence in their efficacy shaken—as too many have had—by employing them under circumstances when there was no reasonable hope to be entertained that they would do good.

which a seton in the skin had produced adhesion between the pulmonary and costal pleura, at a spot corresponding to the track of the tape. This shows that a *mechanical* irritant may produce effects similar to a *chemical* one.

I have also been favoured with the following observations by Dr. Sandwith, of Beverley :—“One of the purest local counter-irritants is the flesh-brush, which I know from personal experience to be singularly efficacious. Thirty years ago I was crippled with rheumatism of the shoulder; the deltoid muscle felt extremely cold, and the slightest motion produced excruciating pain; when a succession of liniments had been used without relief, a few applications of the flesh-brush did the business.

“It fell to my lot, many years ago, to make a complete cure of a case of white swelling of the knee, by friction; the joint was bent and immovable, enlarged, with two or three superficial ulcers, and the leg and thigh wasted. Having got the ulcers healed, I recommended hand rubbing. The father of the boy being a schoolmaster, took the lad into the school, and had his knee rubbed by the other boys in succession, the day through; after three months the knee was perfectly cured.”

These observations perfectly accord with the conclusions I have endeavoured to draw, viz., that the so-called counter-irritants do not act on a derivative or revulsive principle, but by improving the condition of the circulation in or through a part, and increasing the vital power in the tissue, which has been impaired by accident or other cause.

CHAPTER XXI.

HYGIENIC MEANS CONSIDERED.

The importance of the preceding considerations demonstrated by reference to present plans of practice as compared to those of olden date—Fevers—Typhus—Yellow fever—Apoplexy—Chorea—Cases—Hydrocephalus—Case—Convulsions—Chloroform—Cases—Hysteria—Spinal irritation—Pneumonia, and other inflammations—Mercury, colchicum, &c.

ERE we close our observations on the importance of judiciously supporting the constitutional powers of the patient in all cases of illness, it will be useful to contrast the practice now generally adopted by the thoughtful and observant of our own day and in our own country, with that which was prevalent in former times in Britain, and is yet common in Italy and other foreign countries.

To begin with fevers.—Dr. John Armstrong and Dr. Clutterbuck, who subsequently recanted his opinion, less than fifty years ago strongly urged that patients with typhus should be bled freely; averring that this diminished the violence of the symptoms, and contributed directly to recovery. To within a very recent period his views were adopted in a modified degree by a majority of the profession. They have not, it is true, drawn blood, but instead thereof, they have used antimony, purgatives, or other depressing drugs. Twenty years have scarcely passed since a distin-

guished physician in Liverpool (a robust-looking man, æt. 50) died prematurely in fever, from his unlimited use of bleeding in his own case ; and, within a more recent period, Dr. Southwood Smith has recommended venæsection on a large scale in typhus. Now, on the contrary, quinine, the most powerful of our tonics, is very commonly employed, and wine or other stimulants are given according to circumstances ; while the greatest care is taken not to depress the strength ; and any one who adopts this plan judiciously, and not by routine, looks in vain for those fierce and terrible symptoms so graphically described by the old authors.

Turning to Williams's account of the treatment of miasmatic fevers, we find that the ancients bled for intermittents. Even so late as in the Walcheren expedition venæsection was resorted to ; at Gibraltar, in 1828, the same was tried ; and elsewhere a similar practice was adopted by first-rate medical authorities up to 1830. When this plan was abandoned, mercury was employed in its place, and the doses used were enormous, "6000 grains of this metal being given in one case by Dr. Chisholm." The mortality under this plan was very great, and quite equalled that following bleeding. Now, on the contrary, large doses of quina are used, and the contrast between the present per-centage of deaths, and that under the old system, is immense. Dr. Williams says, "The deaths, which had been to the admissions as 449 to 4,053, or about *one in nine*, and in 1833 as 1,526 to 6,074, or about *one in four and a half*, were reduced in 1834-5 to about *one in twenty-two*—the deaths being to the admissions as 538 to 11,593."

In erysipelas, the older authors recommended bleeding, low diet, calomel purges ; and, as a consequence, they spoke of the disease as being a fearfully formidable one. Now, when it is treated upon different principles by steel, wine, and

other roborants, its fatality has become wonderfully diminished.

We have already adverted to the facts that small-pox was at one time treated by stifling heat, and subsequently by venæsection. The present plan differs from both these, and its comparative success is conspicuous.

In days only just gone by, a threatening of apoplexy was rendered, pretty certainly, a "stroke," by a diligent use of the lancet, the cupping-glass, the calomel purge, and low diet. Now, on the contrary, these are very rarely used, and the disease is staved off by a close attention to the powers of life, and often by the free use of brandy.

Chorea was once treated by purgatives habitually, and is so yet by many. Epilepsy was in the same category, and infantile diseases were met by leeches to the head, lancets to the gums, and calomel to the bowels. A more correct modern experience treats these complaints by such tonics or other means as are likely to improve the constitutional vigour: and no one who has watched the effects of each plan can have any doubt of the superiority of the modern. Water in the head we have already referred to, and have shown how far more successful a roborant system is than a depressing one in its treatment.

The following cases illustrate the truth of the foregoing remarks:—

1. Mary Ann R., æt. 13, had an attack of chorea, for which she was admitted into a hospital. The disease was of a month's standing and had been produced by fright. The body was incessantly in motion, the spasms were affecting the chest and glottis, and causing a peculiar cry. As she was known once to have passed worms, aperient medicine was ordered; and, as it acted but indifferently on the bowels, larger doses were administered. No other remedies were

employed. The constant motion prevented sleep, and ultimately excoriated the nates. On the second day after her admission she died of exhaustion.

2. Jane S., æt. 17, after prieking her finger one day, had a set of symptoms of peculiar character, which resembled those of tetanus and chorea, but were identical with neither. There was an habitual movement of the body and extremities, combined with strong, firm, muscular rigidity. She was a stout young woman, and well nourished. After a variety of remedies had been used without relief, a tobacco enema (an extraordinarily depressing agent) was employed. Under its influence the motions ceased for a few hours. On their recommencement the tobacco was, at her solicitation, again employed. The result, however, was almost immediate death from exhaustion.*

3. Miss B., æt. 13, had an attack of chorea, equalling in severity that of Mary Ann R. The jerking of the body, tongue, limbs, &c., was extraordinary; her mother could not keep the child on her knee, and the incessant motion prevented sleep at night. Tincture of the sesquichloride of iron was prescribed in very large doses, frequently repeated, and a highly nutritious and stimulating diet recommended; in three days the child was well enough to do anything. A very occasional jerk alone showed that she was not absolutely cured.†

The following is the latest case of water in the head which

* Both these cases were witnessed by the author, but he is not in any manner responsible for their treatment.

† Dr. Todd was the first to point out this line of practice in the publication of a case similar to the foregoing, which was treated in a similar way. No. 3 occurred shortly after the Doctor's case was reported, and the treatment was copied from Dr. Todd's, with the sole exception that the hydrocyanic acid used by the Doctor in his case was omitted in that of Miss B.

has come under my notice. I was called June 24th to see Jane W., aged $5\frac{1}{2}$, who, after ailing for a few days, had been treated by her mother with aperient medicine, and who shortly after the bowels had been freely moved, was seized with convulsions and subsequent insensibility. The child was delicate, lived in a narrow and crowded court, and had previously been under my care repeatedly for threatenings of hydrocephalus. On this occasion I found her all but comatose, the head and surface cool, the pulse small and rapid, 130 in a minute, and the breathing quiet. General convulsions came on occasionally, and lasted a variable period, from one to five minutes; they were sometimes very severe, at others they resembled a general twitching. Vomiting of simple mucus had occurred once or twice. As the child could not be made to swallow anything, I recommended the occasional use of chloroform inhalations, and nothing more. This was adopted by the mother, and at the end of thirty-six hours the child improved sufficiently to ask for a drink of water, and to recognise its parents. In place of general convulsions the child now began to complain of sudden and acute pain in the spine, which made her scream, and she also complained of pain in the head; there was a craving for water, but no milk or whey would be looked at. At the end of forty-eight hours screaming and sleeplessness were the prominent signs, and for these I prescribed one-sixth of a grain of muriate of morphia, which insured a comfortable night's rest. Next day the child was better, as regarded intelligence and freedom from spasm, but it would take nothing but water, and at night the insensibility returned, and so profound was it that the case seemed hopeless. Chloroform inhalation was again resorted to at intervals of an hour or whenever any spasmodic affections were noticed. During this period the urine was passed involuntarily, and

the bowels had not been opened from the first day. The semicomatose condition lasted for thirty-six hours, but at the end of that period intelligence again returned and the child drank freely of milk. The greatest quiet was now enjoyed, so that no excitement whatever might occur to the brain. On the next day, as the bowels were still costive, an enema was administered, which operated comfortably, no medicine was ordered, as the child refused to take anything but milk or tea ; from this period the improvement was steady, and on the 4th of July the child was able to run out of doors and play with her companions, and has continued well ever since.

In nothing, perhaps, is the present plan of treatment more conspicuously successful than in that formidable set of symptoms classed as convulsions. An M.D. of my acquaintance, and one who had the character of being a very judicious physician, was converted to homœopathy, by a friend who induced him to try globules for his own child during an attack of convulsions. As he had never seen any previous case recover so fast, and so completely under the old system, he abandoned it and took to the new ; we can now see the reason why the latter was preferable. If we turn to any medical authority ten years old, we find that convulsions in children were attributed to teething, and were treated by lancing the gums, leeches to the head, calomel, or other purges ; sometimes by general bleeding, and blisters or other counter-irritants to the head, neck, arms, &c. The mortality from the disease under this plan was great, the prognosis being always more or less grave. Now, however, that a different plan is coming into general use, the mortality has greatly diminished, and many a case, once considered hopeless, is almost magically restored under the influence of chloroform.

Dr. Simpson was the first to record a case of infantile con-

vulsions thus treated. The child was not a week old, and had been under his care and that of another physician for two days, during which time the convulsions were incessant. As a last resort, the inhalation of chloroform was tried with complete success ; with necessary intervals for feeding, its influence was kept up for two days, and the child then was quite well.

The following case, which came under my own eye early in 1859, well shows the value of this remedy :—

Miss J., *æt.* 11, a tall overgrown girl, who had, as a child, suffered first from hydrocephalus and subsequently from cervical abscesses, had a very mild attack of scarlatina, which was followed by hæmaturia and sickness ; this gave way in a day or two, and she improved very much for a fortnight. At the end of the fourth week of the fever, she was taken ill once again with sickness, and vomited throughout the day everything she took. The urine was neither bloody nor albuminous, however. At about 6 o'clock it was first noticed that blood was contained in the urine, and that this was very scanty ; the sickness continued, and, after a distressing fit of retching, about 7 P.M., she began to talk wildly, and in a few minutes more she had an epileptic fit, of extreme severity. She was now seen by two medical men, and a sheet wrung out of hot water was placed round the loins, the feet were fomented, and ammonia used to the nostrils. I saw the case shortly after 10 P.M. She was still in strong epileptic convulsions, the face being much distorted, the lip cut by the teeth, and the mouth foaming. The pulse was irregular, the skin clammy and pale, and the face somewhat livid, though pallid. In consultation, the case was considered almost hopeless, and a vigorously counter-irritant plan, with smart catharsis and leeches to the loins, was strongly urged. The author, however, being very

averse to such severe remedies, determined to try first the effect of chloroform inhalation. The effect was magical; in less than half a minute the convulsions ceased, and the child lay as if asleep. In two minutes more, however, the fits returned, and the chloroform was tried again with the same results. Its use, at intervals, was continued for two hours, when it was altogether abandoned. In four hours from its employment the patient was perfectly recovered from the epileptic attack; and it may be further noted, that there was no return of the vomiting; that the child gradually improved; that the urine continued bloody for two months; that purgative aperient medicines, though indispensable, always produced vomiting, and that beyond a change of air, and a half-weekly aperient, no treatment was adopted.*

The advantage of chloroform inhalation over the old plan of leeches, bleeding, calomel, antispasmodics, counter-irritants, &c., is equally conspicuous in puerperal convulsions, general epilepsy, mania, and a variety of other nervous diseases.

Delirium tremens, once treated by venæsection, purgatives, antimony, and still commonly treated by opium, is now successfully managed by Dr. Laycock in the Edinburgh

* For the benefit of those who may be induced to use chloroform inhalations in convulsions, I may mention, that the respiratory muscles are often affected (apparently by the chloroform) after the general convulsions cease. The rhythm of breathing seems gone, and such long intervals elapse sometimes between one respiration and another, as to lead to the fear of death having occurred. Whenever this occurs, respiration may be induced, either by pressure on the lower ribs, suddenly removing the hands; or, as another author has suggested, by bringing the patient's arms together and pressing them on the stomach, and then throwing them upwards and outwards, as in the act of yawning or stretching.

Infirmity, and by some friends of the author's, with food instead of physic—opium even being eschewed. The mortality under the opiate plan, Dr. Laycock shows to be more than ten times greater than under a clever system of expectancy, which includes the administration of *aqua pura* in a draught of *aqua fontis*, mixed at the bedside as an opiate.

With such facts as these before me, how could I doubt the assertion of a homœopathist, who told me that he had cured a very bad case of the disease by one drop of tincture of henbane, given every four hours; which would be to the full as potent as the twenty minims of *aqua pura* adopted by Dr. Laycock, and the bread-pills with which an old "accident ward" nurse of my acquaintance used, habitually, during twenty years, to make her patients sleep, and, as she said, with never-failing success?

Let us next point to the views once entertained of hysteria and spinal irritation, and the treatment adopted by physicians. Of the frightful suffering entailed upon unfortunate patients we have many illustrations in Griffin's and Teale's books, and there are few physicians of twenty years' standing who cannot recall cases where an improvement of symptoms has been commensurate with an abandonment of medical treatment, and this not because all medical treatment was bad, but because a wrong plan was adopted.

There is scarcely a book in our medical literature more melancholy to read than Dr. R. Lee's Treatise on the Employment of the Speculum.* In it we have a record of three hundred cases, chiefly of debility, treated as dependent on disease of the womb, in scarcely one of which any good was done by special treatment. It makes our blood boil to find that in the nineteenth century, when all boast of such

* Of course it will be seen that this remark refers to the things exposed, and not to the master-hand which exposed them.

a vast increase of knowledge, and good feeling for suffering humanity, that such an amount of ignorance, or interested misrepresentation, such as is evidenced by Dr. Lee's histories, could exist in Britain's metropolis. No one with the ordinary feelings of humanity can come to any other conclusion than that the patients there described would have been infinitely more comfortable under the do-nothing system of Hahnemann, than under the fierce cauterisations of the fanatics of the speculum, whose doings Dr. Lee exposes; and yet we are called upon invariably to support these against homœopathists, because the latter are medical heretics!

We denounce, with the direst anathemas, those who, in our estimation, let their patients remain miserable or die; yet we cover with the shield of charity those who help to augment their patients' sufferings, if they do not hasten their dissolution. Surely such one-sided toleration must be radically bad.

The change which has taken place in the treatment of lunatics in general, and especially maniaes, is especially striking. Once it was thought that their ravings were the result of some fiery process going on in the brain, which, at any price, must be extinguished, and venæsection, antimony, low diet, circular swings, cold douche, &c., were employed; and thus, as Dr. Conolly reports, many a hopeful case became hopeless. Now, on the contrary, the maniacal fury is looked upon as the result of cerebral debility, and is treated accordingly; with an improved dietary in asylums, and a liberal use of cod-liver oil, the same authority reports that the success in treating insanity is far greater now than it ever was before.

There is scarcely a single disease in which the contrast between the present and the past plan of treatment is more

apparent than in pulmonary consumption; and Liverpool may feel proud satisfaction in knowing that Dr. Turnbull, whom she may claim as her own, has been one of the foremost pioneers of progress.

In days gone by, phthisis was looked upon as a disease; its seat was undoubted; its cause was the formation of tubercles; the complaint was fearful in its ravages; and a remedy for it was eagerly and unceasingly sought for.

But no remedy was found: consequently, the dogma that consumption was incurable was gradually nurtured into a fundamental truth.

Hence arose another dogma, viz., that any one who stated that consumption was curable could not recognise the complaint, *i. e.* that the curability of consumption was an idea as absurd as that of attributing responsibility to lunatics.

At the present day we fancy that we can see why and how these doctrines arose. We see that phthisis was looked upon as a disease to be conquered—just as we looked upon the sepoys rising in rebellion—it was attacked by every material in the medical armoury. Bleeding, mercury, low diet, emetics, setons, issues, moxas, blisters, incision, creosote, iodine, tar, and a host of other things, were tried generally and locally—with what results we know.

But, at the present day, we recognise in phthisis not a disease of the lungs, but an enfeebled condition of the system, and, instead of endeavouring to cure the complaint, we try to restore the general health; well knowing, that if we can do that, the lungs will partake of the benefit, and become healed by the ordinary processes of nature.

Take again the old plans of treating pneumonia, pleurisy, bronchitis, and other inflammations, where the routine practice was to bleed, cup, antimonialize, or salivate, to a greater or less extent, every individual—how severe and fatal were

the diseases, and how rarely did the patients recover under many weeks! Under the old plan the mortality in the Infirmary at Edinburgh from pneumonia, taking an average of twenty-five years, was 36 per cent., and Dr. Bennett gives other statistics from France and Italy, to show that a mortality, varying from 15 to 33 per cent., was a common one. Dr. Diek, of Vienna, gives, as a result of 380 cases treated by venæsection, tartar emetic, and diet, thus: venæsection, mortality 20 per cent., tartar emetic 20, and diet 7 per cent. Dr. Bennett's plan, now very generally adopted, is thus described, "never to attempt cutting the disease short, or to weaken the pulse and the vital powers." The result of this plan has been a mortality, a trifle *less* than 5 per cent.

So it is with many other diseases. Surgeons now look back with feelings almost akin to horror at the fearful doses of mercury once given for syphilis, and the consequences which such treatment entailed. Physicians of the present day deprecate the large doses of colchicum once given for gout, and shun equally the strong pills and black draughts which were given to cure constipation, and the aloetic purges and local leeching, once in vogue, for the cure of amenorrhœa.

With all this change, an equal alteration has occurred in the general tone of our thoughts and conversation. The time was when all diseases were supposed to arise from eating and drinking too much, when to work hard and live sparsely was considered the prime rule for health, and when all complaints required a rigidly low diet.

Now, on the contrary, we see that it is poor living, poverty, and starvation, that encourage the onset of disease, and that its hold is firm, or otherwise, according to the weakness or strength of the patient.

How any other ideas could ever have prevailed it is difficult to understand, repugnant as they are to experience and common sense. The man who wants his horse to work well, feeds him well ; while he whose proportion of work equals that of his beast, actually starves himself that he may do it properly !

We find that the practice of surgeons upon many points has altered quite as much as that of physicians. Thus, we find Mr. White Cooper remarking, in a recent treatise upon Wounds of the Eye, "It was formerly the practice to deplete largely, and to confine to the most limited liquid-diet old persons who had undergone operations on the eye, or who were suffering from wounds of that organ ; the phantom of inflammation seems to have been ever present before our predecessors. This much is certain, that the opposite plan of treatment is generally adopted at the present day with the happiest results ; and of those cases which take an unfavourable turn, for one patient who is attacked with acute inflammation after extraction, six or more suffer from non-union of the section from deficiency of power."

In the few cases of iritis (whether syphilitic or otherwise) I have had under my care during the last three years, I have entirely given up the use of mercury ; they have been treated by local bleeding, strong lead lotion constantly applied to the closed lids, and belladonna to the eyebrow, and at the end of the third or fourth day a small blister, the size of a shilling, on the temple. The diet is generous, and quinine given internally ; all the cases have recovered, and with far greater rapidity and completeness than I was in the habit of meeting when I treated them on the older plan. It will doubtless occur to many that the treatment of this disease by turpentine—a powerful, general, and local stimulant—has been advocated by more than one observer.

It remains for us now to recapitulate the propositions we have been attempting to demonstrate. We believe—

1. That the phenomena of life are due to a definite *force*.
2. That the vital force is not identical or correlative with any other known force.
3. That it is a force acting in a definite direction, which direction differs in genera, species, and individuals.
4. That the vital force manifests itself in two forms: conservative, *i. e.* resisting injuries;—reparative, *i. e.* repairing damages.
5. That in healthy human beings, under favourable circumstances, the amount of vital force in each is equal.
6. That vital force cannot be increased beyond the natural standard.
7. That it may be deteriorated, reduced, or depressed.
8. That when it is so depressed, there is alteration of structure and function in one or more parts of the body.
9. That the presence of disease implies impairment of vital force.
10. That vital force may be regained, or restored to its healthy standard.
11. That repair of injuries and recovery from disease can only take place through the instrumentality of the vital power.
12. That the reparation will be fast or slow, according to the amount of vital force in the system, or in a part.
13. That any plan of medication which produces a steady diminution of vital power must necessarily be bad.
14. That all treatment must have for its end and aim the restoration of the patient to the standard of health.
15. That these principles ought to underlie all medical theory and practice.
16. That in following up these principles, the physician

must closely ascertain what are depressing agents, and those which have an opposite tendency, generally and locally.

17. That vital force cannot be directly increased or augmented.

18. That food and physic are only "means to an end."

19. That it is unphilosophical to employ means to restore the vital force in a part, if we are doing anything to depress it as a whole, and *vice versa*.

20. That there cannot be deficiency of vital force in one organ without a corresponding deficiency in other parts, except from some purely local and temporary cause.

21. That where there is evidence of deficient vital power in the nervous system, and in the heart, lungs, stomach, liver, &c., it is unphilosophical to assume that one organ is diseased because the other is; inasmuch as all of them are affected from one general cause, *i. e.* deficient vital power.

22. That the old plan of medication has been faulty.

1st. Because it has aimed at the removal of special symptoms, without regard to the general condition of the system.

2nd. Because it has treated phenomena as due to excess of power, when they have been produced by the opposite condition.

3rd. Because this mistake has led to a greater deterioration of the vital power by drugs, &c., than was already present.

23. That a plan of medication, which does nothing to depress the vital power, is practically superior to one that does depress it.

24. That homœopathy, with its infinitesimal doses, in its early days was such a plan, and, consequently, that its success was comparatively great; but that it is untenable as a system:—

1st. Because it ignores the principle of life as the chief power in the body.

2nd. Because it attributes powers to substances and to quantities which are absolutely inert.

3rd. Because it excludes "systematically" from its arsenals agents of known power in restoring strength to the constitution.

4th. Because it attributes to an irrational cause effects which must be attributed to a rational one.

25. That thoughtful physicians of the present day have shown a steady tendency towards the improvement of their science, and that that improvement has been manifested by a departure from the frightfully depressing means, once so popular, and an adoption of a plan of an opposite nature; by a desire to conserve the health, by keeping up the systemic powers, rather than by an attempt to re-invigorate a jaded constitution by refreshing draughts of senna-tea, and banquets of barley-gruel.

26. Lastly; and it is this conclusion which has induced us to give the title we have done to this essay—

That the theory and practice of medicine ought to be based upon a knowledge of alterations in *power* or vital *force*, rather than of changes of *structure* alone.

We may sum up our idea of the correct principle of treatment thus:—In the early stage of any disease, when fever is present, the mildest medicines are the best, as the condition is a natural one, essential to the complaint, and having in previously healthy persons a constant tendency to abate after a definite period; under no circumstances should means be adopted to cure this fever which would of themselves suffice to make a healthy man seriously ill. As soon as the intensity of the symptoms subsides, and before the fever itself has gone, the plan of treatment is to be entirely

changed. One day may be given to ascertain the condition of the vital power, and the direction it is taking ; after that, the physician will encourage the restorative powers of the system with medicinal or hygienic dietetic agents, until health is restored.

Special diseases require special plans of treatment, yet the preceding principle is applicable to all.

With changes in practice such as we have indicated above, who can say that the science of medicine is not in a transition state, emerging from the darkness of false facts, false theory, fallacious experience, and unreasoning dogmatism, and passing towards the light of reason, truth, and common sense ? And when such changes are going on, why should we attempt to crush all who venture to explore a new track for themselves, or abuse them as impostors, quacks, or charlatans ? Shall we declare that the old school of Hippocrates, and the modern teachings of Copland, Watson, Alison, Abercrombie, &c., are to be the *ne plus ultra* of medicine ? In an age when all is progressing, is our art and science to be the only one to stand still ? We answer unhesitatingly, No ! *Excelsior* must be our motto ; we must ever strive after improvement, and in that strife we must abandon every reed we break, instead of trying to bolster it into a staff. Each theory repugnant to common sense must be abandoned ; all practice which proves faulty must be given up ; nothing must be adopted but what stands the test of most rigid examination ; and the standard by which all our doings must be measured is, the life, health, and comfort of our patients. Books will ever be necessary to put us into a certain track, and will support the student until he can walk alone ; but they ought never to be anchors for chaining their readers to the author's dogmas. As such a temporary aid we consider the preceding pages, and

our end will be attained if we have succeeded in showing, that there is a basis on which a theory and practice of medicine may be founded of greater soundness than has hitherto appeared—upon that foundation each one must build for himself.

APPENDIX.

I.

ON FLATULENCE: ITS SIGNIFICANCE AS A SYMPTOM, AND ITS TREATMENT.

THERE are many symptoms of disease constantly presenting themselves to our notice, which, from their persistence, severity, or importance, come at last to be considered as entirely apart from the diseases they commonly indicate. Headache has thus been for a long period treated as a substantive complaint. Amenorrhœa has been considered in the same light. Diarrhœa, indigestion, neuralgia, pleurodyne, and latterly cough, though all symptoms of a particular state of the system, or of certain organs, find a place in nosological arrangements side by side with pneumonia, pleuritis, and the like.

In the same manner flatulence, flatus, tympanitis, meteorismus, or simple wind on the stomach, though it is only a symptom of a certain state of things, is of sufficient importance to be considered as an individual disease. We meet with patients whose sole complaint it is, and who long as earnestly for its cure as they would for the subsidence of a pneumonia; and I have myself recently had some patients under my care in which the complaint has been as distressing and almost as intractable as excessive ovarian dropsy.

It was in consequence of the difficulty I experienced in the management of these cases that I turned my attention specially to investigate the subject; and having, as I thought, attained some definite and useful knowledge of it, I venture to

lay before the Profession the results obtained. I propose to consider—

1. The composition of the gas secreted.
2. Its origin.
3. The circumstances under which it is formed, *i. e.* the causes.
4. Its accompaniments.
5. The treatment which the foregoing considerations indicate.

1. Respecting the composition of the wind little need be said, for it in no way affects the general question. It has been ascertained to consist of nitrogen, oxygen, and carbonic acid, combined in proportions nearly the same as are found in atmospheric air; but it is also very frequently found to contain in addition carburetted and sulphuretted hydrogen; the amount of the latter being at times considerable. The composition of the gas is, to a great extent, determined by the ingesta, as well as by the condition of the stomach or bowels at the time. Thus, for example, I know individuals who are unable to eat a hard-boiled cold egg, without having immediate eructations of air, tainted with sulphuretted hydrogen, though the same persons can take raw eggs without any such result; and generally can take them lightly boiled, too, with impunity. Cabbage, cauliflower, beans, and peas, have a similar effect upon many; and with some the use of tainted food, such as game overkept, or the like, produces the same effect.

2. The origin of the gaseous matter is of more importance than its composition. A short consideration of the subject suffices to show that it may have at least four different sources.

1. The air may be swallowed with or in our food and drink.
2. It may be produced by a fermentative process in the alimentary material taken, or in the contents of the intestines generally.
3. It may be secreted by the mucous membrane.
4. Or it may arise from a putrefactive process in the substance of the intestinal canal itself, or its contents.

(1.) That a small quantity of air only is taken with our food any one may readily convince himself, by trying to imbibe as much as he can that way, either by gulping air down with his solid pudding, or swallowing the froth of a bottle of porter “well up.” He will then find that the difficulty of swallowing

the air is so great, that it is almost absurd to suppose that much can ever be taken accidentally. He will be still further satisfied on this point, if he kills many of the lower animals shortly after a meal; and by noticing in his own person how soon air swallowed in froth is rejected by the stomach after it has been taken. But, granting for the sake of argument that some air may be so introduced, it is tolerably clear that it will not be in sufficient amount to distend the stomach painfully, or to pass into the bowel.

(2.) That an immense amount may be generated by the fermentative process in the stomach there can be no doubt. This has been, over and over again, proved by the experience of graziers, who have lost many valuable cows by the enormous flatulent distention of the stomach, consequent upon eating largely of clover under certain circumstances; and by the fact that many individuals vomit the food they have taken in a fermenting condition—a process that has been known to continue a long time after the material has been ejected. But, even in these cases, it is not the food alone which is at fault, but some particular condition of stomach superadded; for it is affirmed as a fact, that the clover may be eaten with impunity if the cattle shall have previously eaten a small quantity of hay; and the materials which ferment in one person may be taken with impunity by another, or by the same individual at another time.

(3.) The third source of the flatus is the mucous membrane. That some membranes are able to secrete air rapidly, and as rapidly to absorb it, has been proved by experiments on the swimming bladder of the fish; and that the mucous membrane of the intestines can do so equally, is inferred from the extraordinary rapidity with which an enormous quantity is formed and re-absorbed;* and especially from the phenomena of rectal flatulency. By the period that the feces have reached

* Case.—Dr. George Johnson told me that he was once called to see a young woman who appeared to be in great suffering from hysterical spasms. The most prominent symptom was sudden and enormous tympanitis, alternating with as sudden and complete flattening of the abdomen; no wind passing either by the mouth or the anus. The phenomena occurred many times in his presence.

the anus in a solid state, they have generally lost all their fermentative propensity; and, as we can demonstrate, they remain for a considerable time after their expulsion without undergoing any gaseous change. Nevertheless, while they remain in the rectum, they may, and often do, give rise to voluminous gaseous emanations, which, from their sudden formation, we presume could have no other origin than the mucous membrane. We may also refer to the flatulence which so commonly comes on in weakly persons after prolonged fasting, as a further proof of its being due (occasionally?) to the mucous membrane alone.

(4.) That meteorism is also due to putrefactive changes, there can be no doubt in the mind of any one accustomed to post-mortem examinations. He well knows that during life flatulent intestines are not universal; whereas he only perhaps once in a lifetime meets with a corpse whose bowels are not enormously dilated with wind.

We come, then, to the conclusion, that in tympanitis the mucous membrane of the stomach and bowels plays a more important part than either the accidental swallowing of air or the use of certain articles of diet. It next remains for us to investigate the circumstances under which the mucous membrane secretes air.

3. The mucous membrane of the stomach secretes air after it has been empty for a considerable time, prolonged fasting being generally accompanied by painful flatulence. This, however, is not universally true, for a perfectly healthy man can endure privation of food without generating flatus at all. The distention is almost in direct proportion to the debility of the system generally, or of the stomach individually, many patients being unable to fast for so short a period as four hours without suffering from flatus severely. This condition is frequently relieved by taking food, but it frequently happens that the presence of food under these circumstances provokes vomiting, or painful spasm.

The intestines, like the stomach, secrete air when an individual has been long fasting, and sometimes to such an extent that the patient, when dressed, seems to be extremely corpulent. I had not long ago an instructive example of this. A lady of fifty-

four, or thereabouts, had been under my care for excessive tympanitis, from which she slowly recovered. After having enjoyed perfectly good health for some months, she heard that a son, in a distant country, was threatened with what she considered to be extreme danger. She could bear no more tidings for a month, and was so devoured with anxiety, that she could eat nothing: a little wine and water was all she took. In the course of two or three days the abdomen began to swell again, and by the end of the month was enormously distended with flatus. At the end of that time good news relieved her mind, but the tympanitis remained, and she was again many weeks ere she recovered her usual shape. During the progress of the cure, little or no wind was passed upwards or downwards, although the passage of flatus had been one of the most distressing symptoms during the advance of the malady. In this, and similar cases, it is evident that the flatus was not due to food; that it was formed in the bowels; and that the cure depended, not on the expulsion of the wind, but on its absorption.*

We see phenomena of a similar kind in typhus, or other diseases of a low type. In them tympanitis comes on as the patient's strength fails, and the distention of the abdomen thus becomes a fair indication of the extent of the patient's debility.

We can scarcely fail to associate this in our own minds with the flatus constantly formed in the bowels shortly after death, before all vitality in the body has been lost, and certainly long before putrefaction has set in; and if there be any real analogy between them, we cannot resist the conclusion, that one of the causes of the generation of flatus is, that the mucous membrane is *beginning to die*, or is, at any rate, in a condition practically resembling that.

If that be the case, we shall certainly be able, in every instance where flatulence is present, to find some cause which

* I may mention, *en passant*, that whenever this lady took an exhausting amount of exercise, the depression consequent upon it was never seen until the day after, *e. g.* a long walk, or a day's shopping on Monday, would always produce an increase of flatulence on Tuesday. At first she scarcely believed this; but after noticing herself very closely to demonstrate that I was wrong, she became convinced that I was right.

operates in a depressing manner on the stomach or bowels, or system generally. As far as my experience goes, we do so. It is produced by fasting,—by loss of blood,—by purging,—by prolonged vomiting,—by the enervating effects of intoxication,—by the weakening influence of excessive muscular action—*e. g.* after parturition,—by the influence of influenza, or common “cold,”—by the results produced from tobacco in persons unaccustomed to it, or unable to use it comfortably; it is common in hysteria,—in chorea,—and it is present more or less in cases of low fevers, peritonitis, ascites, &c.

In many of these instances, however, it is not particularly noticed by the patient until food is taken, and then only under certain circumstances. Thus, a lady who came under my care some time ago, would have an attack of painful flatulent distention of the stomach in an evening, whenever she had an unusually harassing day. The time of the invasion was generally determined by taking tea or solid food, yet, if none were taken, the attack was only deferred for an hour or two. During one illness, the stomach was so extraordinarily sensitive, that the exertion of talking, &c., consequent on the presence of many visitors in the sick room, was enough to determine the coming on of the complaint, which could, however, generally be staved off by the liberal use of champagne.

In cases such as this, we find the flatulence increased greatly by the use of food, but even here there is room for amplification; for the stomach, which will secrete vast quantities of air on the introduction of meat or potato, &c., will digest quietly dry bread or biscuit; and another which will be painfully flatulent after gruel and other slops, will be comfortable after the use of such food as partridge, chicken; or beef and porter will promote digestion in many cases where ale will provoke flatulency.

This phenomenon we attempt to explain by saying, that every stomach has its own peculiar powers, and what is digestible in one person, or at one time, is the reverse in another person, or at another time; and that it is certain that food which the stomach cannot digest becomes more or less of an irritant. It is argued, too, and with justice, that stomachs, when they are weak, have the same idiosyncrasies as when

they were strong; and that there is nothing extraordinary in champagne throwing off an attack of flatus, as we are most of us familiar with the fact, that condiments, such as mustard, pepper, cayenne, wines, and brandy bitters, are constantly used to give a temporary stimulus to a weakly stomach.

We arrive then at the conclusion, that an enfeebled stomach produces wind when it is irritated by the presence of indigestible food, an effect which passes away when its powers are regained.

I must, however, here note, that the same effects which produce "wind on the stomach" in one individual, produce spasm, vomiting, heartburn, or simple gastralgia in another, and that one or all of these may alternate with flatulence in the same person.

Now it is strictly rational to believe that the mucous membrane of the bowel will act much in the same way, with respect to flatus, as the mucous membrane of the stomach, and we shall therefore expect to find that flatulent distention of the intestines will be determined to a great extent by their vital condition, and by the matter introduced into them. We have already seen how meteorism is produced by low fevers and other depressed states of the system: we now regard it as produced by irritants. The question here arises, What is an irritant to the bowels? It is difficult to give a categorical answer; for, as happens in the stomach, what is a stimulant to one person or at one time, is an irritant to another, or at another time. Thus an aperient is by many considered as a medicine, which stimulates the mucous membrane of the bowels to increased secretion, and the muscular coat to energetic action; while others explain the phenomena by saying, that the medicines are purgative by their irritating action, &c.

Nor is this difficulty theoretical only, for we actually find in practice, that purgatives will, on some occasions, relieve the very meteorism which at others they produce or greatly aggravate. Bearing in mind the distinction between a *stimulant*—a medicament, that is, which gives for a period more or less additional functional power—and an *irritant*—a medicament, that is, which provokes an immediate or exaggerated functional

operation,—we ask whether the frequent use of a stimulant may not convert it into an irritant?

When we inquire closely into the nature of excitement, or the operation of a stimulant, we are compelled to consider it as a financier would a draft upon capital. Ordinary revenue failing for the purpose for which the money is required, a portion is withdrawn from the principal, and such withdrawal cannot take place without a small permanent diminution of revenue, or an appropriation of a considerable amount of revenue to refund the capital. We put this into medical language by saying, that stimulation is followed by a corresponding amount of depression. Frequent stimulation, then, we necessarily conclude, is followed by corresponding frequency of depression or cumulative debility.

But we know, from long experience, that any organ in a depressed condition is far more irritable than the same in health; and, consequently, that the purge, which was a stimulant to a healthy bowel, becomes an irritant to the one enfeebled by the effects of frequent excitement.

A purgative, then, by frequent repetition, may actually produce the same result (tympanitis) it was originally intended to relieve and cure.

If there be any truth in this deduction, we shall find in practice that aperients are, under certain circumstances, followed by, or actually produce, flatulent distention of the bowels; these circumstances being the presence of general or local debility, and an irritable condition of the bowel, from whatever cause arising. That the deduction is correct, the following cases will prove:—W. J. H., a consumptive young man travelling for his health, was generally in a comfortable condition as long as he was quiet at any one place. But going from one locality to another, whenever it involved a long day's journey, always involved an attack of flatulent distention of the stomach and bowels, attended with a paroxysm of asthma. The first plan of relief adopted was to apportion the food to the digestive power of the stomach, and nothing was taken beyond omelettes and coffee. For a time the plan succeeded; but as he was then travelling for many days successively, this meagre fare—*plus* the fatigue—so reduced his digestive power that

even this light food acted as an irritant. With this state of the stomach the bowels sympathized, and became daily more distended with air, and to relieve this he had recourse to aperient medicine. For twelve or fourteen hours the effect of the medicine was satisfactory, but it was invariably followed by increased flatulence during the three following days. Again aperients were resorted to, but then their good effects were limited to one or two hours, and the distention became greater than ever; and if a third dose was then taken no good result whatever, even for an hour, could be detected, although there was a manifest increase of tympanitis. A different plan was now adopted: a generous diet was used, and the digestion habitually assisted by brandy or port wine, while a residence at Nice gave a vast improvement to the constitutional powers. With improved health, and an abstinence from all medicine, the stomach and bowels recovered their tone; no flatus was generated, and ordinary journeys were borne with comfort. On one occasion, however, he was in the carriage during the whole night, and this after a hard day, followed by a good dinner at a late hour; the road was in a frightfully bad state, and the jolting for the first ten hours tremendous and continual; no sleep was procured, and twenty-one hours elapsed ere the journey was over, or any food taken. The fatigue was now excessive, and flatulence was complained of, which became excessive after a mouthful of food had been swallowed. This state of things continued for four-and-twenty hours, and then passed away. From this period the general health was uninterruptedly good for many months, and no flatus was complained of. At last, however, after a number of "dinings out," the flatulence returned, and he had recourse once more to aperients for its relief. As before, the pills gave him a day's comfort, but this was succeeded by an increase of tympanitis for three days following; he then took more medicine, which aggravated the complaint to such a degree that he became seriously alarmed, and sent again for me. I recommended simply the use of the fetid spirit of ammonia hourly, the use of egg and wine, jelly, beef-tea, and the ike, and a complete abstinence from aperients; in four days the flatulence had entirely gone; the bowels acted comfortably, and my

patient considered himself well enough to go hence to Malvern from home. As before, however, the journey was too much for him, and he had an attack of flatulence at night. He has since died of phthisis.

The next case points to the same state of things.

Mrs. C., aged about 48, was affected by frequent attacks of constipation of the bowels, for which she was in the habit of taking aperient medicine. At last the bowels remained unopened for many days, and signs of obstruction set in. Nothing could be detected by an anal examination, and aperients were used freely. At first mild ones were adopted, and their strength gradually increased, until she was taking one or two drops of croton oil. It was, however, noticed that the sole effect of the medicine was to bring on excessive and distressing tympanitis; they were, therefore, abandoned altogether, and the flatulence at once subsided. The bowels, however, continued obstinate, and after a short period death occurred from perforation. The disease was then ascertained to be scirrhus strieture of the descending colon.

Not many months ago I had the opportunity of seeing a little child who had a most unusual amount of tympanitis. As far as I could gather, he had been treated at the first successfully by mercurial aperients, and these were continued subsequently with the view of improving the vitiated secretions. But, as often happens, the secretions became more and more vitiated, and the flatulence was distinctly increased after every powder.

It is, then, clear that purgatives will, and often do, act as irritants to the bowels, and produce a secretion of flatus in them, in precisely the same manner as indigestible food produces "wind on the stomach."

A similar effect is produced on the bowel whatever the nature of the irritant may be, and a continuous natural purging is as commonly attended with or followed by a large formation of flatus, as is purging from the use of drugs.

4. We now come to speak of the accompaniments of flatus. This need not detain us long. Some are distinctly referrible to the same condition of the stomach and bowels upon which the flatulence itself depends; others to the mechanical effect produced by the distention; and some are due to the same condition

of the whole system which has favoured the formation of the tympanitis. Thus, as we have seen that wind on the stomach is due to deficient functional vigour (by which I mean, deficient power to perform its natural function), so we may anticipate finding it accompanied with many other marks of dyspepsia: and as we have seen that tympanitis is promoted by intestinal debility, so we may reasonably expect it to be accompanied by constipation or torpidity of the bowels, by some vitiated condition of the usual feculent secretions, by torpidity of the liver, impaired expulsive power in the rectum, and probably piles or fissure in the rectum or about the anus. We might naturally conceive, that as the flatus closely resembles in its chemical composition our atmospheric air, that the fæces lying in contact with it in the bowel would undergo the same changes within the bowel as they do after they are expelled. And as we know that these external changes are attended with the extrication of a large amount of ammonia, and still further, that endosmose may take place through membranes, we might, I say, reasonably infer that decomposition would ensue, ammonia be formed, and this be absorbed into the system to the material injury to the blood. But it is remarkable that our experience of facts does not endorse this conclusion; for the motions are not passed in a decomposing condition, and we have no proof whatever of the absorption into the system of any intestinal gas, not even sulphuretted hydrogen. It is, however, to be remarked, that the fæces passed by our tympanitic patients do in reality decompose sooner than those passed by parties in a state of health; but this is due to the secretions having the same deficiency of vitality as have the organs producing them. The urine of a typhoid patient will decompose with as great rapidity as his fæces, and these scarcely change more rapidly than does the whole body after death. But the influence of vitality upon secretions we have already referred to.

The mechanical effects of tympanitis are many of them peculiarly distressing. In one patient it will produce asthma, from its pressure upon the lower lobes of the lung, the part with which the male chiefly breathes; and here we may remark, *en passant*, that tympanitis does not generally, if ever, produce the same effect upon respiration in a woman as in a

man; for man breathes chiefly by the diaphragm, the woman by the ribs and shoulders. Woman's frame is prepared beforehand for vast abdominal distention (*i. e.* during pregnancy); man's is not. As tympanitic and even dropsical distention in a woman does not materially differ from uterine enlargement, we see women tolerating, with ease to themselves, a meteorism which would materially interfere with the respiration of men.

The heart is equally affected with the breathing, and angina pectoris, palpitation, and other cardiac diseases, are aggravated by the mechanical results of tympany. The enormous size which the abdomen sometimes acquires is such as to interfere materially with the patient's movements; and one lady, whose case I have adverted to, was so bad, that she was unable to put on her own stockings.

Many phenomena accompany tympanitis, because all the organs of the body are more or less in the same condition as the stomach and bowels. As the latter cannot perform their special functions correctly, so the brain, the lungs, the heart, the liver, uterus, kidneys, testes, &c., cannot perform theirs; and we have low spirits, melancholy, drowsiness or pervigilio, headache, palpitation, dyspnœa, leucorrhœa, menorrhagia, chlorosis, or sexual frigidity. Tympanitis may be the disease of which the patient makes most complaint; but, after all, it is no more than one of a number of other symptoms, all of which point to the same conclusion.

5. If this be so, we shall have little difficulty in determining what is the most correct plan of treatment in this complaint; and, as in so many other instances, we shall find that practice has gone ahead of theory, but that in consequence of an insufficient reading of experience, practice has not been an absolutely certain guide.

As flatulence depends upon the condition of the alimentary canal, the materials that are in it, and upon both of these combined; so our treatment must be directed to the ameliorating that condition, and proportioning the ingesta, dietetic or medicinal, to the chylopoietic powers.

If the flatulence depend upon some transient cause, *e. g.* the use of cigars the day before, the result of a debauch. of over-fatigue, of mental excitement, prolonged fasting, excessive

muscular exertion, and the like, no treatment is necessary beyond quiet, mild diet, and some such gentle stimulant as sal volatile, or fetid spirit of ammonia; and an abstinence from emetics, purgatives, or any powerful stimulant, such as raw brandy. For immediate comfort, opiate epithems or frictions externally, assafœtida or galbanum pills internally, generally suffice; soda, when there is acidity, with bismuth when there is much pain; and carminative aperients when there is constipation. All these, however, are only of temporary use, and must ever be considered as mere auxiliaries.

After the attack has ceased, the stomach must be very carefully treated for at least three days, after which time it may be expected to have recovered its tone.

All special remedies, however, as far as my experience has gone, lose their influence after a short time; and it is reasonable to conclude that they do so by the complaint having become constitutional, and not simply local.

In addition, however, to these, experience has demonstrated that advantages may be gained by the external application of such stimulants to the skin as turpentine, combined with the application of the same material to the bowels internally, in the form of enema; in the one case, absorption taking place through the skin, the other through the mucous membrane. Oil of rue appears to have as high a character in this way as turpentine.

But the same remarks apply to these as to purgatives, for if the stimulant be carried beyond a certain point, the turpentine acts as a purgative, and the purging so diminishes the intestinal power that the turpentine acts as an irritant and increases the formation of wind.

In all cases, however, where the tympanitis is more or less habitual, these temporary remedies, intended for patching up a weak part, rather than for renovating the whole machine, are of little value, comparatively; and must ever be subservient to those general measures which are calculated to improve the general health. The diet must be managed in close accordance with the digestive powers and idiosyncrasies of the stomach, rather than according to the theoretical views of chemists, or the dogmas of such stomach physiologists as Dr. Beaumont,

whose conclusions are based upon observations of one individual man. With attention to diet, there must be the most sedulous care of the constitutional power; what power is present must be carefully husbanded, and it must be augmented by every available resource. Steel, quinine, cod oil, glycerine, and other tonics; wine, ale, and such other stimulants as agree: bearing ever in mind, that even medicine may be prejudicial, if not judiciously administered. Change of air often forms a necessary ingredient in the treatment, and does more good than anything else.

The duration of the treatment required is sometimes very considerable. I once had under my care a lady, who was two months before any very decided improvement could be detected; but at the end of that time it was very apparent, and in another month the flatulence was entirely cured. As no flatus had been passed either by the mouth or anus, it is fair to conclude that it was all absorbed by the intestines.

Another case that came under my notice received no advantage from simple tonic treatment; and though she resided at the top of a hill in a healthy district, she was obliged to go to the sea-side for change. A vast improvement was apparent during the first fortnight, and her shape was entirely restored by the end of the month.

We thus once more find ourselves landed on the same place on which we have so frequently before alighted, namely: that the best method to cure disease, in whatever organ arising, is to bring back the whole system into a state of health, and that any other method ignoring this fact, or not including it, must necessarily fail.

II.

WHAT IS THE CONDITION OF INDIVIDUALS MOST PRONE TO INFLAMMATION ?

WE do not answer this question by a reference to medical authorities, but we turn to hospital, dispensary, parish, and

private practice—a wide field of experience. We find that inflammatory diseases are common in the poverty-stricken and miserable inhabitants of courts and alleys,—in the children of strumous, consumptive, and syphilitic parents; and that they are intractable and destructive according to the previous depressing agencies to which the victim has been exposed. Thus we find water in the head, or acute inflammation of the brain, common amongst strumous children: ophthalmia is equally common in the same class. Bronchitis early attacks those of consumptive tendency; pneumonia carries off those who have been brought low by scarlatina or measles; the same disease is a frequent harbinger of phthisis; pleurisy is frequent in the tubercular diathesis; and it is rare to find quinsy in an individual whose constitution is untainted. In the same way we recognise peritonitis as a consequence of the strumous diathesis in some instances, and as resulting from the imbibition of the erysipelatous poison in others, a poison now recognised as of a peculiarly depressing character. Typhus rarely ends without some local inflammation, and the victims of scarlet fever suffer from inflammations of the severest types. Small-pox terminates frequently in destructive pneumonia; malaria produces inflammation of the cæcum, colon, and liver. Phlegmons are the result of long anxiety, watching, and fatigue, and carbuncle is often the harbinger of general decay; in fine, those who are the weakest constitutionally are the most obnoxious to inflammations.

Again, when inflammation comes on in a man hitherto strong, it is either the result of direct violence which has produced severe injury, and consequent local diminution of vital power, or it supervenes upon some depressing cause acting generally, and others acting locally. Thus, I have seen a man suffer from pneumonia, from the effect of a long racing match against time, followed by subsequent sauntering in the cold air on a rainy day. The fatigue and chill reduced the vital powers generally—the excessive use of the lungs injured for a time their nutrition; *pneumonia* followed, and, in its wake, *acute consumption*. A treatment, however, was employed, in accordance with the views I advocate, and the man recovered perfectly, though with great difficulty.

We next interrogate the strong, the healthy, the well-fed; we find that in them inflammation is most rare. It is true, indeed, that every now and then we meet with a youth who has severe phlegmonous inflammation, and abscess, from an indulgence in cayenne pepper and other heating spices. It is true that we may have gouty inflammation in a winebibber and a free liver; but still we know that the individuals in whom these occurrences take place are not in a state of *perfect* health. They have modified in some way that relation between the blood and the organs which is necessary to perfect health, and are, for a time, though in a different manner, the victims of deteriorated vitality; putting aside these exceptions, we recognise, as a rule, that inflammation is rare in the healthy and well-fed.

Leaving the human species for a moment, let us examine whether we can find any facts to aid us amongst the lower animals. Unquestionably we do, for we see glanders or inflammation of the nostrils, &c., produced by excessive overcrowding, and other depressing agencies, in the horse; just as typhus, ophthalmia, bronchitis, quinsy, and the like, may be produced in man under similar circumstances. Talking on this subject with a medical friend, he told the following anecdote:—"I at one time," said he, "found my horses constantly laid up with one or other disease, mostly inflammation, and they always looked out of condition, for I was obliged to work them very hard. One day an old 'Vet.' said, 'Doctor, you must be paying a good sum to your veterinary surgeon every year.' 'Yes, I am; I rarely pay him less than twenty pounds,' was the reply. 'I'll tell you how to save it,' rejoined the old one; 'give your horses twenty pounds' worth more oats in a year.' I took his advice," he added, "and now my horses are never ill, and never out of condition." What is true of a horse is equally true of a man; the worse he is fed, and the more he is worked, the more liable he is to inflammation, and to every other kind of disease. We next consult the Hospital Register, and find that bronchitis is always more prevalent in cold and moist weather than in warm and dry, and attacks poor old men in preference to the young and robust. We know from our own feelings that the cold, &c., depresses the circulating power.

and we can readily see from experience, that age has not the vital force of youth.

If the occurrence of inflammation, as a general rule, is fostered by debility, we must next inquire whether the process itself has a tendency to restore the body to a healthy condition, or to depreciate its vitality still further.

At the outset of this inquiry we have our attention riveted on the word itself—Inflammation; what does it mean? We pin our faith sufficiently upon the doctrines promulgated by the chemists to believe that our bodies are in reality undergoing a process of combustion, similar in kind, though infinitely less in degree, to the combustion of coal and wood in our fires. Now the idea of combustion implies consumption of fuel; and increased combustion, increased consumption. The word inflammation implies combustion, to say the least of it. It does not require a mathematical education to know that, if additional combustion be added to what is already going on, the consumption of fuel will be necessarily increased. Increased combustion implies increased heat, and *vice versâ*. Now we know that if combustion be always going on without fresh supplies of combustibles, the fire will ultimately go out. We know that the fire (without supply) will go out the sooner, in proportion to the intensity of the combustion. We know that under ordinary circumstances our food keeps up the combustible supply for the body, and that the fire and its food being duly balanced, the heat is continuously kept up; but if the combustion is increased in intensity, and the supply of fuel diminished, it follows that the fire threatens to go out early.

These considerations naturally suggest a number of inquiries, *e. g.* is the natural or ordinary combustion (or *eremacausis*, as Liebig calls it) suspended during the existence of inflammation?

Is there evidence of increased combustion, and of increased consumption of corporal fuel?

It is clear that if the combustion has been greater than usual, the body will have decreased in weight, or something analogous thereto, unless the supply of food, &c., has been greater than usual. If not exceeding the average, the body will remain much as usual, the quantity of food being constant.

The condition, then, of the body during and subsequently to the attack of inflammation, will help us to determine whether the disease is likely to improve the constitution, or to deteriorate it still further.

A reference to experience shows us that in inflammation, and in inflammatory fever, there are increase of heat, loss of appetite, and a positive diminution of weight and strength. There is, then, reason from analogy to believe that inflammation is in reality, as its name implies, a more rapid burning up of the body, or some of its parts, than takes place in health. It is out of the question dogmatically to assert, with these facts before us, that the process can be one calculated to promote the restoration of the body to health. We do not, however, content ourselves with this reasoning alone: we endeavour to drive it still further. If it be true that inflammation involves a more rapid burning up of the body than usual, we ought to be able to find some analogy between its effects and those of common starvation, in which the combustion exceeds the supply of combustibles, and where, in reality, we have a state of things resembling, in more ways than one, that accompanying the disease in question. We turn, then, to the blood; and knowing that the chemists have diligently examined the state of that fluid under a variety of conditions, we tabulate their results. These we reserve for a fresh chapter, concluding the present one with a reference to the authority of Paget. We find him remarking, page 339, vol. i.—“All the changes I shall have to describe are characteristic of defect of the normal nutrition in the parts; they are examples of local death, or of some of the varieties of degeneration, modified, and peculiarly accelerated by the circumstances in which they occur. The degenerations are observed most evidently in the process of softening of inflamed parts.” Again,—“The degeneration which would be progressive in the healthy state, but which would then be unobserved, being constantly repaired, is still progressive to the inflamed state of the part, and is the more rapid because of the suspension or impairment of the proper conditions of nutrition.”

Inflammation, then, not only is one of the results of debility and diseased nutrition, but, when present, it has a direct ten-

dency to increase the debility, by the more rapid consumption of the tissues, and by preventing the possibility of new supplies being taken to repair the increased waste.

III.

THE CONDITION OF THE BLOOD IN CASES OF INFLAMMATION AND OTHER DISEASES, ETC.

THE idea of inflammation being an excessive and unusually rapid consumption of animal fuel, necessarily involves a comparison with phthisis and other diseases, in which there is a waste of tissue, and with excessive fatigue or starvation—in all we have a diminution of tissue, and a greater amount of combustion than of supply. They differ from inflammation in degree, but not in kind. They involve a slow process of decay; inflammation a rapid one. Unable for ourselves, as physicians, to analyse the blood, we turn to the report of the chemists, who aim at accuracy, and have no particular medical doctrine to uphold.

We find them reporting—and I quote from analyses to be found in the few first volumes of “Ranking’s Abstract of the Medical Sciences,” where there are reprints from Simon’s, Andral and Gavarret’s, Becquerel’s, Rodier’s, and Beclard’s works—

1. That there is a larger proportion of fibrine in venous than in arterial blood.
2. That the quantity of fibrine is augmented at least to 90 per cent. by fasting; while the quantity of red particles is diminished from the same cause, though not to a corresponding degree. During old age and great weakness, the fibrine is found to be increased 200 per cent.

After carefully tabulating the results, we find that increase of fibrine is invariably attended with a diminution of blood globules; and arranging the diseases according to the increase

in the amount of fibrine, we have the following very instructive list:—

In a case of leucocythemia in an old man (reported in Bennett's book), treated with calomel, the fibrine was found to be 1100 per cent. in excess! In one case of cancer, with intense anæmia, it was 700 per cent. in excess. Its average in cancer was 600 per cent.; the red globules were reduced 74 per cent. In a case of phthisis the excess was 580 per cent., but it was reduced to 250 by cod-liver oil. The average excess was 300.

	Excess of fibrino.	Blood globules reduced.
Acute rheumatism . . .	190 to 550 per cent. . . .	30 per cent.
Pncumonia	500 "	80 "
Bright's disease	450 "	53 "
Cholera	440 "	0 "
Glanders	400 "	10 "
Bronchitis	300 "	30 "
Infantile convulsions . .	250 "	25 "
Scarlatina	240 "	0 "
Sea scurvy	240 "	50 "
Leucocythemia generally	230 "	30 "
Hemiplegia	200 "	
Typhus	150 "	
Erysipelas	150 "	25 "
Quinsey	125 "	
Lead cachexy	120 "	70 "
Pleurisy	100 "	
Puerperal convulsions . .	100 "	
Puerperal phlebitis . . .	90 "	40 "
Peritonitis	90 "	40 "
Pregnancy	90 "	
Spinal irritation	90 "	
Variola	80 "	
Chlorosis	75 "	80 "
Disease of spinal cord . .	75 "	

Variations compatible with apparent health, 60 per cent.

If this table be of any value, it necessarily leads us to the

conclusion, that in some way or other pneumonia and rheumatic fever are allied to phthisis and other diseases, whose chief characters are excessive debility. It is evident from experience that the connexion is not in their symptoms; and it is difficult to see any other, than that there is in all an unusually rapid combustion with deficiency of supply.

If there be any truth in this idea, it will not be difficult to devise an inductive experiment. If it be true that pneumonia and acute rheumatism are diseases accompanied by excessive waste of tissue, and consequent debility, if we can increase the waste and debility still further, we shall augment the gravity of the disease, and increase its mortality. We find accounts of this experiment in authors who, taking another view of those complaints, have advocated bleeding and other powerful depressing agents. The result is, that large venæsection prolongs the duration of acute rheumatism, and makes the supervention of cardiac inflammation fearfully certain, and a similar treatment in pneumonia generally gives a mortality of thirty per cent., against a mortality of six or seven per cent. under a milder plan!

Again, if inflammation mean a more rapid combustion of the body, and if that combustion be marked by an increase of fibrine in the blood, it will follow that the tendency of a direct abstraction of a large quantity of the combustible material, will practically have the same effect as if that material had been otherwise consumed. We have experiments ready made to our hand by those who have adopted bleeding as a part of their battery against disease. It is found that bleeding in any large quantity has the effect of increasing the fibrine in the blood, in the same proportion, or thereabouts, as it would have been increased by three or four additional days of disease.

If there be any trust, then, to be placed in the teachings of chemistry, we can only compare fibrine to the *ashes* of the furnace of normal and inflammatory combustion, and not to *fuel*, as used to be the fashion in days not long gone by.

We do this the more readily, because in diseases like ophthalmia, boils, and others, where the inflammation is limited, the excess of fibrine is not greater than is commensurate with apparent health.

Analysis of the blood, therefore, endorses the conclusion which other considerations have led us to draw, that inflammation is essentially a debilitating process, and that when suffering from it the individual may be compared to one who has "consumption."

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ERRATUM.

Page 479, line 4, place "or" after "hygienic" instead of before.



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