THE CHEMIST AND DRUGGIST

COLONIAL BUILDINGS, 44A CANNON STREET, LONDON, E.C.

Published on the 15th of each Month.

EIGHTEENTH YEAR OF PUBLICATION.

Subscription, 10s. per year, payable in advance; commencing from any date.

Post free to every country in the world.

Single Copies, 1s. each.

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Cheqnes and Post-office Orders to bc madc payable to *Edward Halse* and crossed Martin & Co.

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THE MONTH

Specimens of next issue of THE CHEMIST AND DRUGGIST will be lavishly distributed among the pharmaceutists of the United States. It is believed that the Centenary of the Republic can hardly fail to develop commercial relations between America and Europe, especially in respect to those nations speaking the same language. We ourselves desire to share in the benefits of that extension, by largely increasing our American subscription list. And we wish our advertising friends to secure an advantage likewise; this they can do by making free use of the pages of our next issue, May 15.

We intend to commence immediately the production of a series of groups of portraits interesting to pharmaceutists. Our next number will contain the first of these groups, and will represent the English Board of Pharmaceutical Examiners. The continually growing circulation of THE CHEMIST AND DRUGGIST which this year has been especially noticeable in regard to foreign subscribers, encourages us greatly to increase its literary value by every available means.

The meeting of the Pharmaceutical Council was held on the 5th inst., Mr. T. H. Hills, president, in the chair. The first matter brought forward was an allusion by the president to the loss which the society had sustained in the death of Mr. Tait, of Edinburgh.—The list of nominations for the vacancies on the council was next produced.—There were two vacancies in the list of honorary members. M. M. G. Planchon, of Paris, and Prof. Dewar, of Cambridge, were nominated. Election next month.—The bronze medals competed for in the chemistry and botany classes at the end of the five months' course were awarded thus:—Prof. Redwood's class: Mr. Samuel Newbury, of Westow Street, Upper Norwood. Prof. Bentley's class: Mr. Fredk. W. Place, 2 Upper Street, Islington.—The financial statement was placed before the council, and seems to have been a bad balance-sheet. It is not yet before us, but according to Mr. Betty the council has barely succeeded in making both ends meet; according to Mr. Bottle the income has this year dropped nearly 1,800*l*., the examination and registration fees being mainly responsible for this; according to Mr. Savage the law expenses have jumped from 69*l*. last year to 468*l*. this year; according to Mr. Frazer the same item has only increased from 193*l*. to 385*l*. It was generally agreed that the expenditure must be closely looked after, but some thought this would prove to have been an exceptional year.—The committee to which the reconsideration of the regulations for the prize competition had been referred reported that they had decided that no extension of centres of examination seemed desirable. Mr. Schacht explained that he had attended the meeting and urged his views, but found himself in a minority of one. He thought the committee was unfortunately selected, for, except the vice-president and himself, all present were London men.—A letter was read from Mr. Hanbury, resigning his seat on the council. The president was requested to see him, with the view of inducing him to change his resolution.—The consent of the South Kensington authorities having been obtained, the conversazione was fixed to be held at the South Kensington Museum on May 18, the annual meeting to take place on the same date.

From an answer given to Colonel Leigh by Viscount Sandon in the House of Commons last month, it appears that some legislation in respect to regulating the sale of patent medicines is at present being considered by the Privy Council.

That a scheme for rendering the trade in patent medicines less anomalous by no longer exempting them from the provisions of the Pharmacy Act would be welcomed by a large section of chemists and druggists is certain. Thirty registered chemists of Exeter memorialised their members to this effect, and at a recent meeting of the Midland Counties Chemists' Association a similar memorial was suggested, and will no doubt be executed.

The *Student's Journal*, a reliable authority on the subject, announces that the Medical Defence Association is about to take proceedings under the Apothecaries' Act against other prescribing chemists, and also promises that the case of the Pharmaceutical Councillor who declared that he infringed the law every day will occupy the attention of the association in good time if he continue his practices.

We note with extreme regret the death of Mr. William Tait, senior partner in the firm of Duncan, Flockhart & Co., Edinburgh. Perhaps no man in the ranks of pharmacy was better loved by those who knew him than he; for he had a warm, affectionate nature, and an unvarying cheerfulness, which could not fail to excite reciprocity. Those who enjoyed his company last summer at Bristol will grieve to know that "next year at Glasgow," when many hoped to renew the acquaintance, they

will find instead of himself only the tender memories associated with his name. Mr. Tait was chairman of the Scottish Board of Examiners, and was an excellent botanist and an able pharmaceutist in all respects. He was connected with the firm of Duncan, Flockhart & Co. from his apprenticeship to his death.

We publish the main part of a very practical paper "On the Phosphate Syrups," read by Mr. W. L. Howie, at recent pharmaceutical meetings at Edinburgh and Glasgow. Mr. Howie finds Parrish's "Chemical Food" most indefinite in regard to its composition. Instead of containing 1 grain of ferrous phosphate in the drachm, as professed, he found nine samples vary between ·290 and ·984 of a grain. He also shows that Parrish's published formula could not possibly contain more than gr. ·715 per fluid drachm. The paper treats very thoroughly the chemical decompositions likely to occur in the syrup.

Mr. William Thomson, F.C.S., of the Royal Institution, Manchester, having analysed nearly 200 mixtures prepared by chemists in England and Scotland, and tabulated the results, offered a paper, recording his investigations, to the Pharmaceutical Society. This was at first accepted, but on the day appointed for reading the paper the council discovered some reason for refusing it. They thus managed to excite considerable curiosity in regard to Mr. Thomson's discoveries, and rumours of variegated tints have been circulated thereanent. The paper was afterwards read before the Manchester Philosophical Society, and is this month printed in our columns. We thought that the trade generally would like to hear what was being said of them; and Mr. Thomson, at our request, very courteously placed his manuscript at our disposal. It is of course open to the criticism of pharmaceutists.

One of our correspondents this month shows a neat means of evading the Apothecaries' Act, even with the comprehensive meaning attached to it by Baron Bramwell. He prepares the medicine he desires to sell, labels it with a descriptive name, but one which certainly does not indicate its composition, and then affixes the necessary medicine stamp. "All's fair in love or war," and we can by no means blame our correspondent for his ingenious stratagem in self-defence, for it must be understood that he is watched by a jealous enemy. We see no flaw in his system, and do not believe the Medical Defence Association will be able to find one.

On April 28, at 8 P.M., Dr. B. H. Paul will deliver a lecture on "Cinchona Alkaloids: their Sources, Production, and Use," before the Society of Arts (Chemical Section).

The analysts have scored a success at last *in re* that obstinate foe Milk of Sulphur. A woman keeping a chemist's shop at Greenwich was asked for 2 ounces of "precipitate of sulphur" (so says the *Times* report), and gave the ordinary milk of sulphur—a very correct representation of an unknown substance. The analyst found 45 per cent. of sulphate of lime in it, as might have been anticipated. If "precipitate of mercury" had been asked for, would he have expected mercury neat? There was no one to post the innocent magistrate in the technical weakness of the case, nor to tell him how frequently such prosecutions had been ineffectually attempted. Consequently he fined the defendant 5*s.* and 2*s.* costs. We cannot envy the analysts such a victory as that; but we are sorry for the ratepayers, who have to pay for the prosecution of these frivolous fancies.

The opening of the International Scientific Exhibition has been postponed until May 1, when it will certainly be inaugurated. A very large and splendid collection of instruments, numbering more than 2,500, has been received from Germany. France and Italy, also, are sending valuable contributions. The delay in opening is due entirely, we are informed, to the unexpected richness of the collection.

A committee has been formed to establish a memorial to the late Mr. Daniel Hanbury. The committee at present consists of Dr. Hooker, Sir George Burrows, Sir James Paget, Sir Robert Christison, Dr. Allman, Dr. Warren de la Rue, Professor Abel, and Mr. T. H. Hills, President of the Pharmaceutical Society. Professor Attfield and Messrs. Carteighe and Bremridge are provisional secretaries. It is proposed to establish a "Hanbury" medal, to be awarded for original research in the chemistry and natural history of drugs, to be open to investigators of all nations. No contribution is to exceed one guinea.

The death of Dr. Letheby, at the age of 60 years, has been announced.

THE PROPERTIES OF THE COCA LEAF OF SOUTH AMERICA (*ERYTHROXYLON COCA*).

By P. L. Simmonds.

THE properties of the Coca leaf having again become the subject of discussion and inquiry, owing to its use by Weston, the pedestrian, in his recent feat, and from the attention drawn to it last year by Sir Robert Christison, it may be well to condense such details and information as are available, in order that the alleged merits of this vegetable substance may be more seriously inquired into. For as yet there is a good deal of discrepancy in the accounts published, and no fair opportunity has been afforded for testing its merits and virtues in Europe, where the leaf has only been received in a dry and unsatisfactory state. What is wanted is the opportunity of analysing it in its fresh condition, and more accurate and detailed information as to how long it retains its asserted invigorating and sustaining properties.

The address of Sir Robert Christison to the Edinburgh Botanical Society last year having been the means of drawing attention here to the alleged virtues of the coca leaf, many ineffectual endeavours have been made by chemists to obtain tolerably fresh samples.

Sir Robert Christison, an elderly man, relates how he made the ascent of Ben Voirlich, and, arriving at the summit greatly fatigued, chewed a portion of coca leaves, and found himself able to make the descent with firmness and juvenile elasticity. He, moreover, adds that with the assistance of the coca leaf he could walk 16 miles with ease, while without it he felt (on other occasions) very much fatigued. According to Dr. Alexander Burnett, this plant, when taken into the system, affects the pulse and respiration, increasing both in frequency, and the former in force at first; subsequently, if the dose is large, it diminishes both.

Dr. Pigeaux, of Paris, after a trial of several months with leaves submitted to him by the Society of Acclimatisation, reports, in their "Bulletin" for March, 1865 (vol. 2, second series, p. 112), that he found it less exciting to the nerves than either tea or coffee, and that from its comparative cheapness it was far preferable to much of the second-rate tea sold. It might be made, he says, the beverage of children, infants, and brain workers, and it ought also to be used in the army and navy, and by all hard toilers. Like all leaves dried simply by desiccation, it soon imbibes moisture, but its valuable properties might be preserved by transport in well-closed cases, or in sacks lined with tinfoil.

A decoction of the leaves has long excited attention in France as possessing a peculiar stimulating power, and favouring digestion more than any other known beverage, and a tonic wine and an elixir are made from them. It seems to be admitted that the leaves, chewed in moderate doses of from four to six grains, excite the nervous system, and enable those who use them to make great muscular exertion, and to resist the effects of an unhealthy climate, imparting a sense of cheerfulness and happiness. In larger doses it is alleged that coca would occasion fever, hallucinations, and delirium. Its exciting power over the heart is twice that of coffee, and four times that of tea.

In South America the leaves are used in various ways—dry, masticated, or chewed in a bolus, sometimes in infusion either alone or mixed with alkalies, potash, or lime.

We should have to go back to the early mythological history of Peru to discover the first traces of the use of coca, but the leaves have played, and continue to play, an important part in

tho habits of the natives. The Incas retained in their own hands the exclusive monopoly of the supply, and distributed the leaves as a special favour to their nobility and the foreign chiefs who voluntarily submitted to their laws.

These leaves were also the appendage of the priests of the Sun, constituting one of the essential bases of their religious ceremonies, and popular superstition transformed them into a symbol of the divinity.

The Spanish conquerors profited by this superstition, and maintained the culture and promoted the consumption by supplying large quantities to the administrations of mines, by which means colossal fortunes were rapidly made. In tho 16th century plantations, of which the rents ranged from 20,000 up to 200,000 francs, were by no means rare, and the tax levied became considerable.

The mines of Potosi, which alone used up 90,000 to 100,000 bales of 25 lbs. each, yielded a revenue to the Government of 100,000*l*. In some of the succeeding centuries the interior commerce in coca rather declined, owing to foreign, religious, and other causes, but about 1794 it again increased, and advanced to 600,000*l*., and in later years even exceeded this sum.

An extended notice showing the effects of coca on the system was published by Dr. Mantegazaga, of Milan, a translation of which appeared in the *Pharmaceutical Journal* in June, 1860. He found that it had a comforting and satisfying effect on the stomach, but after a time a slight burning sensation in the mouth and pharynx and an increase of thirst were noticed. It also caused a circumscribed erythema, an eruption around the eyelids resembling pityriasis, and from time to time a not unpleasant pricking or itching was felt. An infusion of coca increased the action of the heart, and the pulse rose from 70 to 134 beats. From his experiments he drew the following conclusions:—

The leaves, chewed or taken in weak infusion, have a stimulating effect on the nerves of the stomach, and thereby greatly facilitate digestion.

In a large dose coca increases the animal heat and augments the frequency of the pulse, and consequently of respiration. In a medium dose, three or four drachms excite the nervous system in such a manner that muscular exertion is made with great ease: then it produces a calming effect. Used in large doses it causes delirium, hallucination, and, finally, congestion of the brain.

All travellers who have visited Peru attribute to the use of this leaf by the Indian miners the power of sustaining hard toil. Possessing an exciting and tonic property, it enables them to withstand famine, thirst, want of sleep, severities of climate, the injurious metallic exhalations from mines, and to support excess and fatigue night and day. Hence it has been thought it might render equal service to travellers who have to pass through marshy lands and polar regions, by rendering them less sensible to miasmatic fevers and extreme cold.

All the Indians, indiscriminately, chew the coca leaf as sailors do tobacco, and when it has become slightly saturated with saliva they add what is called locally the "llipta," which is a small hardened cake composed of lime and calcined wood ashes. In some districts they only add a little quick-lime. Each Indian carries, suspended from his belt, a small calabash containing the coca leaves, from which he helps himself with a spoon or bent stick as occasion requires.

Mons. E. Colpaert, in an interesting account of the culture of coca in Peru ("Bulletin Soc. of Accl.," Paris, 1862, p. 956), states that it appears that this leaf has the property of allaying the craving of a deficiency of food, and that a person who uses it can subsist many days without eating, and without being sensibly debilitated. Also that an Indian has made a journey of 200 or 300 leagues, executing daily his 60 miles, nourished solely by coca leaves, without his health suffering.

But while he believes and admits that coca is a strengthening substance, he is of opinion that its abuse has very injurious effects upon the intellectual faculties. Any one who has visited a mineral district there will have noticed this, for there the Indian miners use this leaf to excess. Not content with chewing it from the moment they awake to the time they go to sleep, they even indulge in it during the night, and it ultimately reduces them to a complete state of idiotcy, brutalising them as opium does the Chinese when taken in excess.

M. Colpaert says that often when passing the grand chain of the Andes he has chewed coca to combat the cold, and always with the best effect. The leaves have a bitter taste, but do not burn the tongue, as is alleged. Those who use it continually, and with "llipta," have an insupportable smell.

The first time he tasted it he felt, after a few minutes, slight shiverings of fever, the blood mounted to his head and pressed forcibly on the temples. He felt this for about ten minutes, after which a complete reaction took place, and he experienced from head to foot a pleasant and agreeable heat. Arrived in the evening at his resting-place, he took coca in the shape of tea before going to sleep, only throwing away the first steeping and drinking the second water of infusion. Notwithstanding the snow and the intensity of the cold, he experienced a pleasant heat, perspiring so freely as to wet the mattress.

The Indians attribute to coca many virtues, and employ it in different forms. It is for them an indispensable and favourite sustenance, for the deprivation of every other substance is less felt by the Indian than that of his favourite coca.

Every traveller passing through the country should lay in a stock, for it is the best medium of currency, and that most appreciated among the Indians. Often in the mountains not a thing could be obtained with dollars or coin of any kind, but a handful of coca will act on the Indian like a talisman, and for it he will place his hut and all that it contains at your disposal. They also use coca leaves for every external malady, whether it be a cut in the hand, to stop hæmorrhage, to heal ulcers and boils, or for neuralgia and headache. In the latter case a moistened leaf of coca is applied to each temple, and, whether it be superstition or reality, immediate relief is said to be obtained. The following narrative of the virtues attributed to coca by the Indians was told M. Colpaert by actual witnesses of the proceedings.

In one of his later journeys to Vilcabamba, one of the richest mineral districts of Peru, he arrived in the town at the moment when they were carrying out to his home one of the miners, who for many years had been afflicted with a dreadful malady, which defied all the efforts of medical skill to cure. His body was covered with external ulcers, and the unfortunate given over as incurable, and, suffering martyrdom, implored to be put to death. An old Indian, who had formerly worked under his orders, demanded permission to undertake his cure, which was granted. The patient was laid on the floor of the room, stripped, and half a dozen Indians commenced chewing coca and llipta, singing and dancing round him with strong cabalistic actions. After about a quarter of an hour, when the leaves had been sufficiently masticated and impregnated with saliva, evidenced by the abundant foam, they again commenced dancing round and spitting on the body of the unfortunate. This lasted for about half an hour, when each Indian placed his quid of chewed coca on the ulcers of the patient, who was then enveloped in cloths, and left to repose. The same scene was renewed every two days, and at the end of the month the patient, who was named Gonzales, was thoroughly cured. This treatment took place in 1850, and he was living eleven years after, when M. Colpaert wrote his narrative.

Poppig, Waddell, Von Martins, and others have pronounced favourably on the chewing of coca; but Von Tschudi and Dr. Scherzer (who accompanied the Austrian *Novara* expedition) give the most remarkable accounts of its stimulating effects.

The former informs us that during his stay in Peru he employed an Indian in some very fatiguing digging for five days and five nights, and that this man did not partake of any food during the whole time, and rested even only two hours in the night; but he constantly chewed coca leaves, consuming an ounce every two or three hours. After the work was done the same individual accompanied Von Tschudi during a ride of 63 English miles over elevated plains, keeping pace with his mule, and taking only a short rest for his coca chewing. After all these hardships he was quite willing to go through them again without eating anything, provided he had plenty of coca supplied him.

A similar case is reported by Dr. Scherzer, where an Indian accomplished a journey of 243 English miles in four days. After resting for one day, he set out for his return, on which he was obliged to pass a mountain of 13,000 feet in height. He actually returned on the fifth day, and during the whole journey there and back he had only taken a little roasted maize and plenty of coca.

Those who once take to coca chewing can scarcely abstain from it, and in this respect coca shows even a greater power on human habit than tobacco does.

From the general observations made, a moderate use of coca does not appear to be injurious to health, and Von Tschudi even

feels inclined to think the contrary, basing his opinion on the fact that many Indians attain a very great age without losing any of their mental faculties.

Dr. Pickering, in his "United States Exploring Expedition," states that he found "coca formed the resource and consolation of the miners of Alpamarca, and its use in preference to tobacco had extended to European residents. I was here first struck with the superior powers of endurance of the aboriginal American, an important item, as it has appeared to me, in the profitable working of the South American mines.

"Whilst ascending on foot to the mines of Alpamarca, we remarked the frequent necessity of resting for the sake of taking breath. The cause did not seem difficult of explanation, for at the elevation of 15,000 feet the atmosphere had lost one-half of its density, so that we were obliged to double the number of our inspirations to procure our accustomed supply of air. The English superintendent stated that 'a residence of years does not relieve this shortness of breath and inability of long-continued muscular exertion, and that the aboriginals born on the spot suffer equally with strangers.'"

The coca plant is described by Castelnau as a bush which rarely attains six feet in height, and does not often exceed three: its foliage is of a bright green, its flower white, and its fruit small and red. When the plants are about eighteen inches high they are transplanted from the seed beds into fields called cocales. The mature leaves are gathered with the fingers: they are dried by spreading them in the sun, sometimes on woollen cloths. This operation requires great care, for the plant must be protected from all dampness, which changes its colour and thus diminishes its value. It is then packed in bags, weighing from 50 to 150 lbs., which are afterwards transported to great distances. The large heaps of the freshly-dried leaves, particularly while the warm rays of the sun are upon them, diffuse a very strong smell, resembling that of hay in which there is a quantity of milfoil It is doubtful whether the fruit, which is in the form of a small cherry, would bear transport across rigorous and variable climates.

Dr. Poppig reckoned the profits of a coca farm to be 45 per cent. The annual produce of coca in South America is reckoned at 30,000,000 lbs. Coca will not answer where there is frost, but requires a pretty equal climate throughout the year, like coffee or cinchona. The smell of the leaf is agreeable and aromatic, and when chewed it gives out a grateful fragrance. The properties are to enable a greater amount of fatigue to be borne with less nourishment and to prevent the occurrence of difficulty of respiration in ascending mountain sides. This would be a great boon in India, and even in parts of Europe. Mr. C. R. Markham, in his "Travels in Peru," says, "I chewed coca, not constantly, but very frequently, and besides the agreeable soothing feeling it produced, I found I could endure long abstinence from food with less inconvenience than I should otherwise have felt, and it enabled me to ascend precipitous mountain sides with a feeling of lightness and elasticity, and without losing breath."

In Peru coca is almost confined to the Urubamba Province, and is not exported from the coast, as it is consumed in Cuzco, Puno, and Arequipa. It is considered inferior to the coca of the Yungas, Bolivia, which is most esteemed by the Indians. The annual production of the leaf of this plant in Bolivia is estimated at 600,000 arrobas of 25 lbs. It grows in abundance on the surface of the Yungas of the Department of La Paz. The Indians, of whom there are about a quarter of a million in the State, chew it continually, as it has the reputation of staying hunger, allaying thirst, and doing away with the necessity of sleep.

This plant is also cultivated in vast tracts of Peru known under the name of cocales.

This plant is indigenous to the valleys of Bolivia, and is cultivated with much care for its leaf, which is collected three times a year. It requires a warm and humid climate, where the temperature is never below 10° Reaumur. It resists great heat, but will not survive the slightest frost. The shrub, which attains a height of 2 feet to 4½ feet, has a thick and handsome foliage.

From time immemorial the dried leaves have been used by the Indians. They attribute to its juice nourishing and fortifying properties, which contribute to the extraordinary sobriety of the native races of Peru and Bolivia. However, its usage has not been adopted by the Spaniards or their descendants, who, besides a want of appreciation of the flavour, are of opinion that it stupefies the intellectual faculties.

DISPENSING TESTED.

*On the Degrees of Accuracy Displayed in the Dispensing of Physicians' Prescriptions by Druggists in Different Towns throughout England and Scotland.** By William Thomson, F.C.S. (*Royal Institution, Manchester.*)

THE results obtained by Mr. Allen, the public analyst for Sheffield, a short time ago, in reference to the inaccuracies displayed by druggists in making up prescriptions, led me to believe that it would be interesting to have the same prescription dispensed by different druggists in different parts of England and Scotland, and by analyses to decide the *range* of inaccuracies, if any. By the aid of my friend, Dr. Sinclair, of Manchester, to whom I am indebted for much subsequent help, I was furnished with two ordinary prescriptions, the principal ingredients of which admitted of very accurate determination, as I shall afterwards show.

The prescriptions were as follows:—

℞. Potass. Iodid. .. .. 3ij.
Sp. Chlorof. .. .. 3j.
Aq. ad .. .. ℥vj.
M. 3ss. ter die.

℞. Zinci Sulphat... .. .. 9ij.
Aq. Pur. .. .. 3ij.
M. Fiat Lotio.

The processes of analysis were so simple for both that it leaves little doubt as to the accuracy of the results. The specific gravity of each solution was first taken. 100 grains measure at 60° Fahr. were then placed in clean, accurately tared and marked platinum capsules, weighing from 180 to 200 grains each; the fluids were then carefully evaporated to dryness on a water bath, those containing the potassium iodide being afterwards heated in an air-bath at 220° Fahr. till they ceased to lose weight, whilst those containing the zinc sulphate were dried at 220° Fahr. and afterwards heated to dull redness, to drive off the last atom of water of crystallisation, and the anhydrous zinc sulphate calculated into the crystalline or hydrated zinc sulphate. These prescriptions, then, contained no ingredient which could interfere with the direct determination of the salt introduced. I give the dispensers, in this paper, the advantage of not estimating the actual proportion of the pure salt, but the total of what had been added by them. The first prescription should have been made up to a total fluid measure of 6 ounces (2,625 grains), which quantity should have contained 120 grains of potassium iodide. The second prescription should have been made by adding 40 grains of crystallised zinc sulphate to 2 ounces of water, which would make a total fluid measure of 893 grains, but as few gave either the exact measure of liquid, or weight of solid, I found it necessary to make three columns of figures in the following tables for each prescription—the first to show the amount of liquid measured out; the second to show the total amount of solid weighed out; and the third, as a comparison of the actual strength of the different fluids, which is made by calculating the amount of potassium iodide which would be contained in exactly 6 ounces (2,625 grains measure) of the mixture, and the amount of zinc sulphate which would be contained in exactly 893 grains measure of the lotion supplied by each druggist.

It will, of course, be clearly seen that if the potassium iodide or zinc sulphate were damp, or in bad condition, although the weighings may have been made with absolute accuracy, the actual amount of the salts found on analysis would be less than that weighed; but this is equally a fault, because dispensers ought to have all their drugs in good condition. The following table will show the results of the analysis of eighty-one samples of the potassium iodide mixture, and the same number of the zinc sulphate lotion, one sample of the mixture and one of the lotion having been dispensed by each druggist; besides which, at the suggestion of Dr. Sinclair, I have annexed the prices charged by each for the two bottles, as in his opinion it might prove of general interest to dispensers; besides which, the table would not be so complete without it, as it makes a comparison between the amounts charged and the accuracy given by each dispenser, and I presume that those who charge most should dispense in a manner approaching nearest to perfection. I may further state that from each important town I endeavoured as far as possible to have one lot dispensed by a druggist having

* This paper was accepted by the committee of the Pharmaceutical Society of Great Britain to be read before them, and subsequently, on the day advertised by them for its reading, rejected by the council. It was read before the Manchester Philosophical Society on March 7, 1876.

the highest reputation, and another by one of the lowest class, but I found it difficult to carry out this exactly, so that the prescriptions have been made up more generally by high-class or respectable druggists than by those of a lower class. I have, however, as far as possible, marked those who could be recognised as having decidedly large and respectable shops, and those that were decidedly low-class; the others may all be accepted, I believe, as respectable, and many may even be termed high-class, druggists.

TABLE I.

[In this and succeeding tables the sign * after the name of the town indicates "large" shop; †, "medium;" ‡, "low;" §, "small."]

No.	Name of Town, etc.	Prescription containing Iodide Potassium: Total amount of Fluid measured out by the Druggist	Prescription containing Iodide Potassium: Total amount of Potassium Iodide weighed out by the Druggist	Prescription containing Iodide Potassium: Strength equal to amount of Iodide contained in 6 fluid ozs.	Prescription containing Sulphate of Zinc: Total amount of Fluid measured out by the Druggist	Prescription containing Sulphate of Zinc: Total amount of Zinc Sulphate weighed out by the Druggist	Prescription containing Sulphate of Zinc: Strength equal to amount of Sulphate contained in 893 fluid grs. (about 2 ozs.)	Prices
		Grains (measure)	Grains (weight)	Grains (weight)	Grains (measure)	Grains (weight)	Grains (weight)	
		The solutions *ought* to contain						
		2,625	120	120	893	40	40	
	Scotland.							*s.* *d.*
1	Aberdeen*	2,650	119·3	118·1	860	40·1	41·7	1 6
2	Aberdeen†	2,650	120·6	119·4	910	41·2	40·4	1 6
3	Small village in Kincardineshire†	2,830	122·5	113·7	890	3[illegible]·5	[illegible]6·6	2 0
4	Cupar Fife†	2,740	128·5	123·1	850	40·4	4[illegible]·5	1 10
5	Inverness*	2,760	122·3	11[illegible]·3	760	3[illegible]·3	46·1	2 2
6	Inverness†	2,840	118·7	109·7	910	41·2	40·4	1 8
7	Banff†	2,710	120·0	116·6	940	47·4	45·0	1 6
8	Banff†	2,800	122·4	114·7	810	36·1	39·8	1 8
9	Dundee*	2,590	120·7	122·3	870	41·2	42·3	2 2
10	Dundee†	2,740	119·7	114·7	910	35·7	35·0	1 6
11	Glasgow*	2,730	103·6	99·6	810	45·2	49·8	2 2
12	Glasgow†	2,520	116·4	121·3	880	36·5	37·1	2 4
13	Glasgow‡	2,600	116·7	117·9	950	42·5	39·9	2 2
14	Edinburgh†	2,520	119·4	124·4	870	42·3	43·4	2 4
15	Edinburgh*	2,600	135·7	137·1	910	40·[illegible]	39·8	2 6
16	Edinburgh‡	2,790	128·9	121·3	860	32·5	33·7	2 0
17	Airdrie†	2,750	141·6	135·2	860	43·2	44·9	2 0
18	Airdrie†	2,800	121·8	114·2	920	41·3	40·1	2 6
19	Greenock†	2,320	120·4	136·2	810	53·8	59·3	1 10
20	Greenock*	2,410	121·5	130·7	800	[illegible]0·9	45·7	2 8
21	Dumfries†	2,580	120·5	122·6	940	45·7	43·4	2 0
22	Dumfries†	2,490	127·6	134·5	920	41·6	40·4	2 0
	England.							
23	Carlisle†	2,590	112·9	114·5	890	39·3	39·5	2 0
24	Carlisle†	2,810	102·1	95·4	965	40·7	37·7	2 0
25	Lancaster†	2,560	121·6	124·7	825	41·0	44·4	1 8
26	Lancaster†	2,730	120·7	116·6	820	39·9	43·4	1 10
27	Preston‡	2,700	116·9	113·7	920	35·2	34·2	2 0
28	Preston*	2,560	118·3	121·3	920	56·1	54·4	2 6
	Manchester:							
29	City*	2,590	121·6	123·3	885	33·3	38·7	2 9
30	City*	2,660	123·2	121·6	1,020	39·8	34·8	2 8
31	City*	2,750	135·9	129·7	910	41·8	41·0	2 8
32	City†	2,360	118·3	131·6	900	39·9	3[illegible]·6	2 4
33	City*	2,670	115·3	113·4	870	37·8	38·8	2 9
34	Oxford Street†	2,650	114·1	113·0	900	40·9	40·6	2 9
35	Oxford Street*	2,630	119·0	118·8	940	40·4	38·3	2 9
36	Didsbury†	2,610	119·8	120·5	965	42·1	39·0	2 6
37	Strangeways†	2,700	113·0	109·8	830	38·7	41·7	2 0
38	Strangeways†	2,800	121·8	114·2	870	40·8	41·8	1 0
39	Lower Broughton*	2,400	116·6	127·5	840	38·3	40·7	2 4
40	Deansgate‡	2,520	104·2	108·5	1,190	45·6	34·2	1 6
41	Great Ancoats St.‡	2,630	119·1	118·9	860	40·4	42·0	2 0
42	Ardwick‡	2,300	117·8	134·4	860	57·2	59·3	1 6
43	Pendleton†	2,690	120·8	117·9	820	44·0	47·9	2 2
44	Pendleton†	2,720	117·8	113·6	900	40·1	39·8	2 6
45	Patricroft‡	2,560	107·6	110·3	930	45·4	43·6	2 6
46	Patricroft‡	2,780	119·4	112·7	950	39·1	36·8	2 0
47	Eccles†	2,820	119·1	110·9	900	41·5	41·2	2 6
48	Eccles‡	2,620	126·7	126·9	960	39·9	37·1	1 8
49	Stretford Road†	2,590	123·0	124·8	900	46·0	45·7	2 4
50	Stretford†	2,440	116·5	125·4	950	41·5	39·0	2 0
51	Stretford†	2,620	120·9	120·5	830	42·3	45·4	1 9
52	Bowdon†	2,530	110·9	112·4	840	28·6	[illegible]·0·4	2 3
53	Bowdon†	2,600	114·9	116·0	990	39·7	35·8	2 6
54	Altrincham‡	2,550	104·8	107·9	810	8·1	8·9	2 0
55	Altrincham†	2,660	126·1	124·4	800	45·3	50·6	2 0
56	Southport†	2,670	122·3	120·8	940	38·2	36·3	2 6
57	Southport‡	2,670	99·9	98·2	960	22·6	21·0	1 6
58	Blackpool†	2,520	120·9	126·0	890	41·7	41·8	2 2
59	Blackpool†	2,560	116·7	119·7	955	42·5	39·8	2 2
60	Oldham‡	2,620	60·5	60·6	985	31·8	28·8	1 4
61	Ashton-under-Lyne†	2,720	122·1	117·9	900	39·4	39·1	2 0
62	Warrington†	2,820	125·8	117·1	850	38·9	40·9	1 9
63	Warrington†	2,910	119·1	106·3	960	38·3	35·6	2 0
64	Nantwich†	2,680	119·5	117·1	890	39·6	39·1	1 10
65	Derby†	2,810	120·3	112·4	980	39·8	36·3	1 6
66	Derby*	2,710	121·1	117·3	840	41·9	44·6	2 2
67	Loughborough*	2,550	116·3	119·7	880	38·6	39·1	1 6
68	Loughborough†	2,690	44·2	43·1	930	39·9	38·3	1 1
69	Nottingham†	2,640	123·8	128·1	890	39·6	39·8	1 4
70	Nottingham*	2,690	122·4	119·4	850	40·0	42·0	1 0
71	Kegworth‡	2,530	116·9	121·3	910	40·2	39·4	2 9
72	Chesterfield†	2,640	117·7	117·1	920	36·9	35·8	1 9
73	Birmingham*	2,580	119·5	121·5	810	39·8	43·9	2 2
74	Birmingham‡	2,520	115·7	120·5	900	38·0	37·7	1 6
75	Norwich‡	2,490	114·5	120·8	890	38·2	38·3	1 9
76	Norwich*	2,620	121·6	121·3	930	41·3	39·6	2 4
77	London*	2,660	118·4	116·8	940	39·7	37·7	2 9
78	London†	2,580	101·6	103·4	870	41·5	42·6	0 9
79	Weymouth†	2,550	123·7	127·3	890	40·6	42·2	2 0
80	Weymouth*	2,660	117·0	115·5	910	39·2	38·5	2 0
81	Liskeard, Cornwall†	2,610	104·0	104·6	850	43·3	45·4	1 8

The figures given in the above table show the amounts of anhydrous potassium iodide in the mixture, and of zinc sulphate containing 7 molecules of water of crystallisation in the lotion.

It might be well to mention here with regard to the verification of these figures that the analysis of each sample which deviated beyond five grains in the potassium iodide or zinc sulphate from the prescribed amount was repeated, and the results of the second analyses found in each case to agree with that of the first. The specific gravities of all the lotions closely coincided with the amounts of zinc sulphate found, but in the mixtures, owing to the different amounts of spirit of chloroform which had been added on the one hand, and the difference in the actual composition of that spirit of chloroform on the other, the specific gravity was no indication to the quantity of potassium iodide present. In looking over the above table it will be seen that only two druggists out of the eighty-one have given the exact weight of potassium iodide; thirty-four have given *more* than the prescribed amount, and forty-five *less*; but it may be of further interest to notice that when the whole of the quantities of potassium iodide given by the eighty-one different druggists are added together the total quantity comes to 220½ grains less than it would have been if each druggist had dispensed the exact quantity. Again, in the lotion, only one druggist out of the eighty-one gave the exact weight of zinc sulphate; forty-three have given *more* than the prescribed amount, and thirty-seven *less*; and when the whole of the quantities of the zinc sulphate given by the eighty-one different druggists are added together it comes to only 12½ grains *more* than it would have been if each druggist had dispensed the exact quantity. This *résumé* seems to show that a larger percentage of druggists have given less weight for the more expensive drug, viz., potassium iodide, than for the zinc sulphate, the value of which is infinitesimally small; but still, no one can come to the conclusion that this is really done with dishonest intention in the large majority of cases. I think, however, that no one can have a doubt about the want of care which is shown generally in dispensing by the above table. A large percentage have dispensed within a range of inaccuracy which many might consider reasonable. I have, however, made all my estimations with analytical accuracy, and I think it must be left to the medical profession to decide what limits of error they consider might be allowed. With the view to decide what amount of inaccuracy a pharmacist would consider allowable, I consulted a gentleman who is a partner in an establishment which does a considerable business in dispensing. After informing him of the investigation I had been making, I asked him what amount of inaccuracy he would consider allowable in dispensing 120 grains of potassium iodide in 6 ounces of fluid, and also for 40 grains of zinc sulphate in 2 ounces of fluid. He considered that in both cases they ought to be absolutely accurate, but if I allowed three-tenths of a grain either way I should be allowing sufficient for all practical purposes. I have, however, been still more lenient than my pharmaceutical friend, and have allowed five-tenths of a grain on either side of the prescribed quantity as the range of practical accuracy. I know that many dispensers will take objection to this range of inaccuracy as impracticable. We, as analysts, can weigh easily the one-hundredth part of a grain, and I know that balances used by dispensers for weighing such quantities as 120 grains are capable of turning with the tenth part of a grain if kept in good condition, and it would, therefore, be absurd for anyone to contend that it is impracticable to weigh drugs within half a grain. On these premises, then, I have formed the following summaries of the above results.

For the potassium iodide mixture, two druggists out of the eighty-one have given the exact weight of the prescribed amount; nine out of the eighty-one have come within the practical range of accuracy; fifty-five out of the eighty-one have weighed within 5 grains either way of the prescribed amount; whilst the remaining twenty-six have made greater errors. For the zinc sulphate lotion, only one druggist out of the eighty-one gave the exact weight of the prescribed amount; nineteen out of the eighty-one have come within the practical range of accuracy; fifty-one out of the eighty-one have weighed within 2 grains either way of the prescribed amount; whilst the remaining thirty have made greater errors.

In the actual measuring of the fluid I have assumed that measurements within 5 fluid grains either way are absolutely correct, whilst within 15 grains either way are practically correct.

For the potassium iodide mixture, six dispensers out of the eighty-one have measured correctly; eleven out of the eighty-one have come within the range of practical accuracy; thirty-two have measured within fifty grains (a teaspoonful) of the prescribed amount; whilst the remaining forty-nine have made greater inaccuracies. For the zinc sulphate lotion, six dispensers out of the eighty-one have measured correctly; sixteen have measured within the range of practical accuracy; twenty-eight have measured within 25 grains of the prescribed amount; whilst the remaining fifty-three have made greater inaccuracies.

Lastly, with respect to the strength of the solution, some dispensers may make both their weighings and measurements in excess or deficiency, and in that case the strength might be exactly what is required; whilst others may have weighed correctly and measured incorrectly, or *vice versa*, and in that instance the strength of the solution, which is the most important point, would be wrong.

Not one dispenser succeeded in making the prescription to the exact strength in either the mixture or lotion.

In the potassium iodide mixture, five out of the eighty-one dispensers have come within the range of practical accuracy; forty have made the strength of the mixture within 5 grains more or less than the prescribed amount; whilst the remaining forty-one have made greater errors.

In the zinc sulphate lotion, fourteen out of the eighty-one dispensers have come within the range of practical accuracy; forty-five have made the strength of the lotion within 2 grains more or less than the prescribed amount; whilst the remaining thirty-six have made greater errors.

It may be interesting, before leaving this part of the subject, to make a few further observations on the dispensing of these solutions.

We found that the mixture of No. 74, dispensed by a man in Birmingham, was strongly alkaline to test paper, and I submitted its contents to further analysis and found that, out of the 115·7 grains represented in the table, 100·1 were composed of carbonate of potash, and 15·6 of iodide of potassium, &c. From this large proportion, it seems as if the former salt had been intentionally added, along with a small proportion of potassium iodide. One (No. 48) from Eccles contained 2·5 grains of carbonate of potash in the 126·7 grains weighed out. Many were absolutely free from carbonate of potash and many contained traces of that salt. No. 46 had both the mixture and lotion corked with very dirty corks. The dispenser of No. 16 (from Edinburgh) put in a preparation of orange instead of spirit of chloroform. No. 4 (from Cupar Fife) added the spirit in such proportion that it possessed the smell of whisky; whilst No. 18 (from Airdrie) dispensed the chloroform without any spirit, so that the chloroform remained insoluble at the bottom of the bottle.

This mistake might have proved serious if some ignorant patient had taken the last dose of the bottle, which would have contained all the chloroform which had been added. The seven mixtures to which the following numbers relate contained disagreeable-looking sediments—17, 24, 45, 46, 56, 74, and 78.

One more potassium iodide prescription was made to contain the same quantity of salt as the others, but the solution only made up to two instead of six ounces. The following shows the result:—

TABLE II.—POTASSIUM IODIDE PRESCRIPTION.

No.	District	Actual measure of the mixture dispensed (in fluid grains)	Actual amount of Potassium Iodide weighed out by the Druggist	Strength of the mixture calculated on the two ozs.	Price
		The mixture as prescribed.			
		875	120 grs.	120 grs.	
1	Manchester: Stretford Road ...	895	123·1	120·4	s. d. 1 2

With the view to test further the range of inaccuracies in other and more valuable medicines, Dr. Sinclair and I arranged to have a few different prescriptions dispensed, and he accordingly wrote out five, having the following composition:—

℞. Argent. Nitrat. .. .. 3j.
Aq. Distillat. .. .. ℥j.
M. Fiat lotio. To be kept from the light.

These were subjected to analysis, and the following table shows the results:—

TABLE III.—SILVER NITRATE PRESCRIPTION.

No.	District	Actual measure of the lotion dispensed (in fluid grains)	Actual amount of Silver Nitrate weighed out by the Druggist	Strength of the lotion calculated on 447·5	Price
		The lotion as prescribed.			
		447·5	60·0	60·0	
	Manchester:				s. d.
1	Moss Side West...	410	59·8	65·3	1 0
2	London Road‡.....	425	44·8	47·2	1 0
3	Oxford Street	425	57·4	60·4	1 6
	Liverpool:				
4	Great Homer St.‡	433	73·2	75·6	1 4
5	London, E.C.	365	55·0	72·3	0 8

The figures in this table show the amounts of anhydrous silver nitrate contained in the solutions.

These show that not one of them has given the exact weight of this drug; only one came within the range of practical accuracy; three came within the range of 5 grains, and two made inaccuracies of upwards of 13 grains. In measuring none came within the range of absolute accuracy, viz., 5 grains either way, and only one came within the range of practical accuracy. In strength one came within the range of practical accuracy. The others made errors of over 5 grains.

The next prescription was the following:—

℞. Quin. Sulphat. .. .. 3j.
Acid. Hydrochlor. dil. .. .. .. 3j.
Aq. .. .. ad ℥ij.
M. Sig. One teaspoonful to be taken in a wine-glass of water twice a day.

Two of these prescriptions were dispensed, and three more containing the same amounts of quinine sulphate and hydrochloric acid, but made up to 6 instead of 2 ounces measure.

These were submitted to analysis, with the following results:—

TABLE IV.—SULPHATE OF QUININE PRESCRIPTION.

No.	District	Actual measure of the mixture dispensed (in fluid grains)	Actual amount of Quinine Sulphate weighed out by the Druggist	Strength of the mixture calculated on the two ozs.	Price
		The mixture as prescribed.			
		875	60 grs.	60 grs.	
	Liverpool:				s. d.
1	Lime Street	920	59·7	56·8	3 6
2	London, E.C.‡.....	900	42·0	40·6	2 6

In No. 2 the hydrochloric acid of the prescription had not been introduced, and most of the quinine sulphate remained undissolved.

No.	District	Actual measure of the mixture dispensed (in fluid grains)	Actual amount of Quinine Sulphate weighed out by the Druggist	Strength of the mixture calculated on the six ozs.	Price
		The mixture as prescribed.			
		2,625	60 grs.	60 grs.	
3	Lancaster, Town ...	2,660	56·3	56·1	s. d. 3 0
	Manchester:				
4	London Road	2,700	64·5	62·7	1 6
5	Liverpool, Bootle ...	2,810	59·7	55·8	2 2

The figures in these tables represent the amounts of quinine sulphate, containing 7 molecules of water of crystallisation.

In this it will be noticed that in the quantities weighed none of the five dispensers arrived at absolute accuracy, two came within the range of practical accuracy, and the remaining three are outside this mark; none measured within the range of either absolute or practical accuracy, and none came within the range of either absolute or practical accuracy in the strength of their solution.

The third and last prescription was the following:—

℞. Ferri et Quin. Citrat. .. .. .. 3ij.
Aq. .. .. ℥vj.
Sig. ℥ss. ter die.

Two of these prescriptions were dispensed, and one containing the same amount of salt, but made up to 2 instead of 6 ounces.

The results of the analysis are as follows:—

TABLE V.—CITRATE OF IRON AND QUININE PRESCRIPTION.

No.	District	Actual measure of the mixture dispensed (in fluid grains)	Actual amount of Quinine and Iron Citrate weighed out by the Druggist	Strength of the mixture calculated on the 2,690 grs.	Price
		The mixture as prescribed.			
		2,690	120 grs.	120 grs.	
	Manchester:				s. d.
1	Hulme	2,690	122	122	1 6
2	London, E.C.	2,570	140	146·5	1 9

No.	District	Actual measure of the mixture dispensed (in fluid grains)	Actual amount of Quinine and Iron Citrate weighed out by the Druggist	Strength of the mixture calculated on the 940 grs.	Price
		The mixture as prescribed.			
		940	120 grs.	120 grs.	
	Manchester:				s. d.
3	Oxford Road.....	985	107	102·1	2 6

The figures in these tables represent the iron and quinine citrate, plus 10·5 per cent., the amount which we found the salt to lose on drying at 212° Fahr.

Not one of these three came within the range of absolute or practical accuracy in either the weight or the strength of solution. One, however, measured with absolute accuracy; the remaining two were out of the range of practical accuracy in every respect.

In concluding, it may be of some importance to mention that in the dispensing of these prescriptions, in the large majority of cases, and generally in the more respectable shops, no questions were asked of the purchasers, and no remarks made, but in a few cases, and especially in those shops of a lower class, questions of rather an impertinent nature were asked; in one, not only was the patient's name demanded, but the name of the medical man who prescribed; and in another instance the druggist actually refused to dispense a prescription containing 10-grain doses of quinine sulphate, on the ground that the dose was excessive, and one who did dispense it remarked that the dose was a strong one.

The bearing of these facts on the relative position of the physician, patient, and druggists, although of much importance, especially to the medical profession, does not come within the scope of my paper.

In conclusion I must express my best thanks to our assistant, Mr. Percy J. Winser, for the painstaking and accurate manner in which he has helped me in this investigation.

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The reading of the foregoing paper before the Manchester Literary and Philosophical Society elicited a few remarks from several well-known pharmaceutists, which are thus reported in the *Manchester City News*, which also gave a brief extract of Mr. Thomson's observations.

Mr. George S. Woolley remarked that the Council of the Pharmaceutical Society had not rejected Mr. Thomson's paper "because the facts it contained were distasteful to them," but for much wider reasons, which it was unnecessary for him to mention there. Mr. Thomson had said that chemists were now an examined body. This was only partially true. The Pharmacy Act was passed in 1868, and only since then had it been illegal to commence business without the Minor or Major qualification of the Pharmaceutical Society. The trade was now in a very similar condition to that of the medical profession for many years after the passing of the Medical Act of 1815, a mixture of examined and unexamined men. He considered it questionable taste to introduce the subject of prices in a paper read before such a society as the Manchester Literary and Philosophical.

Mr. F. Baden Benger, F.C.S., said Mr. Thomson had apparently discovered a few fraudulent and some careless dispensers, as might have been expected in so wide a search, but the great majority of his test prescriptions had been for all practical purposes correctly dispensed. The extreme accuracy of the analytical laboratory was as unnecessary as practically it was unattainable in the dispensing of ordinary and comparatively harmless substances. It was quite impossible to obtain bottles of exactly two or six fluid ounces capacity. The very process by which these bottles were made ensured practical, but prevented absolute, accuracy. The glass being blown into moulds which kept the external surface constant, the internal surface (and consequently the capacity of the bottle) must vary slightly according to the amount of glass taken up by the blower. A much more serious source of error in the division of doses arose from the prevalent custom amongst medical men of ordering medicines to be taken by "table-spoonfuls," perhaps the most indefinite of measures, varying in capacity from four to eight fluid drachms in different households. The same remark applied to dessert and teaspoonfuls. Referring to what Mr. Thomson considered the impertinence of the dispenser who inquired if ten-grain doses of quinine had been prescribed by a medical man, he (Mr. Benger) considered it the plain duty of the dispenser to make such an inquiry if he had any doubt on the subject, as ten-grain doses of quinine would produce severe headache in nine people out of ten.

Mr. Siebold, F.C.S., said he had nothing but contempt for dishonest or reckless dispensers, but the dishonesty or carelessness of the few ought not to reflect the least discredit on dispensing chemists as a body. From his own experience as an analytical chemist he was able to state that dispensers, as a rule, did their work with very great care and conscientiousness, and had every reason to be jealous of their reputation. Practically small errors in weighing and measuring came to nothing when calculated for each dose in a compounded medicine. Practical dispensing could not be done with the delicate instruments of the analytical laboratory, and medical men were perfectly aware of this. He hoped Mr. Thomson's paper and tables would not be published in the papers, where they would not be understood by the public. Some of Mr. Thomson's statements ought to have been supported by sealed duplicates of the medicines examined, so that those accused of inaccurate work might have obtained an independent analysis.

Mr. Thomson briefly replied. It was not his intention to publish this paper in the daily papers. It would probably appear in one of the medical journals, and if it found its way thence into the public prints he could not help it.

NOTES ON EARLY CHEMISTRY.

By W. B. A. SCOTT, M.D.

EVERYTHING relating to the origin of chemistry, even the derivation of the word itself, is lost in obscurity. The very orthography of the term is doubtful, chymistry being preferred by some, and this is certainly more in harmony with the etymology proposed by Johnson and others, viz., χυμὸς, juice. There is a Greek term χημεία, used by later writers, which is defined by Suidas as "the making of silver and gold," but this term itself stands in need of a derivation, which the Greek classical vocabulary fails to supply. It has been conjectured, not without probability, that the root may be found in Cham or Chem, the national name of Egypt, where this and many other sciences were cultivated from the earliest times. Alchemy has probably the same root, the prefix "Al" testifying merely to the cultivation of the science among the Arabians.

Tubal-Cain, the first metallurgist, must have possessed a rude practical acquaintance with some departments of chemistry, but the first definite allusion in either sacred or profane history to any chemical process is one which has much exercised the minds of commentators, viz., Exodus xxxii. 20:—"And he (Moses) took the calf which they had made, and burnt it in the fire, and ground it to powder, and strawed it upon the water, and made the children of Israel drink of it." The pulverisation of gold, which (if the passage is to be taken literally) was practised by Moses nearly 3,500 years ago, is now an unknown art, but may have formed part of that wisdom of the Egyptians in which the great Hebrew lawgiver was learned. Possibly the Egyptian practice of embalming may have been favourable to the study of chemistry, since antiseptic agents would naturally be sought for. Mention is made by Herodotus of *natrum* as being among the drugs thus employed, and this is supposed to have been a mixture of carbonate, sulphate, and muriate of soda but for the most part spices were used, as myrrh and cassia—sometimes asphaltum or bitumen.*

The mythical Hermes Trismegistus, an Egyptian priest and philosopher of the age of Isis and Osiris, was at one time regarded as the father of chemistry, but the more discerning criticism of later times has clearly proved that the writings ascribed to him, some fragments of which are still extant in Greek, cannot possess an antiquity higher than that of the Christian era. They seem to have been the compilation of some Alexandrian writer, who endeavoured to construct a system by the fusion of Egyptian doctrines with those of the later Pytha-

* I may mention, as a curious coincidence, though not immediately connected with my present subject, that a method of embalming was also practised by the Guanches, or aborigines of the Canary Islands. Mummies of these persons have been found, wrapped in goat skins.

gorcans. This Hermes has, however, bequeathed his name, if not his works, to modern science, and we unconsciously commemorate him whenever we speak of a vessel being "hermetically" sealed. The claims of Horus, Thot, and similar heroes are probably neither more nor less fictitious than those of Hermes, or, as he is sometimes called, Mercurius, Trismegistus.

Among a nation like the Egyptians, where nearly all knowledge was the exclusive monopoly of the sacerdotal caste, anything like a connected history of the progress of any art or science is, of course, impossible. However, it may be remarked that in the reign of Diocletian (A.D. 284–304) the Egyptians were believed to possess a lucrative acquaintance with alchemy, for that emperor ordered all the Egyptian works on chemistry to be burnt, in order that the natives might no longer be enabled to defray the expense of opposition to the Romans by means of the wealth derived from the practice of this art.

Among the Hindoos the Ayur-veda, one of the Upa-vedas, or supplementary Vedas bestowed on mankind by Brahma, or, according to others, by Siva, contained a section on the administration of antidotes and allied subjects. Only a few fragments of the Ayur-veda have been preserved, but an abridgment of the same by Susruta is still extant, from which it appears that under the head of toxicology were considered the means of distinguishing poisoned food, together with descriptions of various mineral, vegetable, and animal poisons and their antidotes.

In classical mythology the fable of Midas, who was said to have received the power of converting whatever he touched into gold, in return for his hospitality to Bacchus, is by some supposed to have reference to alchemy.

The fact is, however, that until we come to the epoch of the Arabian school, any references to chemistry which we come across are, for the most part, conjectural and unsatisfactory. By this time, however, chemistry had begun to be worked in a scientific, or, at least, a pseudo-scientific fashion, the motive power to its further development being furnished by cupidity and fear. The former was the guiding spirit of alchemy, or the search for the philosopher's stone, or other means of effecting the transmutation of the baser metals into gold or silver; the latter dominated the search for the *elixir vitæ*, or potable gold, which, it was presumed, would prolong life indefinitely. Although, however, a solvent for gold (*aqua regia*) was at last discovered,* death remained unvanquished; the alchemists failed even to attain their primary object. Yet the labours of these visionaries served to lay the foundation of the modern science of chemistry, and to enrich the Materia Medica with many valuable drugs, just as the study of judicial astrology did much for the advancement of scientific astronomy.

There has been much speculation as to the probable causes of the search for the philosopher's stone and the *elixir vitæ*. Why, it has been asked, should any one have supposed that other substances were capable of being transmuted into gold, either by means of the philosopher's stone or any other method, or that any drug or potion could be found which should possess the power of indefinitely prolonging life? A subordinate, but not uninteresting, query is—why was gold in some form the object of both classes of inquirers? To what was this coincidence due?

The learned explanations furnished by Dr. Draper and many others serve rather (so far as they go) as theoretical justifications of the reasonableness of the alchemist's anticipations (assuming the principles of these latter to be correct) than as probable accounts of the sources whence their ideas were originally derived. What appears to myself the true explanation is so perfectly obvious, and lies so much on the surface, that its superficial character may serve to discredit it in the minds of those who prefer what is mystical to what is plain. The striking changes effected in the vast majority of bodies by means of heat, and the extraction of metals from their ores, must early have engaged the attention even of the least observant. If, by means of heat, the employment of a suitable flux, and so forth, base ores can be transmuted into, or, at least, compelled to yield, valuable metals, why might not the process be pushed a step further, and common metals be transmuted into, or compelled to yield, "noble" metals? As a rule, the alchemists regarded the baser metals as compounds, containing the same constituents as gold, but mixed with various impurities: by removing these latter, the residue yielded, or rather consisted of, pure gold. This separation was to be effected by means of the "philosopher's stone"—"a red powder possessing a peculiar smell," which was probably supposed to play a part analogous to that of the "flux" in metallurgy.

Even the direct transmutation of metals may have seemed no impossibility to such as held, with Empedocles, that all substances consisted of the four so-called "elements," fire, air, earth, and water, combined in various proportions; while, to such as, with Heraclitus, recognised but one element, fire, such transmutation can have appeared no more strange than the production of the various allotropic forms of sulphur, phosphorus, &c., appear to us; since, on such a hypothesis, the phenomena would be identical. I do not quite understand how those who held the atomic theory, as propounded by Lucretius, can have consistently entertained the hopes of the alchemists, since, according to this doctrine, although the ultimate atoms are identical in respect to matter, they differ essentially in form. But there are no miracles in which cupidity will refuse to believe.

As to the *elixir vitæ*. Some drugs unquestionably possess a power of shortening life: it was not unnatural to suppose that other drugs might possess the power of prolonging it. Some more or less credulous persons in all ages have even attributed the cure of their own diseases to drugs: this much, at least, is certain, viz., that many patients, after taking drugs, instead of at once dying, have made a more or less satisfactory recovery, after a longer or shorter period of convalescence. *Post hoc, ergo, propter hoc*, is a common though fallacious argument: a patient takes a drug and afterwards recovers, hence the recovery is due to the drug. In a large proportion of cases, it is true, a patient took a drug and soon afterwards died; but then, death is common in the course of nature, while recovery in the hands of a physician was so striking a phenomenon as naturally to arrest attention. The same drug was observed to "cure" many different diseases; that is to say, the same drug had been frequently given in a number of totally dissimilar diseases without producing an immediately fatal result. Did it not seem likely that some still more universal polychrest existed, if only it could be found, which would cure all diseases, and indefinitely prolong life? Was it not probable, *a priori*, that the sovereign remedy would be found to consist of the "noblest" metal? Was not gold the most imperishable of substances? Might it not impart its own enduring character to the human frame, if only it could be administered in an assimilable form? When, in later days, some mysterious sympathy was supposed to exist between gold and the sun, the source of heat and light and life, analogy would lend additional strength to the probability.

Dr. Draper's explanation is as follows ("Intellectual Development of Europe," i. 395):—"As there are veins of water in the earth, and apertures through which the air can gain access, an analogy was inferred between its structure and that of an animal, leading to an inference of a similarity of functions. From this came the theory of the development of metals in its womb under the influence of the planets, the pregnant earth spontaneously producing gold and silver from baser things after a definite number of lunations. Already, however, in the doctrine of the transmutation of metals, it was perceived that to nature the lapse of time is nothing, to man it is everything. To nature, when she is transmuting a worthless into a better metal, what signify a thousand years? To man, half a century embraces the period of his intellectual activity. The aim of the cultivator of the sacred art should be to shorten the natural term; and, since we observe the influence of heat in hastening the ripening of fruits, may we not reasonably expect that duly-regulated degrees of fire will answer the purpose? By an exposure of base material in the furnace for a proper season, may we not anticipate the wished-for event? The Emperor Caligula, who had formerly tried to make gold from orpiment by the force of fire, was only one of a thousand adepts pursuing a similar scheme. Some trusted to the addition of a material substance in aiding the fire to purge away the dross of the base body submitted to it. From this arose the doctrine of the powder of projection and the philosopher's stone.

"The doctrine of the possibility of transmuting things into forms essentially different steadily made its way, leading in the material direction to alchemy, the art of making gold and silver out of baser metals. . . . . While thus the Arabs joined in the pursuit of alchemy, their medical tendencies led them simultaneously to cultivate another ancient delusion, the discovery of a universal panacea or elixir which should cure all diseases, and prolong life for ever. The mystical experimenters for centuries had been ransacking all nature, from the yellow flowers which are sacred to the sun, and gold, his emblem and representative

* Selenic acid also dissolves gold, and is, I believe, the only simple acid which will do so. I know nothing about the properties of seleniate of gold, except that it will certainly not confer immortality.

on earth, down to the vilest excrement of the human body. As to gold, there had gathered round that metal many fictitious excellences in addition to its real values: it was believed that in some preparation of it would be found the *elixir vitæ*. This was the explanation of the unwearied attempts at making potable gold, for it was universally thought that if that metal could be obtained in a dissolved state it would constitute the long-sought panacea. Nor did it seem impossible so to increase the power of water as to impart to it new virtues, and thereby enable it to accomplish the desired solution. Were there not natural waters of very different properties? Were there not some that could fortify the memory, others destroy it; some reinforce the spirits, others impart dulness; and some, which were highly prized, that could secure a return of love? It had been long known that both natural and artificial waters can permanently affect the health, and that instruments may be made to ascertain their qualities Zosimus, the Panopolitan, had described in former times the operation of distillation, by which it may be purified; the Arabs called the instrument for conducting that operation an alembic. His treatise on the virtues and composition of waters was conveyed under the form of a dream, in which there flit before us fantastically white-haired priests, sacrificing before the altar; caldrons of boiling water, in which there are walking about men a span long; brazen-clad warriors in silence reading leaden books, and sphinxes with wings." It was doubtless from such allegorical representations as these that much of the fanciful nomenclature of the alchemists was derived. Characteristic instances of this may be found in one of the addresses of Faust to Wagner, where cinnabar, on account of its energetic action on metals, is called "the bold wooer," and the sublimate obtained in any chemical process is styled "the young queen." "In such incomprehensible fictions knowledge was purposely, and ignorance conveniently, concealed." It is quite obvious that all this must have been an after-thought, furnishing a pseudo-scientific justification of the pursuit of the *elixir vitæ* and the philosopher's stone, but can never have furnished the primary motive of these investigations. Indeed, as much is admitted by the learned but remarkably self-satisfied author.

"Still," Dr. Draper continues, with much justice, "the practical Arabs had not long been engaged in these fascinating but wild pursuits when results of very great importance began to appear. In a scientific point of view, the discovery of the strong acids laid the true foundation of chemistry; in a political point of view, the invention of gunpowder revolutionised the world." For both discoveries we are indebted to the Arabians.

The earliest description of gunpowder is furnished by Marcus Græcus, who probably flourished towards the close of the eighth century. He directs that one pound of sulphur, two of charcoal, and six of nitre shall be pulverised together in a marble mortar. This was used for fireworks long before the introduction of fire-arms. There were other explosive mixtures, as "automatic fire," a compound of equal parts of sulphur, nitre, and sulphide of antimony pulverised and made into a paste with equal parts of asphaltum and the juice of black sycamore, with the addition of a little quick-lime. The celebrated "Greek fire" probably consisted of naphtha, sulphur, and nitre, but the knowledge of its precise composition was kept as a State secret at Constantinople.

It is said that no stronger acid than concentrated vinegar was known until the time of Djafar (eighth century), the instructor of the more generally known Rhazes and Avicenna. He first described *aqua regia* and nitric acid. The former he seems to have prepared by the addition of sal-ammoniac to the latter, for the purpose of dissolving gold. He regarded all metals as compounds of sulphur, mercury and arsenic, and supposed that one metal might be transmuted into another by means of varying the proportions of these constituents. It will be remembered that, eight centuries later, Paracelsus spoke of sulphur, mercury and salt as the elements of all material bodies, a notion which he probably took from Basil Valentine. The descriptions given by Djafar of various chemical processes and utensils are singularly precise and minute. Sulphuric acid was first prepared and described by his pupil, Rhazes, who prepared it by means of the distillation of green vitriol, as the Nordhausen variety is manufactured at the present day. Achild Bechil first prepared phosphorus by means of the distillation of urine with clay, lime, and powdered charcoal.

But our obligations to Arabian chemistry, more especially from a medical point of view, are not limited to the mere discovery or preparation of individual re-agents, or even to the introduction of improved instruments and methods of chemical research. The first "Dispensatorium"—or, as it would now be called, Pharmacopœia—was compiled (under the name of "Krabadin") towards the close of the ninth century, by Sabor ebn Sahel, president of the college at Djondisabour. These *Dispensatoria* received Government sanction, and the "Krabadin" of Abu'l Hassan, a Christian bishop, and physician to the Caliph of Bagdad in the twelfth century, was especially renowned, and was adopted as a model by subsequent Arab compilers. Abundant traces of Arabian influence are not wanting in the pharmaceutical nomenclature of the present day; *e.g.*, alcohol, syrup, julep, naphtha, bezoar, &c. In ordinary parlance, Dr. Johnson supposed the familiar word "gibberish" to be derived from Geber, who has been above referred to as Djafar, and to originate from the cloudy mysticism characteristic of the language of that celebrated Arabian and his disciples; but it is more probably allied to the Dutch *gabberen*—to joke.

The definitions of alchemy given by some of the Arabian writers are striking—"the science of the balance," "the science of weight," "the science of combustion." The last of these has been adopted as a definition of chemistry by one of the greatest of living English chemists. But it seems probable that here diversity of meaning lurks under identity of expression; for while, by his terse definition, the Arabian in all probability chiefly referred to the external fire employed in so many chemical operations, his British representative rather intends to point out the close analogy subsisting between the mutual interactions of chemical bodies, and the familiar process so well known to us all. However convenient this terse definition may be for many purposes, it has always appeared to myself that the definition proposed by Boerhaave is fully better adapted to the general public—"an art whereby sensible bodies . . . . are so changed by means of certain instruments, and principally fire, that their several powers and virtues are thereby discovered." In brief, the terse Arabian formula contemplates chemistry as a *science*: the more lengthy definition of Boerhaave is better calculated to convey a true conception of its object and *modus operandi* as an *art*.

PHOSPHATE SYRUPS.

WITH SPECIAL REFERENCE TO THE NATURE, CAUSE, AND PREVENTION OF CERTAIN PRECIPITATES WHICH FORM THEREIN.

By W. L. Howie, F.C.S.

Read before the North British Branch of the Pharmaceutical Society at Edinburgh, March 30, 1876.

NOTWITHSTANDING the attention which has been given to the various phosphate syrups since the introduction of "Chemical Food" by the late Professor Parrish, the author of this valuable paper believed that we were not yet thoroughly acquainted with the character of certain decompositions which occur in these preparations. He therefore proposed not so much to bring forward new formulæ for the preparation of these syrups as to consider the *rationale* of the processes of preparation, and discuss the best methods by which discolouration and the formation of troublesome precipitates may be prevented, as well as to consider of what these precipitates consist, and to what faults of formula, process, ingredient, or storage their appearance may be attributed.

To take compound syrup of phosphates as introduced by Parrish, we find not infrequently, especially in cold weather, that it deposits a slightly lustrous precipitate, sometimes so bulky as to perfectly solidify the syrup. This precipitate, which is the one we shall first consider, appears to the naked eye to be granular or crystalline, and under the microscope is found to consist entirely of minute detached prisms with double oblique bases, which make a most beautiful object viewed by polarised light. When separated and purified by re-crystallisation, we have grape sugar, of which it is found entirely to consist.

This deposition, although in bulk the most formidable of the precipitates we have to encounter, is least to be feared, as it is very easily remedied. Its cause may be traced if we consider the action of free acid on cane sugar, and the relative solubility of the two saccharines. As is well known, cane sugar in solution is converted into grape by the presence of certain acids, which action is accelerated by heat; and in Parrish's original

formula, with which some pharmacists still work, the quantity of sugar specified is in excess of what could be safely held in solution were even but a moderate portion converted into grape. It will thus be rightly inferred that the most simple method of preventing the formation of this precipitate is not to load the syrup with sugar. There are, however, other points to which I would direct your attention. The application of heat to the acid syrup is highly objectionable, since the formation of grape sugar then and there takes place to an extent which it might take many months' exposure to the ordinary temperature of the atmosphere to accomplish; and, when it is remembered that hydrochloric is perhaps the most powerful of all the acids in this property of converting cane into grape sugar, though recommended by Parrish and others, its adoption for this reason may be considered most injurious. It has been stated in its favour that a syrup in which part of the phosphoric has been replaced by hydrochloric acid has a less biting taste, is more mild and agreeable to the palate, and that this acid is useful in preventing subsequent precipitation of the phosphates. That it has these advantages is open to question, and without doubt a syrup which will not precipitate phosphates unless after long exposure, and which has a mild and pleasantly acid taste, may be made by using tribasic phosphoric acid alone.

SUGAR PRECIPITATE.

With the view of more definitely determining the relative action of the two acids on cane sugar, Mr. Howie had, sixteen months ago, prepared a simple syrup of nearly double B. P. strength, and added to three samples 10 per cent. by measure of the acids, thus:—(*a*) hydrochloric, sp. gr. 1·16; (*b*) phosphoric, sp. gr. 1·5; (*c*) phosphoric, sp. gr. 1·75. In both the latter instances the results were almost identical. A few minute crystals of cane sugar had begun to form before the addition of the acid, on account of the concentrated state of the syrup, and in that to which the hydrochloric acid was added these crystals almost immediately dissolved, showing that the usual and characteristic change of the crystallisable cane sugar or sucrose ($C_{12}H_{22}O_{11}$) into uncrystallisable inverted sugar or lævulose ($C_6H_{12}O_6$) had almost immediately taken place. A yellow tint was also quickly communicated to the syrup. The change, in course of time, advanced till grape sugar (dextrose) $C_6H_{12}O_6$. H_2O, formed in such abundance as to separate in crystals, and in two months from mixing had solidified the syrup, the tint becoming much deeper meantime. Yet still further the change advanced, till in six months more it was found that the crystals had partially disappeared, and blackening taken place, which final phase is due to the formation of caramel; or, more correctly, ulmin and ulmic acid, an examination of the black mass beneath the microscope revealing the fact that it consists of colourless, half-dissolved crystals in a dense dark-brown medium. On the other hand, the syrups to which phosphoric acid had been added remained almost unchanged in appearance for some weeks, the minute crystals of cane sugar before alluded to taking that time to disappear; then the syrup acquired a slightly yellowish tint, which did not much increase with age, and at the end of eight months it showed no more change to the eye than did the other almost immediately on mixing it with the hydrochloric acid. In twelve months, however, on the approach of colder weather, a few warty tufts of sugar appeared on the sides of the bottle, which have since increased in abundance, though even now, sixteen months from the time of mixing, though the tint is dark, no signs of blackening are observable, as with the hydrochloric acid. These experiments prove, the author thinks, that hydrochloric acid in solution of cane sugar promotes, in a very marked degree, the change which it is our aim to hinder.

In the formula for compound syrup of phosphates given in the last edition of Parrish's "Pharmacy," the quantity of sugar ordered is two pounds eight ounces (troy) for twenty-three fluid ounces of phosphate solution. This quantity of sugar is about equal to thirty-five ounces avoirdupois; and, considering the relative solubility of cane and grape sugar—a permanent syrup of the former demanding half its weight of water, while the latter requires nearly one and a-half time its weight to effect a solution—this proportion, though less sugar by nearly five ounces than was ordered in the first published formula, has been found in practice to slightly exceed what can be safely employed. To ensure permanence the specific gravity of the finished syrup should not exceed 1·33. The samples of Squire's "Parrish," which I have tested, have been under this, never exceeding 1·32, which is a good density. Some years ago, however, the specific gravity was considerably higher.

To restore syrup in which this precipitate has formed it is only necessary to reduce the density so that the syrup shall contain water enough to retain the whole of the sugar in solution. The syrup containing the precipitate should be exposed in close vessels to such a temperature, carefully moderated, as will thoroughly redissolve the sugar, and then a solution containing four grains ferrous phosphate and sixteen grains tricalcic phosphate in each ounce of aqueous phosphoric acid should be added in such quantity as the original amount of the precipitate and the circumstances we have just been considering will suggest, and though then somewhat thinner, that is, poorer in sugar, it will not have been impoverished of its active ingredients.

It has been suggested that the higher density of the syrup may be retained and precipitation prevented by another process. Taking advantage of the power of changing sugar possessed by acids, it is found that by exposing the syrup in close vessels (to prevent access of atmospheric oxygen, for a reason which I shall by-and-by refer to) to a temperature approaching 160° F. for some considerable time the grape sugar is re-dissolved and rendered uncrystallisable, so that the syrup has the appearance—as far as density is concerned—as when originally prepared; but Mr. Howie has found by experiment that the grape sugar slowly reacquires its power of crystallising, so that though a syrup thus treated may keep unchanged a few months, it ultimately begins to deposit sugar, which deposit goes on increasing till it has attained its original bulk.

The quality of the sugar has much influence on the readiness with which it crystallises, and especially the sugar from beet-root, now so abundant in our markets, should be avoided, for although beet sugar when pure is chemically identical with cane, the commercial article is more liable to be contaminated with saline and other impurities existing in the beet juice.

These can only be got quit of by careful re-crystallisation. The colour of raw beet sugar, also, is distinctly offensive; it is readily developed by rubbing a little in the palm of the hand, and is said to be due to the presence of fusel oil, and other products of fermentation and decomposition of the saccharine liquor when acted on by chemicals (as lime and sulphurous acid) used in the manufacture for purifying and whitening the sugar. This characteristic taste and smell is yet more marked in beet molasses, which is so offensive as to be wholly unfit for human consumption, and is used largely on the Continent and has lately been introduced into this country for fattening cattle. It is also quite perceptible in the low-class loaf sugar known as "Dutch crushed." This offensive smell has, however, been entirely got rid of by some refiners, Say's Paris loaf comparing not so unfavourably with the highest class cane sugar, as sent out in loaves by Martineau, of London, and in crystals by Finzel, of Bristol, and others. Beet sugar, however, even when refined, may be distinguished by a trained palate by the absence of what may be termed the saccharine flavour of the cane, as well as by its small lustreless crystals. Confectioners and others who desiderate a powerfully sweetening and non-crystallising sugar invariably prefer cane as being much superior in these essentials. In impure sugars, known in the market as "soft" or "moist," there is always a degree of impurity which dealers know promotes a fermentative change which rapidly reduces the quality of the sugar, and when it is also remembered that an aqueous solution of even the purest sugar undergoes in course of time a change into grape, it will be seen how important it is that the use of these inferior qualities, containing in themselves fermentative germs, should be avoided in phosphate syrups.

Another precipitate is ferric phosphate. This is small in bulk, greyish white in colour, and generally amorphous. It appears first as a slight cloudiness, which ultimately disappears, the precipitate having settled to the bottom as a thin grey

layer, though sometimes it may have a pink tinge, due to the presence of a trace of manganese. On being washed and dried, this grey powder is found to be tasteless, and insoluble in water, soluble in hydrochloric and sulphuric acids: the caustic alkalies change it to brown, and a crystal of phosphate of soda added with heat slowly dissolves the brown powder, forming a solution in which yellow prussiate of potash gives a blue precipitate when hydrochloric acid is added to excess. Under the blowpipe it fades to a grey or black bead.

The formation of this precipitate Mr. Howie traces to the introduction of oxygen, which combines with the hydrogen of the phosphoric acid, thus:—

$$2\,(Fe''_3\,P_2\,O_8) + 2\,(H_3\,PO_4) + 3O = 3\,(Fe'''_2\,P_2\,O_8) + 3\,(H_2\,O).$$

The ferric salt, which contains one atom less of the metal than the ferrous, is much less soluble, and a very small change of this kind suffices to produce the precipitate. It should be noted that while dried ferrous phosphate is slate blue in colour the ferric salt is dirty white.

Mr. Howie here incidentally commented on the characteristics of the ferri phosphas of the British Pharmacopœia, erroneously called ferrous phosphate. The British Pharmacopœia requires only 44·75 per cent. of *ferrous* salt, the greater part having assumed the *ferric* condition in washing and drying. Even this moderate standard seemed beyond the reach of some makers. The testing of six commercial samples gave the following proportions of ferrous salt:—No. 1, 46 per cent.; No. 2, 46 per cent.; No. 3, 38·7 per cent.; No. 4, 36 per cent.; No. 5, 34·3 per cent.; No. 6, 20·7 per cent.; the last having less than half the quantity of dyad iron it should contain. This is of importance from a therapeutic point of view, as it is a recognised property of certain ferrous salts that they are more easily assimilated and act more powerfully than ferric, and the inference is that ferri phosphas of commerce, though frequently recommended for the preparation of these syrups, is quite unsuited for that purpose, it being impossible to dry the salt in the way of ordinary manufacture without a great proportion being converted into ferric phosphate.

The quantity of changed phosphate necessary to produce this ferric precipitate being so small, to prevent it entirely the greatest care in preparation and storing is necessary. The first source of oxygen is, of course, the water in which the iron and soda salts are dissolved. This water, and likewise that used to wash the precipitate, should be well boiled to expel dissolved oxygen; the sulphate of iron should be pure, and free from ferric oxide, the clear crystals only of the phosphate of soda selected, and the whole operation conducted as rapidly as possible, the soda being poured into the iron solution, and the resulting precipitate washed by decantation.

Having remarked on the similarity of certain of his conclusions with those given by Mr. Rees Price at the March meeting of the London Pharmaceutical Society, although these had been arrived at by very different methods, Mr. Howie proceeded to compare the several processes for producing the ferrous phosphate. Parrish's formula orders ten drachms sulphate of iron and twelve drachms phosphate of soda. In these quantities the metal and phosphoric radical occur almost in such proportions as would form diferrous phosphate, $Fe''_2H_2P_2O_8$ (which may have been the theory of the framer), but as triferrous phosphate is produced the excess of phosphate of soda serves only to further precipitate the iron salt, which, however, is in great part still held in solution by the sulphuric acid set free, as shown in the equation

$$3(Fe''SO_4) + 2(Na_2HPO_4) = Fe''_3P_2O_8 + 2(Na_2SO_4) + H_2SO_4.$$

This free sulphuric acid, unless neutralised, prevents the precipitation of the ferrous phosphate, and though a definite weight of ferrous sulphate be employed, yet from this and other causes the iron which finds its way into the syrup is too often an unknown quantity. In proof of this, from the supernatant liquor of ten drachms sulphate of iron and twelve drachms phosphate of soda (the quantities in Parrish's formula), and equal to 257 grains triferrous phosphate, I recovered 77 grains, showing a waste of 30 per cent.

The British Pharmacopœia process for the preparation of ferri phosphas is apparently more perfect, an equivalent of acetate of soda being added, which is decomposed by the free sulphuric acid just alluded to, and acetic acid liberated, in which, according to the text-books, the phosphate is insoluble. This, in practice, is found not to be the case. From the supernatant liquor of the quantity given in the Pharmacopœia formula for ferri phosphas, the iron in which ought theoretically to yield 563 grains $Fe''_3P_2O_8$, I recovered 125 grains, equal to a loss of 22 per cent. It should be noted, however, that bulk of liquids, temperature, and mode of mixing, influence, to some extent, the waste by these processes.

It was suggested by Mr. Schweitzer, in 1860, to use carbonate of soda instead of acetate, carbonic acid escaping on the decomposition taking place. I find it best to add gradually with constant stirring the carbonate solution to the previously mixed iron and soda liquors, and this seems to be the best, at least the most practical and economical process. From the British Pharmacopœia quantity again, but having substituted 260 grains bicarbonate of soda for one ounce of acetate, the quantity of iron found in the mother liquor was only equal to 4·29 grains $Fe''_3P_2O_8$, or a percentage loss of 0·76, which is scarcely worth reckoning, and is due to the fact that the phosphate is soluble to a small extent in aqueous solution of carbonic acid.

The author next went on to consider the precautions necessary in precipitating ferrous phosphate so as to avoid the confusing results often experienced.

When the iron and soda salts are dissolved in cold water, and mixed still cold, the precipitate is at once greenish and gelatinous, and practically will not subside unless after long standing. A phosphate thus prepared must, therefore, be washed on a filter.

When the solutions before mixing are brought almost to the boiling point (about 180° F.) a dirty white precipitate is thrown down, and when the soda has been nearly added the whole may solidify into a stiff pasty mass, even when a considerable quantity of water has been used for solution. The mixture in a short time becomes again liquid, but the precipitate is bulky and to some extent gelatinous, and will not at once wash by subsidence.

If, again, the temperature of the solutions previous to mixing be about 130° F., and the soda very gradually poured into the iron with constant stirring, the precipitate formed will be nearly white, the true colour of recent ferrous phosphate, and when the precipitation is complete the phosphate will subside in two or three minutes, and can be thoroughly washed by decantation in little more than half an hour. It may then be thrown upon a calico filter, and easily deprived of the rest of the water by pressure with the hand or in a screw press, very little passing through the cloth, and the whole operation being conducted so rapidly the white colour of the phosphate will scarcely have changed. There should be at least one gallon of water for every pound of sulphate of iron, an equal quantity being used for the soda: it should be boiled some time (to expel oxygen), and the salts dissolved in it while still nearly boiling, which will reduce the temperature to about 130° F., on noting which the precipitation may be at once proceeded with. I am not prepared to state the extremes of temperature within which this curdy or granular precipitate may be obtained, but it seems quite safe from 100° to 135° F. It is most satisfactory in being readily soluble in the acid, and as it is easily dried this method is specially suitable for the preparation of the British Pharmacopœia ferri phosphas, there being little difficulty in turning out a dry phosphate of over 50 per cent. ferrous salt, which I have found almost impossible when working at other temperatures. But further attention to certain minutiæ is necessary to ensure a perfectly satisfactory result. It is in the preparation of the dry ferri phosphas that the advantage of pouring the soda into the iron becomes apparent, as a much higher ferrous percentage is thus obtained than when the order of mixing is reversed. This is especially noticeable when carbonate of soda is used: for example, the result of pouring the iron into the mixed soda solutions gave a greenish phosphate containing 32 per cent. ferrous salt; while prepared as before stated, by adding the phosphate of soda to the iron and then the bicarbonate, the product showed 51 per cent. ferrous phosphate. This proneness to oxidise is evidently not caused by the precipitation of carbonate of iron with the phosphate, but the precipitate being thrown down from an alkaline solution is doubtless due to the formation of a basic phosphate even less stable than the ordinary salt. I think bicarbonate of soda is to be preferred to the neutral carbonate, as it can more easily be had pure, and as it contains no water of crystallisation the equivalent is much less, and is, considering this, the least costly of the two salts. It has a further advantage, that there is not the same risk of damaging the phosphate should a slight excess be added, it being best to precipitate phosphate of iron from an acid solution, and commercial carbonate of soda not unfrequently is contaminated with the caustic alkali.

It will be seen, on considering what has just been stated, that

to produce a certain quantity of phosphate of iron of definite composition considerable care must be taken that the material be neither changed nor lost, and if we remember that there have been few formulæ more modified than Parrish's it is not astonishing to find in "chemical food," as commonly met with, a considerable diversity of iron strength. The result of the estimations of nine samples I put before you, and the figures are at least interesting if they are not reassuring:—

Perfect Syrup supposed to contain 1 *grain Ferrous Phosphate per Fluid Drachm.*

	Specific Gravity	Fluid percentage of HCl, specific gravity 1·16	Direct Volumetric indication of $Fe_3P_2O_8$	Total Iron (actual weight) calculated as $Fe_3P_2O_8$	Phosphate of Lime (Indefinite)
			gr. per fld. dr.	gr. per fld. dr.	gr. per. fld. dr.
1	1·306	0·685	0·648	·425	0·82
2	1·325	0·384	0·648	·169	1·65
3	1·324	2·198	0·469	·290	0·66
4	1·320	None	0·514	·447	1·37
5	1·324	3·396	0·738	·492	0·58
6	1·332	0·850	1·118	·984	2·20
7	1·330	None	0·760	·514	1·11
8	1·310	1·370	0·478	·447	1·12
9	1·330	None	0·895	·602	1·10

It will be seen from the table that the results of the direct volumetric estimation by bichromate of potash are entirely unsatisfactory, there being a great variation between this indication of the syrup and the true quantity of iron present. This is due to the reducing action of the grape sugar on the bichromate. The variation is by no means constant, and we can by this means to some extent trace the history of the syrups. No. 8, for example, is evidently a very new syrup which has been prepared without heat, while No. 7 no doubt has sustained exposure to a high temperature, during which the phosphoric acid has inverted a quantity of the sugar, as explained previously. Prolonged exposure to the action of the acid in the cold would have the same effect, but I judge that this No. 7 syrup is not old, because of the absence of the ferric precipitate which would have shown itself had such been the case. It will be further seen, on reference to the table, that the syrups, with one exception, do not approach the strength commonly supposed. Squire states in his "Companion" that Parrish's chemical food "contains in every fluid drachm 1 grain phosphate of iron and 2½ grains phosphate of lime," and Parrish's own words, as given in his "Practical Pharmacy," are "each teaspoonful contains about 2½ grains phosphate of calcium and 1 grain phosphate of iron," and in another part of the same work he states that "a teaspoonful is equal to 1 fluid drachm." But between the product of his formula and these statements there is a glaring discrepancy, which is confirmed on examination of the syrup sent out in this country under the guarantee of his name.

In Parrish's formula there are ordered 10 drachms sulphate of iron, which would produce 257·5 grains triferrous phosphate were none wasted in the process, and we may consider the finished syrup to measure 45 fluid ounces, or 360 fluid drachms. It is clear that 257·5 grains of phosphate in 360 fluid drachms cannot possibly give more than ·715 grain per fluid drachm, and if we deduct 77 grains waste, as before shown, we have almost exactly half a grain (·501) per fluid drachm, which even exceeds the quantity I have found in the guaranteed syrup. The lime strength, again, is wrongly stated. Twelve drachms of phosphate of calcium, equal to 720 grains, in 360 fluid drachms of syrup is exactly two grains per fluid drachm, so that to say that Parrish's syrup contains half a grain of ferrous phosphate and 2 grains tri-calcic phosphate per fluid drachm, would state the strength in precise language, and more nearly accord with fact.

To obtain with certainty this definite iron strength, without waste of material, I would recommend the substitution of the following for the ten drachms sulphate of iron and twelve drachms phosphate of soda at present in the formula:—

Sulphate of Iron	7½ drachms
Phosphate of Soda	6½ ,,
Bicarbonate of Soda	1½ ,,

proceeding with the precipitation according to the instructions already given. These quantities for 45 fluid ounces of finished product will produce a syrup containing half a grain phosphate per fld. dr., or the same strength as produced by Parrish's wasteful formula.

The figures in the second iron column, representing the total iron, were arrived at thus:—I take one fluid ounce of the syrup, and dilute with four ounces of water, precipitate with ammonium sulphide, collect and wash the precipitate, which contains, besides all the iron as ferrous sulphide, greater part of the lime. This black precipitate, when quite freed from sugar, is treated with dilute hydrochloric acid, and the solution boiled in a flask till the sulphuretted hydrogen is completely expelled, taking care to prevent oxidation afterwards. The liquor will contain all the iron as ferrous chloride, and when cool may be estimated with the volumetric bichromate, taking the precaution to first prove the absence of ferric salt with sulphocyanate of potassium. Each 28 grains measures (27·93 exactly) required indicate one grain ferrous phosphate per fluid ounce of syrup.

A process for the preparation of phosphate syrups, which in results, as far as freedom from ferric contamination is concerned, is much superior to the old method of dissolving the precipitated phosphate in acid, was put forward lately by Mr. H. W. Jones.* The process consists in dissolving pure metallic iron in phosphoric acid to saturation and estimating volumetrically, then reducing to standard strength and adding a proper proportion of phosphoric acid. The estimation in this process I find to be quite unnecessary, as the exact quantity of iron and acid may be at once put together, and if the metal be the best charcoal iron the amount of impurity is so small as to be scarcely worth reckoning. If the iron be in form of filings it will dissolve in a mixture of equal parts of acid (specific gravity 1·5) and water in about five hours, while the smallest wire (No. 36) will take at least as many days. Some authorities hold that diferrous phosphate ($Fe_2H_2P_2O_8$) is formed by this process, but others (see Watt's "Dictionary," vol. iv. p. 564) state that it is the triferrous salt.

A formula for syrupus ferri phosphatis (British Pharmacopœia) on this basis would be—

Iron	38 grains
Phosphoric acid, sp. gr. 1·5	6 fluid drachms
Water	6 fluid drachms
Syrup	8½ fluid ounces.

Mix the phosphoric acid with the water and dissolve the iron in the mixture, plugging the mouth of the flask with cotton, then filter and add to the syrup. Contains one grain ferrous phosphate in each fluid drachm.

The advantages of this process are that the phosphate solution may be prepared entirely out of contact with the air, except during the short time occupied in filtration. As the simple syrup is prepared by heat, there is left little chance of access of oxygen, and if the product be at once put into bottles and sealed it will be found to keep perfectly free both from precipitate and colour for almost an unlimited time. This specimen, over a year old, has no precipitate, and the tint is so slight as to be invisible by gas light.

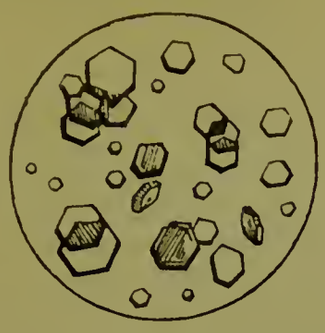
Ordinary iron is unsuitable, as it contains, besides a large percentage of carbon (as graphite), a quantity of sulphur, derived chiefly from the coal used in smelting, which communicates an offensive smell to the solution. Swedish or Norwegian iron, smelted with charcoal and known as "charcoal iron," is most suitable for such purposes.

It would be an improvement in Parrish's process if the phosphate solution were prepared in so concentrated a state that a sufficient quantity of water could be reserved to dissolve the sugar, to which, when cold, the phosphate solution would be added. Yet in practice this is somewhat troublesome, and the alternative plan of dissolving the roughly powdered sugar in the cold phosphate solution, by mixing and subsequent percolation, if necessary, is usually followed.

The iron precipitate is generally deposited in an amorphous condition, though sometimes evidence of a crystalline structure is evinced by its forming a cake at the bottom of the bottle, and also by a roughish granular appearance on the sides. I have examined many precipitates under the microscope and have found the regular hexagonal plates which I have endeavoured to represent in the diagram to be the characteristic crystalline form. When the syrup contained no hydrochloric acid, and no great excess of phosphoric acid, the precipitate was invariably amorphous; but where hydrochloric acid was in excess I found the irregular crystals developed to a large size, which, being transparent, do not make much appearance in the syrup when precipitated, while the amorphous deposit, from its opacity, is, even when in very small quantity, only too visible. With excess of phos-

* *Pharm. Journal*, 3rd series, vol. v., p. 541.

phoric acid, again, though the crystals are so exceedingly minute as to be with difficulty made out with a $\frac{1}{8}$-inch objective, in other



FERRIC PHOSPHATE PRECIPITATE.

specimens they have attained a comparatively large size, when the vitreous lustre and mathematical exactness of the hexagon make them a most beautiful object with the higher powers.

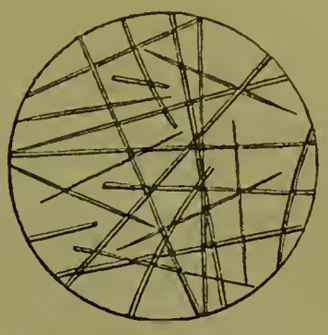
Another crystalline form of iron phosphate is occasionally met with in ferri phosphas. It takes the form of rhomboidal plates, sometimes so exceedingly minute as to pass through filtering paper. My attention was first directed to them by observiug, when dissolving certain phosphates in dilute acid, a transient silky lustrous appearance exhibited by the solution when agitated. The crystals may be examined by placing a minute drop of dilute hydrochloric acid on a slide, and adding as much of the phosphate as may be lifted in the eye of a sewing needle. The acid dissolves most rapidly the amorphous portion of the phosphate, and if the slide be placed quickly beneath the instrument the crystals will be found to

FERROUS PHOSPHATE PRECIPITATE.

shine out at once (A). In these crystals we have the key to the superiority of the white granular phosphate precipitated at 130° F. On examination it is found to consist almost entirely of minute crystalline granules or clusters of prisms (B) interspersed with rhomboids. When, however, the precipitate is at first gelatinous, when made at other temperatures either higher or lower, in course of time it granulates; but, the crystallisation taking place much more slowly, we have larger crystals, and chiefly rhomboids (C). We can thus understand, by making certain of the formation of this crystalline phosphate, how much easier washed and less prone to oxidation it will be than the bulky amorphous precipitate.

We pass now to the third precipitate, which consists of phosphate of quinine, and occurs in Easton's syrup. It usually appears a few days after making, and though occasionally attaching itself to the sides of the bottle, in which position the characteristic tufts of radiating acicular crystals can easily be made out, it often shows itself in the body of the syrup, not unlike vegetable humus, or little flocks of cotton wool floating about. This crystallisation, once commenced, may go on till the syrup is entirely solidified, and though the crystals may be redissolved by heat, yet after a time they invariably again separate, even when a quantity of phosphoric acid is added. In the diagram you have the appearance of the precipitate under the microscope.

The cause of this separation of quinine is somewhat obscure. It seems never to form in a syrup which is quickly made, and neither the quinine solution or the syrup exposed as in filtration. It has struck me as curious that some pharmacists whose process for making this syrup is simply "mix and shake" are "never troubled with it, and can't understand how anyone should be," and several others whose recognised aim is to send out articles in speckless perfection, not infrequently are annoyed to find their care result in such an unsightly product. Of the several samples shown all that have crystallised were filtered through paper either before or after mixing with the syrup. In syrups prepared without the exposure of filtration I have never known this precipitate to form.



QUININE PRECIPITATE.

The best method of rectifying this separation is to expose the syrup to as low a temperature as possible, to permit the crystallisation to proceed to its utmost limit, then separate the precipitate on a calico filter, in which with pressure it can be well freed from the syrup. This pasty mass is then treated with a little water, in which it is soluble, and a small quantity of citric acid added to prevent precipitation of any ferric salt; then the quinia precipitated with ammonia, washed, dissolved in phosphoric acid, and added to the syrup, which, meantime, has been carefully and as rapidly as possible filtered through paper. Without re-precipitation it seems almost impossible to keep the quinine in solution.

The lime in compound syrup of phosphates gives no trouble when once dissolved and the syrup not subsequently heated, this salt being less soluble in hot than in cold sugar solution; but tricalcic phosphate of commerce, besides containing a large percentage of water, is sometimes difficultly soluble. To overcome this character of phosphate from bones it has been recommended to prepare it by saturating hydrochloric acid with quicklime, and adding this liquor of chloride of calcium to solution of phosphate of soda. The phosphate thus produced is, however, the dicalcic $Ca_2H_2P_2O_8$, though boiling the precipitate in the supernatant liquor converts it in part into the tricalcic salt. The production of the latter seems to be better attained as stated by Warrington,* by pouring the calcium chloride gradually into solution of disodic phosphate to which an equivalent of ammonia (or soda) has been added, taking care to keep the alkaline phosphate in excess during precipitation. The decomposition may thus be represented:—

$$3(CaCl_2)+2(Na_2HPO_4)+2(AmHO)=Ca_3P_2O_8+4(NaCl)+2(AmCl)+2(H_2O).$$

If phosphate of potash and soda instead of carbonates were ordered in Parrish's formula it would tend to the perfection of the product.

The acid which is now almost universally used instead of the monobasic or glacial is the tribasic, it being akin to the tribasic salts to be held in solution, besides having greater solvent power.

Glacial phosphoric acid in Parrish's syrup may be detected by adding a little to solution of albumen. If the syrup be in excess no coagulation takes place.

Nitrate of silver added to Parrish's syrup for the detection of hydrochloric acid produces no precipitate unless that acid be present, the free phosphoric acid preventing the precipitation of the phosphate of silver formed. The chloride of silver is insoluble in nitric acid. The samples of the "genuine" syrup I have examined contain no hydrochloric acid, and it is somewhat astonishing to find this acid so frequently occurring in the specimens submitted to examination, and which, I think, are fairly representative samples.

We come at last to the final change that I mean to touch upon, and which I shall do but shortly, that is, the discolouration. In Parrish's syrup the cochineal disguises any moderate brown tint, but in Easton's and British Pharmacopœia phosphate of iron syrups it gives considerable annoyance. Nitric in the phosphoric acid, and acetic acid from the acetate of soda, have each been charged as responsible for this change; but we must again turn to the atmosphere as the chief cause. If the syrup be carefully prepared, and at once bottled and sealed, it would seem to keep almost colourless for a very long time; but exposure to the air is quickly followed by a brown colour appearing on

* *Journ. Chem. Soc.*, 1873, p. 983.

the surface, and rapidly extending downwards through the whole bulk. This has been referred by some to the formation of caramel, and the experiments with the large percentage of acid and strong syrup would seem to favour this theory, which is further borne out by the fact that part of the colour is discharged by filtration through animal charcoal. But the greater depth of tint, unless in very old syrups, is due to a yet undefined change which takes place in the iron salt and is brought about by the action of atmospheric oxygen, no doubt in somewhat the same manner as noticed in alluding to the basic salt formed in the dry phosphate.

The proper preventative is to secure all syrups containing ferrous phosphate in such a way as to exclude atmospheric air.

It has been suggested that the solution of phosphate should be kept separate from the syrup and mixed as wanted, and this in some quarters has met with considerable favour. But unless the solution be kept carefully in closed vessels it is even more liable to become peroxidised in this form than when mixed with the syrup, and when peroxidation has taken place to any extent the ferric precipitate is sure to form in a few days after mixing the iron liquor with the syrup.

A SATIRE ON THE VIVISECTORS.

THE current number of the quarterly *British Journal of Homœopathy* contains a very cleverly conceived and smartly written satire on the Vivisectionists, by Dr. W. B. A. Scott, who, it will be remembered, wrote on the same subject in our columns last month. The author pretends to undertake the advocacy of the practice of "infanticide," or, as he terms the practice, "pædoctony," from a conviction, he says, that the opprobrium which Christian prejudice has attached to the idea conveyed by the former appellation might repel readers on the very threshold. The author asks his readers

To approach the subject with unbiassed minds; to divest themselves of the prejudices of early education and of the unphilosophical emotions of the natural heart; and regarding the question from a rational, not from a sentimental, point of view, to be sufficiently candid to admit the intellectual conclusions to which they shall be led by irrefragable demonstration, and sufficiently conscientious to reduce the theory to practice.

To reduce the evils occasioned by the rapid increase of population, two courses are open to us—either to limit the production, or to provide for the artificial extinction of the surplus as soon as produced. The first of these methods, the Malthusian system, has been found insufficient to cope with what has been of late emphatically termed the "impulses of irrepressible gallantry."

While, therefore, we ought at all times to keep Mr. Mill's ideal before us as the aim towards which all our efforts should be directed, it seems necessary in the meanwhile to adopt such measures as may enable us to obtain some at least of the practical benefits which will ensue in more abundant measure on its complete realisation.

In urging the adoption of the latter alternative, namely, the artificial extinction of the surplus, Dr. Scott anticipates certain objections which persons whose minds are enthralled by the tyranny of prescriptive error may raise against it—

In the first place [he says] I shall be accused of advocating murder, but this I utterly deny. Murder is "the act of killing a man *unlawfully*" (Johnson). Legalised extinction of life, therefore, is clearly no murder. Sir Edward Coke defined murder as follows:—"When a person of sound memory and discretion *unlawfully* killeth any *reasonable* creature in being and under the king's peace, *with malice aforethought either expressed or implied.*" Now, it is quite clear that legalised pædoctony, for purposes of social amelioration, falls under no head of this definition. Being legalised, it is no longer "unlawful;" a new-born infant is hardly a "reasonable being," at least the "reason" is rather in *posse* than in *esse*, but, even waiving this point, it is quite clear that there is not the slightest "malice aforethought either expressed or implied." . . . .

It will be next objected that, however the business may be extenuated on technical grounds, the universal testimony of the human conscience is adverse to the taking away of human life. . . . .

This objection, however, must be examined a little more in detail. To make conscience the arbiter of our actions would be fatal to all progress. Even admitting that death may sometimes be inflicted, still, nothing is more universally reprobated by the unenlightened conscience than the infliction of prolonged and excruciating tortures on the bare possibility that some day or other they may be productive of some profitable result. Yet to the mind which has received the illumination of science, and has been fed with the truths of physiology, nothing is more clear than the injustice, nay, the absurdity of this condemnation. Some in every enlightened age have nobly distinguished themselves from the common herd by setting this vulgar prejudice at defiance: as, for example, the admirable Herophilus of Alexandria, who vivisected six hundred men and women in the pursuit of truth; but what was his reward? To be denounced as a "butcher" by the fanatical Tertullian, another instance of the ineradicable hostility of "ecclesiastically minded persons" to men of science. Instead of rejoicing in the hope that by means of the protracted torments of a few more myriads of frogs, cats, and rabbits, the physiologists of ten thousand years hence may be more or less unanimous as to whether the white blood-corpuscles are extravasated in the process of inflammation, and may even not hold more than a hundred distinct conflicting opinions respecting the functions of each individual organ in the brain, the votaries of conscience have even organised a society with the avowed object of throwing legal obstacles in the way of what is vulgarly and defamatorily called torturing animals to death by inches, but what is in reality neither more nor less than practical physiology. This, I may remark by the way, is another instance of the lamentable results of the associations which have grown around certain words, and much of the sensation to which the language of the anti-vivisectionists has given rise would be allayed if they would but consent to designate the object of their aversion as "dienecesalgic zootomy," while the offence of coining a somewhat awkward adjective might be condoned in consideration of the greater clearness and distinctness thereby imparted to our conceptions. Since, however, it is now generally acknowledged by those who derive either fame or money from the practice of dienecesalgic zootomy that the verdict of the universal conscience of mankind is hopelessly erroneous on this subject, with respect to which it speaks with a clearness and a loudness rarely to be heard on other occasions, it is surely not unreasonable to call its authority in question on other points also where its utterances are less distinct. A little force of thought is all that is requisite in order to extend this consideration to other topics, when we shall clearly perceive that the promptings of conscience in general serve as a beacon rather than a guide. . . . .

Dismissing the complex problems of political economy as of too intricate a nature to be well adapted for purposes of illustration, a single instance will suffice: it is impossible to pursue the study of physiology after the fashion in vogue among modern *savants* without setting every principle of morality at defiance; now, when an effete morality is weighed against a nascent science there can be no question which ought to kick the beam. And if it is lawful to act thus when the only reward likely to be attained in many cases is the possible gratification of scientific curiosity, and when the means employed involve the lengthened and excruciating agonies of myriads of wretched animals, how much more does not it become our imperative duty so to act when the certain amelioration of the physical condition of mankind is our object, which may be secured by the painless extinction of a certain proportion of infant life, which, in nine cases out of ten, would, if prolonged have proved anything but a blessing to its possessors!

The scheme proposed is this—

No woman, whether married or single, shall be permitted to retain more than two children born of her own body; of the children thus confiscated for the public weal a certain small proportion shall be preserved alive for scientific purposes to be hereafter specified; the remainder, after having been duly baptised, shall be deprived of life in the most expeditious and painless method possible. Every child of either sex, from the third inclusive, to be thus confiscated, unless one of the first pair shall have died in the meanwhile, in which case the mother shall be allowed to retain one of the succeeding children, of either sex, at her own option, to replace the deceased. In the event of twins being produced at the second birth, or triplets at the first, it shall be in the option of the parents or reputed parents to decide which of the children shall be preserved, unless in the case of one presenting teratological phenomena, interesting in a scientific point of view, when the same may be demanded on behalf of the community on the production of a certificate signed by three professors of physiology or pathology to the effect that the peculiarities are such as to render the infant a just object of scientific curiosity. As a guarantee to the mother that such infants as are to be deprived of life are subjected to no avoidable suffering, the operation of pædoctony shall, if required, be performed in her own presence, and no professor of physiology shall be allowed to assist at the same, either in person or by deputy. The remains of the infant, after dissection and the abstraction of such parts as it may be deemed advisable to make into "preparations," shall be calcined and restored to the mother in a box of wood or other suitable material, in size not exceeding that of an ordinary writing-desk, nor less than that of an ordinary snuff-box

The author descants at some length on the benefits derivable from his suggested reformation. The comparatively small number of children reserved for scientific purposes are to be for the most part distributed among the vivisectors. But they are to be reserved for vivisectors of the highest class only. None is to receive a human infant without giving proof of his

dexterity by the performance of a series of the most painful experiments which can be devised on a crucified dog without the administration of any anæsthetic. The article concludes in these words:—

My cause is identical with that of the vivisectors, and with theirs it will stand or fall. If we are to revert to the superstitions of the dark ages, and acknowledge the paramount authority of conscience and the right of moral nd emotional considerations to a place in the regard of a man of science, we must both go to the wall. The empire of conscience, if acknowledged at all, is universal, nor can it recognise any sphere of human action as xempt from its sway. Until the emotions and the moral sense are extinguished by a judicious course of practical physiology no individual will e capable of hastening the advent of the scientific millennium, or, indeed, of rejoicing in its glories even should he himself be permitted to reign with Herophilus and his vivisectors. To the "natural man" love, friendship, poetry, and art are dear, but the emotions to which these respond must be "mortified" ere he can enter into the kingdom of science. So long as these emotions are allowed to influence the conduct of men, so long, in all probability, will sorrow, in some form or other, be the lot of humanity. Crush them, and insensibility will be produced, but, perhaps, a scientific millennium may be realised. Are we willing to pay the cost?

The editors of the *British Journal of Homœopathy* take the trouble to add a note to Dr. Scott's article assuring their readers that they do not share their contributor's sentiments in opposition to the practice of vivisection. Opponents, however, no less than sympathisers, can but enjoy the reading of such an admirable piece of irony.

LINIMENTUM SAPONIS,

WITH ESPECIAL REFERENCE TO ITS EMPLOYMENT IN HOSPITAL PHARMACY.*

By W. Willmott.

THE author's object was not to assail the preparation which had successfully borne the test of long-tried experience, but to indicate how it may be rendered more accessible and efficient where circumstances deny to it the exact composition to which the sanction of authority has been accorded. As long ago as 1824 and 1836 the liniment offered difficulties to the conscientious pharmacist, who found the spirit of rosemary too strong to retain the soap that was dissolved by heat, so that gelatinisation occurred on cooling. To remedy this, in 1851 the soap was reduced in quantity, and water was added to the spirit, but without effect. It was then found that the mistake arose from dissolving the whole of the soap used, rather than from the mere proportions of the ingredients. As Mr. Deane showed, the gelatinisation was due to the margarate of soda which was dissolved from the soap when the temperature rose above 70° F. Accordingly, in 1864 the British Pharmacopœia gave the following instructions:—"Digest at a temperature not exceeding 70°, with occasional agitation until all are dissolved." But here the old blunder is repeated respecting complete solution, and the order is misleading, since the soap resists the efforts to dissolve it under the conditions. It was not until 1867 that this was rectified, and the following clear instructions given:—"Mix the water with the spirit, and add the oil of rosemary, the soap, and the camphor. Macerate for seven days, at a temperature not exceeding 70°, with occasional agitation, and filter." The result is a liniment which is perfectly clear and bright, and being free from any tendency to thickness or gelatinise, except at unusually low temperatures, is admirable in every way. But there are two objections—the waste occasioned by the undissolved soap, and the length of time required to complete the process. The author estimates the loss at four-tenths of the soap employed, which represents over 46 lbs. in preparing 100 gallons of the liniment, a loss which should be avoided in places where economy is of paramount importance, as it is at most of the London hospitals. Now the question arises—Can the Pharmacopœia form be dealt with alike to the saving of time and the prevention of waste without sacrifice of efficiency in the specialities of hospital practice. The liability of the solution prepared by heat to gelatinise decreases as we weaken the spirit to a certain point. From this point the gelatinisation increases until in using water only as in using spirit only, we have the same congealed mass. In the proportion of proof spirit, or better still, equal parts of each spirit and water, the margarate of soda no longer gelatinises the fluid, but is precipitated in a flocculent condition. Such a solution, submitted after preparation by heat to a temperature a little below freezing, and filtered, will remain bright and clear and without tendency to congeal. The same result may be insured by reducing the proportion of soap to two-fifths of the quantity ordered (little less than is taken up below 70° F.), exposing to cold as in the former instance, and filtering. The reduction of soap or spirit may or may not be advantageous, and some difference of opinion on these points may be entertained; but this is a medical question, and these modifications are not proposed when large quantities of ingredients have to be dealt with.

Another alternative is to use a soap consisting of pure oleate of soda, which dissolves readily when added to the water and spirit, such as almond oil and castor oil soaps. Although these may at some future period be rendered available, our present inquiry relates to hospital needs, and here we find a wide divergence as to the quantities of each ingredient, to judge from the formulæ in use at the different hospitals, ranging from all spirit and no water at Guy's to all water and no spirit at Middlesex, while in each case potash or soft soap is the kind employed, thus affording a medical authority for the use of soft soap and spirit in varying proportions. That potash soaps may be productive of ill results when applied in the weakened form of an embrocation scarcely seems borne out in practice. In hospital pharmacy it is customary to use the commercial kind with methylated spirit. The objection to the employment of the former—namely, that it contains a large quantity of uncombined alkali—may be removed to a great extent by the method of manipulation employed. It appears objectionable to commence by dissolving the soap in hot water, as likely to impart irritating properties to the liniment. The following will, according to the author, be found to give satisfactory results, where, on medical authority, the Pharmacopœia instructions are departed from:—

℞. Sapo. Moll. (free from caustic potash), 1 lb.
Camphor, 8 ozs.
Ol. Rosmar., 2 fl. ozs.
Sp. Rect., 5 pts.
Aq. Destill., 3 pts.

Mix the camphor and the oil of rosemary with the spirit, and then add the soap. Stir occasionally during twenty-four hours, and strain or filter. Afterwards add the distilled water, and mix.

The spirit quickly dissolves the neutral portion of the soap only, so that the irritating alkaline matter which would be taken up by boiling water is absent from the preparation. The liniment is clear and free from all sediment, and remains so at all temperatures.

The following discussion took place:—

Mr. Umney had not much difficulty in making British Pharmacopœia soap liniment when he prepared a special soap, of which nearly the whole dissolved. It certainly separated at low temperatures, nevertheless he would adhere to the Pharmacopœia. Most pharmacists knew that properly prepared soap liniment would gelatinise at a temperature approaching the freezing point of water. On making the liniment on a large scale he had reduced a bar of soap to thin shreds by planing it with a carpenter's plane. He should be sorry to deviate so far from the pharmacopœia as Mr. Willmott had indicated.

Professor Redwood said that the paper indicated first that the British Pharmacopœia product was good and unexceptionable; secondly that the British Pharmacopœia process was extravagant, inasmuch as there was a loss of soap, and thirdly a more economical and equally efficacious product might be obtained by the substitution of soft soap for hard soap. Professor Redwood thought as a general rule the economy was not necessary nor desirable, except in the case of hospital practice, and he hoped that members would not adopt the suggested method of making soap liniment. The old excuse for a deviation from the British Pharmacopœia method had now been removed, and he was not sure that soft soap was as good for the purpose as hard soap. The possibility of caustic alkali being present was a very important consideration when they remembered that the liniment was often applied to inflamed places, which were easily irritated by alkaline preparations.

Mr. Ingham had pressed the waste in a mould and used it for washing, for which it answered well.

* Abstract of a Paper read at an Evening Meeting of the Pharmaceutical Society of Great Britain, April 5, 1876.

Mr. Gerrard said that Professor Tichborne had demonstrated how the liniment might be prepared by mixing oleic acid and carbonate of soda. The oleate was perfectly soluble in spirit, and the excess of soda insoluble, and there was no waste. He thought the freezing process would be a great trouble.

Mr. Martindale said it would be an advantage if the house surgeons of hospitals knew something of the cost of the preparations they ordered. He had known a pint of soap liniment ordered for an out-patient. The committee of a hospital with which he was connected had directed him to adhere to the Pharmacopœia, but to substitute methylated for rectified spirit. Commercial oleic acid had a disagreeable odour, and the liniment made from it would be excluded from general practice. The Pharmacopœia spirit was too strong, and the soap was not all dissolved. Now, Mr. Willmott had pointed out that proof spirit would dissolve the whole of the soap. The soap liniment made in London was not like that made in the country. The British Pharmacopœia liniment evaporated so quickly it could not be used with any amount of friction, and the country people preferred one which would lather a little. Medical authorities might try which produced the better therapeutic effect. The waste might be usefully pressed in a calico strainer and used for ordinary scrubbing. Mr. Willmott ordered too little soft soap in his liniment, the two ounces to one pint being equal to only about an ounce of dry hard soap, whereas the British Pharmacopœia gave two ounces and a half to one pint. The loss of time was a disadvantage, especially in winter, when it was extended.

Mr. Williams remarked that there was a sample of soft soap on the table which had been presented by Mr. Pound; it appeared to be neutral, and of a very beautiful kind. He had an idea that a neutral soft soap would make a better preparation than a hard soap.

Mr. Willmott, in reply, said that Mr. Umney had not explained the nature of the special soap he used. His paper had reference rather to hospital practice than to private practice. The freezing would not be required in the summer time, and in the winter a little ice and salt would be very inexpensive and of little trouble. But he did not put forward his preparation as a substitute for the British Pharmacopœia liniment. As regards the quantity of soft soap used, it must be remembered that soft soap was of a more emollient and lubricating character than hard soap. He had never had a complaint that soft soap liniment had irritating qualities. The two kinds could be kept, and the British Pharmacopœia liniment dispensed when ordered in the prescription, and the soft soap liniment in other cases.

Mr. Umney said that the soap he had used was professedly an olive oil hard soap. The white Castille soap of trade would not strictly stand the British Pharmacopœia test; it was made with other fats besides olive oil.

Mr. Willmott said he had not used ordinary Castille soap in his experiments, but Pharmacopœia hard soap, which was not, he apprehended, exactly Castille soap.

Provincial Reports.

BIRMINGHAM.

The quarterly meeting of the Midland Counties Chemists' Association was held at 90 New Street, on Friday last, the president, Mr. Thos. Barclay, in the chair. There was a fair attendance of members and associates. The minutes of the previous meeting having been read and confirmed, the secretary presented the report of the soirée committee, showing a substantial balance after payment of all expenses. The balance-sheet for the past year showed also a surplus in hand. The pecuniary condition of the association was thus shown to be in a satisfactory condition. Mr. Dewson then read the quarterly *résumé* of pharmaceutical progress, remarking upon vaseline as a valuable addition to pharmacy, from its power of resisting chemical agents, which rendered it useful in the preparation of ointments and pessaries. The use of acetic ether in the preparation of blistering fluid was commented on, the new drug (tayuya), the preparation of mercurials, &c. The latter subject gave rise to some discussion, in the course of which the president declared his conviction of the superiority of hand-made blue-pill over that prepared by machinery. Mr. Arblaster introduced the subject of the sale of patent medicines, which gave rise to much discussion, Mr. Arblaster urging, since many patent medicines contain "poisons" in the meaning of the Pharmacy Act, and several deaths have lately occurred from the incautious use of such medicines, that it is advisable in the interest of the public that such medicines should be labelled "poison," and be sold only by registered chemists and druggists. After some remarks from Mr. Lucas and others, the president moved that "a committee, consisting of Mr. Arblaster, Mr. Lucas, and other officers of the association, consider the question of sale of patent medicines, with a view to draw up a memorial to the House of Commons, praying them to consider the unsafe condition of the law as regards the sale of patent medicines." Some conversation took place relative to the prizes offered by the president of the council for competition by students of the association classes, after which the meeting terminated.

GLASGOW CHEMISTS' AND DRUGGISTS' ASSOCIATION.

The seventh scientific meeting of the session of this society was held in Anderson's University, on the evening of Tuesday, the 4th inst. In the unavoidable absence of the President, Mr. Alexander Kinninmont, vice-president, occupied the chair. The business of the evening was a paper on "Phosphate Syrups," by Mr. W. L. Howie, F.C.S., of Edinburgh, which appears in another part of this journal.

At the close of Mr. Howie's paper, which was listened to with the greatest attention by the large audience present, the chairman invited remarks thereon, and, amongst others,

Mr. Archibald Paterson, of Govan, referred to the formation of a glutinous mass when the syrup was heated, which Mr. Howie had pointed out was due to the precipitation of the lime from the hot solution, lime salts, as was well known, being less soluble in hot than cold water. Mr. Paterson also stated that while he had passed very large quantities of the phosphate syrups through his hands he had never investigated the processes so minutely that he could criticise to any great extent the calculations Mr. Howie had placed before them, but from Mr. Howie's former productions in this direction, as well as the exhaustive character of the present paper, he should be disposed to accept the statements as pretty nearly correct. Such practical papers were of great value to the trade generally, and he (Mr. Paterson) thought it was a pity that we had so few of them.

Dr. T. D. Moffat also made a few remarks, particularly with regard to the preparation of Parrish's syrup, giving a description of the various means he used to adopt to produce the phosphoric acid and lime salt when the syrup was first introduced, and showed that with a little extra labour he had been able to turn out a syrup much cheaper, and, as he thought, equal if not superior to any that was sold in the market at the time.

Mr. John C. Hunter said he had worked the bicarbonate process some time, and found it very satisfactory. His method was to add the disodic phosphate to the iron and filter, then add the bicarbonate to the filtrate. By this means he thought he had been able to turn out a syrup containing nearly one grain ferrous phosphate per drachm.

Mr. Howie, in reply to Mr. Hunter, said that though the stated strength was one grain ferrous phosphate per drachm, that was the only basis on which such a strength could be built. The product of the formula, worked as Parrish gave it, could not contain much more than half a grain per drachm, and the "genuine" syrup in his (Mr. Howie's) experience contained less than that quantity. He therefore considered that pharmacists were bound to follow the product, and discard the loose statements found on printed labels.

Mr. J. M. Fairlie referred to a specimen of Parrish's syrup on the table with a very large deposit of sugar, and thought that many made a mistake in the kind of sugar they used. Many chemists he knew were in the habit of using the ordinary soft sugar as sold by the grocers, and with it he believed a crystalline deposit of sugar was sure to be formed in the syrup. Several formulas he had seen, he believed, also contained too much sugar. He, Mr. Fairlie, thought that chemists should set themselves against the use of beet-root sugar, as being unreliable for chemical purposes. For some time he had great difficulty in procuring pure cane sugar, none of the houses he had applied

to being able to guarantee it free from beet-root sugar, and so far as he knew at present there were but very few houses in the trade that would give a letter of guarantee; but such should be insisted upon, and thus bring a truly pure article more freely into the market.

The chairman, Mr. Kinninment, referred to the probability of the phosphates existing in the syrup in presence of free acid as bibasic or even monobasic salts, which he thought would bring up the strength to nearer what was considered to be the proper proportion.

Mr. Howie, in reply, stated that it did not practically alter the strength. He had worked upon the amount of iron in all cases, and calculated it as $Fe_3P_2O_8$. With reference to a suggestion that the product of the formula should measure only 36 fluid ounces, Mr. Howie said any one could at once check his statement, for though Parrish did not state the bulk of the finished product he gave certain fixed quantities of sugar and phosphate solutions, and by calculating the sugar of specific gravity 1·6 it would be found the product, theoretically, should measure almost exactly 45 fluid ounces. This he had found corroborated in his own experience as the practical outcome.

Altogether the paper was very well received, and at the close of the discussion Mr. Howie was awarded a most cordial vote of thanks. The members thereafter inspected the diagrams and specimens which had been specially prepared by Mr. Howie, together with the crystalline deposits, which were shown by several high-power microscopes.

The annual meeting of the association takes place early in May.

PHARMACEUTICAL SOCIETY OF IRELAND.

The monthly meeting of the council of the above society was held at the College of Physicians, Kildare Street, on Wednesday and Thursday, the 5th and 6th inst., Sir D. J. Corrigan, Bart., president, in the chair. The following were present:—Dr. Aquilla Smith, vice-president, the Right Hon. the Lord Mayor, Mr. Wm. Allen, Dr. Frazer, Mr. W. Hayes, Mr. E. M. Hodgson, Mr. J. T. Holmes, Dr. Leet, Mr. Pring (Belfast), Dr. E. Reynolds, Dr. Ryan, and Professor Tichborne.

The following business appeared on the summons of meeting.

I. To consider letters from correspondents.

II. Notice of motion (Dr. Henry Whitaker):—

That steps be taken to bring before the notice of the Chief Secretary for Ireland the advisability of having the Pharmacy Act (Ireland) amended, so as to give power to the council of the Pharmaceutical Society to register as druggists all at present in the business, and to confirm them in the rights they at present enjoy: also to make arrangements for the future as regards the qualification of those who may wish to keep open shop for the sale of poisons and poisonous drugs, without the privilege of compounding the prescriptions of members of the medical profession, &c.

III. Notices of motion (Dr. A. Smith):—

1. In the intervals between the monthly meetings of the council, a member may send a notice of motion in writing to the registrar seven clear days before the time of meeting; such notice not to be printed in the "programme of the business to be transacted" without the sanction of the president, or, in his absence, of the vice-president.

2. To prepare a form of a certificate for candidates who have passed the Preliminary examination.

3. That a list of the names and ages of the candidates who have passed the Preliminary examination shall be furnished by the examiner to the council of the society before its meeting next after the examination.

4. That a register of the candidates who have passed the Preliminary examination shall be kept by the registrar, the schedule to contain the name, age, and the address of each candidate, with the date of the examination.

5. To appoint auditors of the treasurer's annual account. The auditors to prepare an alphabetical list of the members who have not paid their subscriptions due before the annual meeting.

6. That every candidate for the membership of the society shall lodge one guinea (with the registrar) before he is proposed for election. The money to be returned in case of the candidate's rejection.

7. That the annual subscription of members of the society shall become due in advance on October 1 in every year.

8. That a member who shall be elected on or after July 1 in any year shall not be required to pay a second subscription until October 1 in the following year.

9. That at the annual meeting of the society a member shall not be entitled to vote unless he has paid his subscription for the preceding year.

10. That if any member be in arrear of his annual subscription for two years his name and address shall be omitted in the published register of members of the society.

11. That the registrar shall keep a confidential list of all candidates who have been rejected, containing their names, addresses, ages, and the date of their rejections.

IV. Notice of motion (Mr. C. R. Tichborne):—

That evening meetings for the reading and discussion of papers in connection with pharmacy be held on the first Wednesday in each month.

The minutes having been read and confirmed the council directed the registrar to reply to the letters received. In reference to Dr. Whitaker's notice of motion Mr. Pring asked to have it postponed, as Dr. Whitaker was not present, and must have missed the train.

Dr. A. Smith's motions were carried with a few verbal amendments.

Mr. William Allen and Mr. William Hayes were appointed auditors for the current year.

Professor Tichborne introduced the subject of holding evening meetings in connection with the society, remarking that the only advantages of membership were the privilege of voting for members of council and being eligible for membership of the council. After some discussion, instead of the original motion, he proposed the following:—

"That the council approves of the principle of holding evening meetings in connection with the society for the reading and discussion of papers connected with pharmacy." The motion was carried unanimously.

The Examinations.

The first Preliminary examination was held at the College of Physicians, on Monday, April 3. Three candidates were examined; one failed. The following passed: H. C. Draper and Standich E. Mason. Dr. E. W. Collins was the examiner, and reported that the successful candidates had passed a very good examination.

Dr. Aquilla Smith and Mr. J. T. Holmes were present at the examination.

The examination for the title of pharmaceutical chemist was held at the same place on Wednesday and Thursday, April 5 and 6. Twenty-one candidates were examined, seven of whom failed. The majority of the members of the council were present at the examinations. The following were successful:—

Rashleigh Belcher.	Thomas Richard Lester.
Henry Bennett.	James Mills.
Edward Brady.	Francis John Minchin.
Robert William Carter.	Johnston Montgomery.
John Paul Cavenagh.	John Chilcot Chas. Payne.
Robert James Downes.	Henry Mockett Prior.
Edward Daniel Elmes.	Henry Taaffe.

The next examination will be held on the first Wednesday in May.

PATENT MEDICINES IN PARLIAMENT.

On February 20 in the House of Commons, Colonel Leigh asked the Home Secretary whether he saw any objection to obliging all owners of quack medicines to declare the ingredients of which the doses were made previously to being allowed to sell them (as was done in France), since much illness and loss of life prevails, especially among young children, from the unrestricted sale of quack medicines, the basis of which is often laudanum or some noxious or dangerous compound. Viscount Sandon said the subject referred to had only been brought recently under the notice of the Lord President of the Council. It opened up some very important questions, and it was receiving his Grace's consideration, and he must ask the hon. and gallant member to allow him not to state an opinion upon it at present.

Scientific Notes from Foreign Sources.

TO PRESERVE MUCILAGE.

In the same journal, D. Preston recommends the use of salicylic acid for preventing the decomposition of mucilage, which, as generally prepared, undergoes rapid change, becomes sour and ropy, and unfit for use. The very slight solubility of salicylic acid in water renders the use of it less objectionable than would otherwise be the case. Instead of using pure water, the gum is dissolved in an equal weight of a previously prepared aqueous solution of salicylic acid; such a mucilage, even after standing a month, shows no trace of decomposition.

RAPID ASSAY OF CINCHONAS.

M. Landry * takes 10 grammes of coarsely powdered bark, and places it in a capsule with 20 grammes of ammonia, stirs the mixture for some minutes with a glass rod, and then adds to it about 15 c.c. of rectified ether. He then agitates, allows to deposit, and decants the ether solution into a small capsule, whence the heat of the hand is sufficient to cause evaporation. This operation he repeats five or six times, taking care to add a fresh quantity of ether only when the preceding addition is completely evaporated. It suffices then to heat the capsule over the flame of a spirit-lamp, just sufficient to chase away the deposit of moisture which condensed during the evaporation, and the determination is complete. The increase in weight of the capsule gives the alkaloid removed from the bark. After having exhausted the bark of its quinine in this way the cinchonine may be estimated as above by using chloroform in place of ether. The process is much more protracted.

PHOSPHIDE OF ZINC.

An essay on the employment of phosphide of zinc in medicine was lately presented to the Société de Thérapeutique by M. Vigier, pharmacien, who has made a special study for some years of this and other phosphoretted compounds. He urges that this preparation is the most reliable and advantageous for the purpose of administering phosphorus, and he quotes the experience of Dr. Seguin, of New York, and Drs. Ashburton Thomson and Routh, of London, in confirmation of this opinion. His theory, supported by many experiments, is to the effect that half the phosphorus contained in the compound is converted in the stomach into phosphoretted hydrogen, the remainder being practically inert as hypophosphite of zinc. M. Vigier, with his friend Dr. Curie, have made many experiments on rabbits, as well as on themselves. They believe that a dose of 1 gramme might be fatal to a man if it were not rejected by vomiting. They have found 6 centigrammes sufficient to kill a rabbit. M. Vigier, in the course of his investigations, took 1 gramme of phosphide of iron without experiencing any effects whatever. This is due to the greater stability of the iron compound. The formula recommended by Messrs. Vigier and Curie for medical use is:—

Phosphide of zinc, in fine powder,	gramme	0·80
Licorice powder	„	1·30
Syrup of gum	„	0·90

For 100 pills, silvered.

Each pill would weigh 3 centigrammes, and would represent theoretically 2 milligrammes of phosphorus, but, as explained above, only 1 milligramme in an active form. From 2 to 4 of these pills may be administered daily.

M. Vigier also points out that phosphide of zinc is often defective, some samples which he has analysed containing half its weight of oxide of zinc. This is due to an exposure to the air during the process of manufacturing. Chemists should also be careful that the zinc they use is of the utmost purity.

SOLUBLE SACCHARATED OXIDE OF IRON AND DIALYSED IRON.†

As these salts, particularly the former, are now used to a considerable extent in pharmacy, it will perhaps not be superfluous to point out that in solution they suffer precipitation by addition of solutions of certain salts used in dispensing. According to experiments undertaken with a view to define the reactions, solutions of the chlorides of potassium, sodium, and ammonium (and probably the chlorides of the earth metals), and also the very soluble acetates of the alkalies, cause precipitation of the saccharated iron when added to an aqueous solution of the same. On the other hand, even concentrated solutions of the bromides, iodides, nitrates, sulphates, carbonates, bicarbonates, phosphates, and chlorates of the alkali metals, as well as caustic soda and potash, are without perceptible action. Judging from the indifferent nature of the salts (chlorides and acetates) producing a precipitate, the action must be regarded as due to a physical attraction between the molecules of water, of the salt, and of the saccharated iron, and with reference to this it may be remarked that the bromide and iodide of potassium, which stand in respect of solubility near the chlorides of potassium and ammonium, are without precipitating action on the dissolved saccharated iron; and further, with chloride of potassium and a few other salts the precipitation is not immediate, but occurs after a little time.

With a solution of dialysed iron, not only do the chlorides and acetates of potassium, sodium, and ammonium cause turbidity and precipitation, but also sodium sulphate, potassium nitrate, sodium phosphate and bicarbonate, whilst potassium chlorate is indifferent. From these facts it is concluded that both these iron preparations are best without addition; at all events, they should not be dispensed with several of the soluble officinal salts.

TO DISTINGUISH PETROLEUM BENZINE FROM THE BENZINE OF GAS TAR.

Our last impression (p. 82) contains a note translated from the *Journal de Pharmacie de Genève*, headed as above. The method of testing referred to is not so reliable and free from objection as is there indicated. In a communication to the journal, Professor Schœr states, "I have repeated the experiments with pure benzol (crystallising at a low temperature), and have obtained the results already published in the journal.* There can be no doubt the petroleum benzines from different sources are capable of dissolving iodine with production of various shades of red, often approaching the raspberry tint; this fact alone proves the impossibility of distinguishing these different bodies with certainty by means of iodine."

ARAROBA—GOA POWDER.

From a compilation by Dr. J. B. Ullersperger,† of what has been published on this subject, we extract the following for the information of our readers:—Whatever the relations of araroba and goa powder, this much is certain, and established by the most reliable reports, that the root of araroba or Pó da Bahia has proved particularly efficacious in skin diseases, as lepra, proriasis, pityriasis, ecthyma, pellagra, &c.; against herpes circularis and herpes circinatus, it is all but a specific. According to Dr. Bomfin araroba or arariba is one of the largest intertropical trees between 13° and 15° south. It grows about San Salvador, and especially in the forests of the districts of Valencia and Camaner, and attains a height of 20 to 25 metres, and a circumference of 5 to 6 metres. The flower is small and of a violet colour; the leaves are 6 centimetres long; the bark is smooth and dark green. The wood ‡ is in general of a yellow colour when fresh, but on drying becomes much darker and may readily be reduced to a fine, light powder. Its action is irritating or caustic; the powder or a salve containing it causes inflammation when applied to the eye. The bark, leaves, and flowers have the same properties as the pith, but in a less degree. According to Bomfin, araroba is said to have been known in Europe and Asia, under the name Pó da Bahia, for a hundred years. In China and Japan it is the subject of a monopoly, which greatly enhances the price. At Saigon, where, with the rest of Cochin China, herpes, both acute and chronic, may be considered endemic for Europeans, Dr. Polasne de Champeaux found only Pó-Bahia to be of any avail. Hitherto Brazil has had no official Pharmacopœia, but has been content to make use of the French or Portuguese. As a remedy against skin diseases, araroba has proved its efficacy in various parts

* *Journ. de Pharm. et de Chim.*, March, 1876, p. 203.
† *Pharm. Post*, March, 1876, p. 89.

* By Professor Flückiger.
† *Zeitschrift des österreich. Apoth.-Vereines*, March 1, 1876, p. 109.
‡ Pith (?).—Ed. C. & D.

of the world. Diseases of the skin are evils not only, as is well known, very annoying and sometimes very persistent in themselves, but are liable to become dangerous, especially if the nerve centres are attacked. A promising remedy is therefore deserving of every consideration.

PRESERVATION OF DECOCTIONS AND INFUSIONS UNDER COTTON WOOL.*

The mode of preserving infusions and decoctions suggested by Almén has been tried by J. F. Ryberg on several easily decomposable officinal infusions, such as *Inf. amarum* and *Inf. Gent. comp.*, and found satisfactory. Infusum amarum, which usually in a few days becomes turbid and mouldy, remained unchanged for six weeks, although in the seventh week mould began to form and soon spread through the liquid. This result was referred by Ryberg to the circumstance that the indiarubber stopper did not remain fast closed and air was permitted to enter. In the second case, where a quantity of more than 7,000 grammes of compound infusion of gentian was taken, the experiment succeeded still better, although several times, weekly, small quantities were withdrawn from the flask for examination. The process of Almén, which perhaps may not have remained in the memory of many readers, is essentially as follows:—The infusion or decoction is heated for some time in a water bath at 100°, and the bottle then fitted with a tight cork, through which passes a glass tube, lightly filled with cotton wool. The cork has a second opening, through which passes a glass tube quite to the bottom of the bottle; this tube is bent at a sharp angle and has fitted upon it a piece of india-rubber tubing, by means of which the bottle may be filled and afterwards the contents drawn upon. Ryberg is of the opinion that for *Infusum Sennæ compositum*, for which this method is particularly recommended, the Pharmacopœia should authorise preservation under cotton wool.

EXAMINATION OF UNMALTED BARLEY FOR SUGAR AND DEXTRIN.†

According to the experiments of Gotthold Kühnemann, unmalted barley contains only one variety of sugar, which polarises to the right, does not reduce copper solution, yet is crystallisable: in malted barley a part of this is converted in the process of malting by the increased warmth of germination into uncrystallisable sugar, which reduces copper solution. The same conversion takes place when an alcoholic extract of unmalted barley prepared in the cold is evaporated with heat, as for example, in recovering the alcohol. For the examination recently-harvested air-dried barley was taken, and in order to avoid every source of heat was beaten to a fine powder, and not ground between stones. The search for dextrin yielded results contrary to the statements of the various text-books of chemistry, physiology, and technology, viz., that dextrin is absent from unmalted as well as malted barley. Crystallisable sugar and various other organic bodies were found in unmalted barley, especially sinistrin.

TO DISTINGUISH THE CYANIDES.‡

Although, as a rule, it is so easy to detect accidental poisoning by cyanide of potassium, by a general determination of the presence of cyanogen, yet, on the other hand, it is not always easy to resolve the question whether the cyanogen was introduced in the form of free hydrocyanic acid or cyanide of potassium, or, perhaps, as one of the non-poisonous double cyanides, the ferrocyanide of potassium, for example. For the solution of these doubts Jacquemin recommends that a part of the stomach contents should be neutralised with sodium carbonate, the mixture heated in a retort or flask on a water bath to about 50°, and then a slow stream of carbonic gas be led through. Ferrocyanogen compounds are not affected by the carbonic acid gas, whilst the cyanide of potassium is, with liberation of prussic acid. This is conveyed, along with the excess of carbonic acid, through a system of tubes, including a bulb apparatus filled with distilled water, and a second similar one containing a dilute acidified solution of silver nitrate. Almost the whole of the hydrocyanic acid, which can only have been present originally either in the free state or as potassium cyanide, and not as a double cyanide, is retained in the first apparatus, containing the distilled water, whilst, perhaps, unabsorbed traces are retained by the silver solution and precipitated as cyanide of silver.

THE REACTIONS OF VEGETABLE POISONS.*

By O. Pape.

The use of the concentrated acids for the individual recognition of alkaloids and glucosides has the disadvantage of producing with these bodies colour reactions which are liable to great variation. The reason of this is found in the complicated structure of the alkaloids, &c., which suffer considerable and rapid decomposition as an effect of the action of the strong acid. The author finds that the addition of starch obviates this objection in a great measure for a large proportion of the alkaloids.

Digitalin, the bright yellow non-crystalline variety usually met with in pharmacies, when triturated with ten parts of starch, exhibits the following reactions:—By addition of so much concentrated sulphuric acid that the mixture has the consistence of pap, the starch acquires a dark brown colour, but on further addition of a few drops of nitric acid, and stirring with a glass rod, and subsequent affusion of water, this becomes deep green. The same reaction is observed when cane sugar is substituted for starch, with the difference that on addition of water the green body passes readily into solution and so fails to impress the eye. Both reactions are extremely useful for the purpose of identification.

Pure crystallised digitalin with ten parts of starch reacts as follows: A few drops of sulphuric acid produce a muddy-brown colour: by addition of nitric acid and copious affusion of water a dull green starch mass remains behind. The same digitalin with cane sugar, spread in a thin layer, gave with sulphuric acid a yellow colour, changing to orange; on stirring, this finally became deep brown. On addition of water a green colour is unfortunately not always observed, as the body producing it is readily soluble. The starch and cane sugar reactions are nevertheless both characteristic. Crystallised digitalin, with an equal weight of starch, and coloured brown by sulphuric acid, also exhibits with hydrochloric acid, and lastly water, a green mass. The yellow amorphous digitalin treated in the same way gives similar reactions, the final green colour being, however, more intense.

Veratrin, mixed with ten parts of starch, and a few drops of sulphuric acid added, shows brownish yellow, which colour becomes brownish red on stirring. Nitric acid and water added consecutively leave a yellow mass of starch.

Morphine, mixed with starch in the same proportions and treated with sulphuric acid, suffers no change which declares itself by the colour, but subsequent addition of nitric acid and stirring with a glass rod produces a beautiful orange tinge.

All the acids were used in the concentrated condition, and applied to the alkaloids in the dry state in a porcelain mortar.

A NEW TEST FOR BRUCINE.

By F. A. Flückiger.†

An aqueous solution of mercurous nitrate (free from nitric acid) gives at first no colouration when added to the solution of a brucia salt, but if the mixture is gently heated on a water-bath a very durable fine carmine colour is produced. Strychnine does not give this reaction, so that one part of brucine can be detected by this means when mixed with ten to twenty parts of strychnine. The opium and cinchona alkaloids, veratrine, cafferine, piperine, are not coloured by mercurous nitrate, but albumin and phenol act in the same way as brucine. The red colour produced by phenol, however, soon passes into brown. Brucine may be detected in presence of strychnine by evaporating the acetates to dryness. Strychnine acetate is decomposed, and yields pure strychnine, while brucine acetate suffers little alteration. Cobalticyanide of potassium precipitates dilute solutions of the salts of strychnine, but not those of brucine.

* *Pharm. Zeitung*, January, 1876, p. 62.
† *Archiv. der Pharm.*, February, 1876, p. 168, from *Ber. d. d. Chem. Ges.*
‡ *Archiv. der Pharm.* February, 1876, p. 170, from *Ann. de Chim. et de Phys.*

* *Archiv. der Pharm.*, March, 1876, p. 233.
† *Journ. Chem. Soc.*, March, 1876, p. 443, from *Arch. der Pharm.*

Editorial Notes

OUR POSITION AND OUR PROSPECTS.

THE approaching close of another pharmaceutical year naturally leads us to ask ourselves what advancement, if any, has been made by our body generally within the past twelve months, and prepares us also for the account of their stewardship which the official guardians of our interests must soon render.

The Pharmaceutical Society was established "for the purpose of advancing chemistry and pharmacy, and for the protection of those who carry on the business of chemist and druggist." The Council is the Society's representative body, and it is their pre-eminent duty to promote the best interests of pharmacy. Somehow or other a strange distinction appears to exist in some minds between the cause of pharmacy and the cause of pharmacists. In fact, paraphrasing a well-known chemical law, we might say that the material advantages enjoyed by the one seem to stand in inverse proportion to the abstract advancement of the other. Atmospheres may be so rarefied that animal life can no longer exist in them, and a society may be carried upwards into regions so sublime that a general asphyxia of its members at length supervenes. In the early years of the Pharmaceutical Society it was obviously the first duty of the Council to secure and foster a higher standard of education amongst chemists and druggists generally. No object could have been more laudable, nor could any other lever have been so successfully applied to the incubus under which the pursuers of our calling laboured. But, *tempora mutantur, et nos mutamur in illis.* What is to all intents and purposes a compulsory Education Act is now operating in our midst, and the Legislature itself has found means to keep pharmacy free from the taint of ignorance. Our examinations, if they are faulty, err on the side of stringency, though it has been recently proposed to draw the cords even tighter, by requiring candidates for the Major to be good microscopists, and to show themselves facile in the use of the spectroscope. Is there not a danger of the advanced detachment of scientific workers, which forms the van of our pharmaceutical army, marching just a little too fast? Marching, indeed, clean out of sight of, or communication with, the main body? The strength of the whole chain is only that of its weakest link, and it is certainly folly to measure the capabilities and the tasks of the average work-a-day pharmacist by the achievements of the Hanburys, the Bradys, and the Stoddarts of his time. The fundamental error which, in our opinion, lies at the root of the doctrines taught by certain of our dignitaries is that every man who chooses pharmacy as his vocation is either actuated by an insatiable thirst for original investigation, or is boiling over with a general scientific enthusiasm. What we might call the bread-and-cheese side of pharmacy is an aspect of the question which never presents itself to the philosophical mind. But, unless we are much mistaken, many of the best friends of pharmacy are beginning to see that this cant about science has been carried quite far enough

The less favoured druggist, who has his being in regions far remote from Bloomsbury Square, must often be forced to ask himself the question with which we commenced these remarks. He is continually being told that a glorious future is opening for pharmacy, and that his field of labour, rugged and rough as it may seem, is in reality an El Dorado which will by-and-by reward its workers with nuggets and gems of inconceivable value. Perhaps he is sometimes tempted to imitate the inquisitive but practical Hodge, who on hearing the stump-orator declare that there was a good time coming, asked "if the guv'nor 'ood obleege 'em with the date."

But why does not the financial position of the pharmacist improve? He has been well educated; he occupies a respectable position in society; his calling has been hedged about with restrictions which protect it from inundations of "Chinese cheap labour," and his business does not suffer as do others, from keen competition. The solution to the problem is not difficult to arrive at. A nutshell would cover the whole case. Stripped of all high-flown fancies, and accidental obfuscations, what is the *raison d'être* of the pharmacist? Emphatically, to dispense the prescriptions of the physician. To this one point the whole course of his training tends, and to it the whole of his professional studies are, or should be, directed. His sphere of usefulness, we readily admit, may be enlarged. He may gratify a *penchant* for chemical investigation by qualifying himself as a public analyst. He may turn his love of nature to practical account by appearing as a professor of botany. Or he may give play to cosmopolitan fancies by combining with pharmacy the trades of perfumer, fancy warehouseman, wine merchant, beer seller, tobacconist, and oilman—we know chemists and druggists who are all these—but the pharmacist, we repeat, is nothing if not a dispenser. Unless his existence can be justified as constituting a medium between the prescriber and the patient, he is a cumberer of the ground, a usurper of positions which belong to other men. Here, therefore, arises the simple, but supremely important inquiry, is there any public need of the pharmacist in his true vocation as a dispenser of prescriptions? To that question the majority of our readers would, we feel convinced, make but one reply. We have no hesitation in asserting that there are hundreds of provincial chemists and druggists as fully qualified and as competent as any of their metropolitan brethren who pass through whole weeks without receiving a doctor's prescription. But we shall be told that improvement in this direction is only a work of time; that when druggists become better educated, and give evidence of a more liberal acquaintance with the sciences bearing on their business, medical men will gladly relinquish their own dispensing, and thankfully delegate the carrying out of their directions to the accomplished pharmacist. Twenty, or perhaps ten, years ago that argument might have had some weight, but in the year 1876 it is rather too late in the day to advance such a sophism in defence of a practice which can find no support except in interested motives and on the most unreasonable grounds. We could put our finger on the names of a score of towns in which, although there are in each one or more pharmaceutical chemists, every medical practitioner dispenses his own medicines. It is, moreover, our firm belief that unless the leading members of both the medical and pharmaceutical professions join hands in a vigorous crusade against the practice we advert to, the provincial druggist will not, a dozen years hence, find that he is richer by one additional prescription than he is to-day. The fact is, country practitioners are so firmly impressed with the conviction (erroneous though it is) that abandonment of dispensing would mean ruin to their income, that unless a strong influence can be brought to bear upon them by the leaders of the profession, which shall touch their *amour propre*, competent and trustworthy pharmacists will (in their view of the case) never be seen this side of the millennium. Surely here there is a splendid opportunity for a Pharmaceutical Council to gain popularity among members of the Society. The *Pharmaceutical Journal* bewails the ingratitude of those who ignore the services of the out-going Council, and sings a pæan of victory over the triumphs which have attended the systematic persecution of the pitiable hucksters, whose worst offences consist in defrauding a legitimate druggist of the sale of a few ounces of oxalic acid or pennyworths of "Mother's Friend." When the Council has had the courage to cope with the bugbear of co-operation, we will join our contemporary in its song of triumph. Till then we should prefer to see it dealing with a question of such practical importance to pharmacy as is that of obtaining a fair share of dispensing experience for even the most remote country pharmacist.

INACCURATE DISPENSING.

The Sheffield analyst having opened a new field for analytical enterprise in the exploitation of physicians' prescriptions, it is not surprising that his example should be followed, and it is perhaps even less surprising that the next report should bring forward revelations of a far higher degree of sensationalism than anything yet attempted. No man living could dispense a mixture in which a resolute analyst could not discover some imperfection; and we should be blind to the evidence of our senses if we did not allow for the bias with which an analyst proceeds in his work. Faraday once constructed an ingenious little instrument to show that any party of intelligent and honourable table-turners did really, though quite unconsciously, employ a certain degree of muscular exertion, the effects of which were as deceptive to themselves as they were to outsiders. In precisely the same manner an analyst commences an investigation, the results of which he to some degree anticipates. We have had proof over and over again within the past three years that two analysts, each of unquestionable reputation, will find in the same substance quite different ingredients. In most cases we believe it is quite unnecessary to assume bad faith on the part of either; the contrary results are dependent simply on the different bias with which the analysis is undertaken. We are compelled to apply this theory to Mr. Thomson's elaborate examination of nearly two hundred mixtures reported in another part of this issue. Such universal carelessness or depravity as this gentleman has discovered among the dealers in medicines is far too astonishing. Absolute accuracy is, no doubt, unattainable; but that pharmaceutists pitch drugs or chemicals into mixtures in such a reckless manner as Mr. Thomson's tables seem to show is a revelation of the exactness of which no ordinary evidence will be sufficient to convince those who have any acquaintance with the proceedings of the dispensing department. Out of eighty-one mixtures, each of which should have contained 120 grains of potassium iodide, none was perfectly correct, and only eleven, according to the analyst, contained the quantity within half a grain: the rest varied between 44 grains and 141 grains, the majority of the errors being towards deficiency. Taking the total of these mixtures, Mr. Thomson finds that he got altogether 220 grains less than he should have had. By omitting from the calculation, however, numbers 60 and 68, in which instances the prescriptions seem to have been read for 1 drachm and 2 scruples of the salt respectively, we find the average proportion of iodide, given in Mr. Thomson's table, a little over 119 grains in each bottle. In the two excepted instances it is by no means improbable that the dispensers, noticing the unusually large dose prescribed, and having no means of communicating with the prescriber, took upon themselves to correct what they thought might very likely have been an error.

There is one important point, however, which Mr. Thomson's

paper brings into prominence, and which deserves the most careful attention. We refer to his notes of measurements. Whatever may be argued against his other columns, it is hardly reasonable to assume any mistake in this matter, and we have therefore the somewhat startling observation that a six-ounce mixture may vary by more than 500 grains in measurement. This, we presume, indicates the extreme inaccuracy of ordinary medicine bottles, and that is a subject worth the attention of druggists' sundriesmen. It certainly proves, likewise, the risk of preparing a mixture in any other manner than in a graduated measure. This plan is adopted by the most rigidly careful dispensers, who have themselves discovered the variations in so-called 6 and 8-ounce bottles, and will not therefore trust to such, except in cases where a divided portion is ordered for a dose.

The column of prices charged for the medicines is also an interesting feature in Mr. Thomson's paper, but we leave comments on that section, and on the paper generally, to our readers, who, we are confident, will scrutinise its conclusions with interest and care.

THE PHARMACEUTICAL COUNCIL ELECTION.

The contest for the 14 vacant seats on the Pharmaceutical Council, to be decided in May, is to lie between the following 16 gentlemen. The names against which an asterisk is attached are the only new candidates:—

Atherton, John Henry, Long Row, Nottingham.
*Atkins, Samuel Ralph, Market Place, Salisbury.
*Baildon, Henry C., 73 Princes Street, Edinburgh.
Bottle, Alexander, 37 Townwall Street, Dover.
Cracknell, Charles, 217 Edgeware Road, W.
Frazer, Daniel, 113 Buchanan Street, Glasgow.
Greenish, Thomas, 20 New Street, Dorset Square, N.W.
Hills, Thomas Hyde, 338 Oxford Street, W.
Mackay, John, 119 George Street, Edinburgh.
Owen, John, 51 Holloway Road, N.
*Roach, Pope, 8 St. James's Street, S.W.
Sandford, George Webb, 47 Piccadilly, W.
Savage, William Dawson, 4 Park Road East, Brighton.
Schacht, George Frederick, 7 Regent's Place, Clifton.
Shaw, John, 24 Great George Place, Liverpool.
Williams, John, 16 Cross Street, Hatton Garden, E.C.

The following gentlemen have also been nominated, but decline to accept office if elected:—

Andrews, Frederick, 23 Leinster Terrace, Hyde Park, W.
Barker, William Robert, 143 New Bond Street, W.
Clark, Walter Beales, 15 Belvoir Street, Leicester.
Constance, Edward, 37 Leadenhall Street, E.C.
Darby, Stephen, 40 Leadenhall Street, E.C.
Guyer, James Brett, 11 Strand, Torquay.
Howden, Robert, 78 Gracechurch Street, E.C.
Morson, Thomas, 124 Southampton Row, W.C.
Sutton, Francis, Bank Plain, Norwich.

It will be noticed that Mr. Sutton, of Norwich, one of the retiring councillors, is among those who decline to accept office.

The following are proposed as auditors:—

Barron, Frederick, 2 Bush Lane, Cannon Street, E.C.
Hodgkinson, William, 127 Aldersgate Street, E.C.
Horner, Edward, 20 Bucklersbury, E.C.
Squire, William, 5 Coleman Street, E.C.
Stacey, Samuel Lloyd, 300 Holborn, W.C.

COLOURLESS TINCTURE OF IODINE.

Reference has been already made to this preparation in the correspondence column of this journal, but the subject will bear further notice, from the fact that the production of a stable and effective tincture of this nature still remains a desideratum in elegant pharmacy. The formula in the German Pharmacopœia is probably not the one usually adopted. It has been found that an apparently perfect colourless solution may be effected readily by the addition of liq. ammoniæ in variable proportions to the old tinct. iodini comp. of British pharmacy.

An account of the different experiments made in this direction will be seen in the annual records of the "Year Book of Pharmacy," and it will therefore be needless to go over the same ground. The main result, confirmed by the personal experience of many pharmacists, appears to be that decolouration of iodine is gained, as far as rapidity is concerned, in exact proportion either to the amount or the strength of the solution of ammonia employed.

Very good results have been obtained by the substitution of a concentrated spirituous solution of ammonia in place of the P.B. liquor.

To this colourless tincture, as well as to all others yet exhibited, there are two objections. After the lapse of a few days, less or more in proportion to the presence or absence of ammonia, a certain feathery, white decomposition makes its appearance, similar in general aspect to a cryptogamic formation. What may be its true nature is a doubtful point; but its occurrence prevents the preparation from being manufactured as a trade article, or being kept in stock.

The second drawback is one of graver character. Not at a date very far removed from this, a fair and somewhat extensive trial was given to decolourised iodine which had been most carefully made. Ladies moving in high society are by no means exempt from glandular swellings, and it would have been a boon to have had recourse to any external application which would not visibly disfigure. Colourless tincture of iodine as an ammoniacal solution failed signally in London West-End practice; and though there was the strongest motive for its continuance, it was reluctantly abandoned.

Nevertheless, it is yet open to the inventive genius of the pharmacist to discover some colourless form of iodine, a liquid, not a smearing ointment, which may be both stable in composition and medically effective in its use.

QUACK MEDICINES IN FRANCE.

In reference to the opinion held concerning secret remedies in France, perhaps the following brief report of a criminal trial in Paris may be of interest. We take the facts from *Le Monde Pharmaceutique*.

Before the Correctional Tribunal—President, M. Carlet.

Prisoners: Benjamin-Aimé Joubert, calling himself oculist, 63 years of age, residing at Gentilly; Frederic Bourceret, 43 years, no profession, residing at Paris; Antoine Pebayle, known as Portelemy, 64 years, doctor of medicine, Rue Mouffelard. Joubert is the maker of a lotion and water for the eyes, &c.; Pebayle is accused of having been associated with him in advertising and selling the same; and Bourceret of having recommended customers on commission.

The following dialogues occur in the course of the trial:—

The President: Joubert, according to your own account the lotion and water invented by you are infallible?

Joubert: Infallible for the eyes.

President: Yes; but you profess that the water will not only cure the eyes, but many other diseases—gout, hæmorrhoids, paralysis, secret diseases?

Joubert: Certainly; it may be applied in many cases.

President: Then, in regard to your lotion, you have given some to M. Faure, whose arm is paralysed: the physicians had pronounced him incurable, and it is that class of patients that unqualified practitioners always get hold of. It was Bourceret who gave him your address?

Joubert: Yes, sir.

President: Well, the patient is worse than ever. His arm is raw, which is due to your lotion, and which might be expected from its composition, of which we have heard—tobacco, ammonia and camphorated brandy. You have sold him not less than 5 litres at 10 francs the litre.

Joubert: I sell what is required. I live by my business.

President: Then you refused to give the prosecution the composition of the eye-water, on the ground that it was your secret.

Joubert: I have made many cures.

President: Yes; it appears that some children have found benefit from your collyrium; but it has not proved useful to adults. It is noteworthy that Bourceret, who recommended you and to whom you gave a commission, applied to other doctors when he had an erysipelas.

Bourceret, on being examined, declared that Joubert did not pay him any money.

Dr. Pebayle admitted that he had prescribed the Eau de Joubert for internal use. He did not know its composition, nor had he read the advertisements.

President: And you have prescribed a water of the composition of which you are ignorant?

Pebayle: Yes.

M. Louchet (Advocate of the Republic): In such conditions we can only regret that the law is not more severe.

Ultimately Joubert was sentenced to imprisonment for 8 days, and 230 francs penalty; Bourceret to 50 francs, and Pebayle to 200 francs penalty.

PRESCRIBING BY DRUGGISTS.

Our medical contemporaries are still very jubilant over their recent victory, and as will be seen by a semi-official proclamation, which we reprint elsewhere, they announce an early renewal of hostilities. The writer of the article we allude to scorns our suggestion that the Medical Defence Association should be satisfied with the employment of the Medical Act. And not unnaturally, assuming that the objects of the Association are purely mercenary. But this we did not venture to assume. We have no sympathy with druggists who entice patients to consult them, falsely professing themselves to be duly qualified, or even giving reasonable colour for such a theory to arise in the imagination of their neighbours. We have also a contempt for the member of a learned profession who complains to the *British Medical Journal* (and his words are echoed by a second correspondent), that "these druggists are stealing the best fruit, viz., the ready-money invalids." So invalids, then, were made for doctors, were they? There we have a simple and happy solution of the great problem of the introduction of suffering into the world. And it is to this axiom that the laws of Great Britain are to adapt themselves. That, at any rate, is the idea suggested by these noble-minded Ephesians for the use of the Defence Association. Their object to protect the poor public from the deceptive arts of crafty usurpers? Don't flatter yourself. It's the "ready money" they are after; and the Apothecaries' Act has turned out to be the winning suit. So play it out; that's the correct game.

The chemist and druggist, it appears, is the only man in this once free country who is prohibited from giving his advice on a medical matter; and he is so prohibited simply for the reason that he was the one person whom the Legislature in 1815 intended to protect. This seems too outrageous to be seriously stated, but here is something like proof that certain persons, otherwise sane, seem calmly to accept the proposition in all its nakedness. "Medicus" writes to the *British Medical Journal* to complain of a "medical botanist" (anybody can be a medical botanist) *attending* a certain case, to which "Medicus" himself was afterwards called. This is how the editor of that journal replies;—

*** "This is not, as our correspondent supposes, 'a case for the Medical Defence Association,' for there is no law to touch it, unless the medical botanist falsely assumes a legal medical title, which does not appear. Druggists prescribing are liable to prosecution, not under the Medical Acts, but under the special provisions of the Apothecaries' Act. Prescribing druggists are by far the most numerous and the most dangerous class of unqualified practitioners, and it is to put down their malpractices that the energies of the practitioners around them should be directed. We recorded two cases of death last week ascribable to their interference. No medical practitioner should consent to give a certificate in any case in which a druggist has prescribed."

We call attention, not to the malevolence—that is not new—but to the strange stupidity manifested by the foregoing extract. If it be the law that, while anybody in Great Britain may without any sort of qualification, dub himself a medical of botanist, and visit all sorts cases, a druggist is liable to prosecution if he simply stand behind his counter and advise some one who comes to him; if that be the law, we say, is it possible that it can remain so if brought into the searching light of publicity?

IMPRISONMENT FOR DEBT.

A difficult question suggested by the Debtors' Act was settled last month in the Court of Queen's Bench. That Act gives power to the judge to order imprisonment for six weeks in cases where the debtor is able to pay and does not. The question is, having served that six weeks, can the man be imprisoned again if he still refuse to pay. The Hereford County Court judge, in a certain case which it is not necessary to particularise here, said Yes; the Court of Queen's Bench, to which the decision was finally referred, said No. The Lord Chief Justice, in the course of his comments, remarked that if imprisonment was allowed at all as a means of enforcing payment in cases where the debtor was able to pay, there did not appear to be any reason why the imprisonment should not be renewed. But the power to imprison was limited, by the Act, to six weeks, and there was no express power to imprison again. And the Court could not give a power which the Legislature had not given, especially as at Common Law a debtor could not be imprisoned again for the same debt when lawfully discharged from imprisonment.

A curious point about this question is that the Debtors' Act gives the power of imprisoning for six weeks on the non-payment of any instalment of a debt which has been ordered to be paid in instalments.

Mr. Bass has again brought forward his benevolently intended bill to practically abolish this power of imprisoning debtors who, though they have the means to pay a debt, refuse. His bill is very short, and is complete in these words:—"The power of imprisonment under the fifth section of the Debtors' Act, 1869, shall not, after the last of December, 1876, be exercised by any Court or Judge other than a Superior Court of Law, or of Equity, or a Judge thereof."

A little bill like that might slip through Parliament almost unnoticed. We are not aware on what arguments Mr. Bass depends; but, at any rate, it should be clearly understood that the power of imprisonment, in these cases, is not in the hands of any vindictive creditor. It is entirely under the control of the judge; and, indeed, the creditor who attempts to secure a commitment without providing himself with sufficient evidence of the means of the debtor, will himself smart severely. The whole subject of the debt laws is in urgent need of revision, and it is most earnestly to be hoped that a serious attempt will soon be made to deal with them, so as to ensure, more efficiently than now, the most abundant protection for every honest man, but the severest penalties for the rogues who abuse the facilities of credit which an extensive commerce has rendered necessary.

Prize for an Oil Extracting Machine.—A prize of 2,000 lire is offered by the authorities of Reggio, Calabria, for the best apparatus for extracting the essential oil of bergamot. The conditions are strength and cheapness in the apparatus itself, combined with capacity for producing the largest quantity of essence in the shortest time without detriment to the colour, purity, and fragrance of the product.

Reviews

AND

Literary Notes.

A Class Book of Chemistry on the Basis of the New System. By Edward L. Youmans, M.D. London: Henry S. King & Co.

The author announces that his object in presenting this book to the public "is to meet the wants of that considerable class, both in and out of school, who would like to know something of the science, but who are without the opportunity or the desire to pursue it in a thoroughly experimental way." It is perhaps unfortunate that a science which is essentially experimental should be ever made a subject of study by persons who are not prepared to pursue it experimentally. What strange notions the student must have who derives his pseudo-knowledge from verbal descriptions of chemical substances, and dreams that he learns something of chemical force by merely reading about it! It would be vain to deny that there are persons desirous of knowing something about chemistry without the trouble of studying it experimentally, but we seriously doubt that the term knowledge can be truthfully applied to the notions so acquired. Those who want a smattering of chemical knowledge ought at least to get an experimental smattering.

About one-third of the book is devoted to an account of the physical forces, a knowledge of which is so essential to the student of chemistry. We can scarcely complain of the superficial notice of many physical facts of great chemical interest, seeing that it is not uncommon to omit the subject entirely in books of this sort. Indeed, it is to be regretted that the science is so frequently studied entirely apart from physics. Dr. Youmans devotes a reasonable amount of space to spectrum analysis, and does not neglect photographic chemistry. The chapters on chemical principles are well written, and contain an excellent exposition of the most advanced notions of chemical theory. The second half of the book, about 150 pages, treats of descriptive chemistry, including the so-called organic branch. It can be imagined how much space is devoted to each of the elements and the more important compounds. Of the five oxides of nitrogen, for example, only two are described. Of course, it is quite impossible to do justice to descriptive chemistry in such a very limited space. We cannot blame the author for not writing a large book if he intended to produce a small one, but it does appear a pity, after so excellent an introduction, to pass so lightly over chemistry proper. However we may differ with the author on these points, we have no fault to find with the matter of the book. For the sake of theoretical chemistry we wish it a wide circulation.

On Fermentation. By P. Schützenberger, Director at the Chemical Laboratory at the Sorbonne. London, 1876: Henry S. King & Co.

This work, which is a continuation of the International Scientific Series, is an attempt to popularise a very difficult subject, and to bring the various theories entertained into a connected arrangement.

The first chapter is devoted to the history of the literature of fermentation, while in subsequent sections various fermentations, such as alcoholic, lactic, ammoniacal, and butyric, are described. Ferments themselves and their actual composition, as well as the functions of yeast, are duly noticed. The portion of the book that will possess most interest to pharmacists relates to an account of the action of various chemical and physical agents on alcoholic fermentation, though some will be already familiar with the experiments of Dumas. Further on, the remarkable action of borax in destroying the activity of soluble ferments and the general question of indirect fermentation is clearly put.

Perhaps it was natural, and to some extent inevitable, that frequent allusion should be made to the previous labours of M. Pasteur. Certain it is that the name, theories, and experiments of this distinguished *savant* pervade the entire volume; and no few paragraphs lead up to the "Application of the Researches and Ideas" he has enounced.

The non-chemical public will find in the pages of this new manual a fair summary of facts which have deservedly attracted great attention: for our own readers much of the compilation will not have the charm of novelty. Twenty-eight illustrations accompany the text.

It is right to mention that two main divisions of the subject have been adopted by the author—the first treating on direct fermentation, that due to cellular organisms; and the second to albuminoid substances, indirect fermentation, and the origin of ferments.

We very much regret that several articles which have appeared lately in our pages—for example, one on "Saffron," last month, and one on "Benzoin," in December last—should have appeared as original. They contained long verbatim extracts from Hanbury's *Pharmacographia*, inserted with no acknowledgment whatever. These articles were sent to us in manuscript by a writer who has contributed anonymously to our journal for some years past, and in whom we had every reason to place confidence. His position gave him the opportunity of obtaining special commercial information, and we discovered with as much surprise as regret the deception which had been practised upon us. It is almost needless to add that no further communications from the same pen will appear in The Chemist and Druggist.

Messrs. Reeves & Turner send us a little book which they call "A Practical Manual of the Law of Sales of Food, Drinks and Medicines." According to the title-page, a chemical analyst, a barrister, and a magistrate have been concerned in this production, and they profess to give a summary of the various Acts affecting the sale of the above-named substances, together "with full notes of all the cases decided on the prior statutes." This profession appears to be a deliberate mis-statement. In treating the Sale of Food and Drugs Act, for example, which occupies the bulk of the book, less than half-a-dozen cases are commented on. What is in the book is not of a very trustworthy character, if we may judge from one or two sections we have looked at. The summary of the Pharmacy Act is a muddle throughout. The compiler has not comprehended the distinction between chemists and druggists and pharmaceutical chemists, and his confusion leads him into some wholly incorrect statements. He says, for instance, "apprentices and assistants must be registered" (which is not the case), and much more of the same misleading character. The chemical analyst (we suppose) gives a chapter on "Common Adulterations." One specimen of his style will suffice. He says:—"Chemically the component parts of alcohol may be popularly described as—carbon, 52 parts; water, 48: that is, hydrogen, 13 parts; oxygen, 35 parts." We cannot afford space to expose more fully the defects of this so-called "manual;" but we have said enough, we hope, to warn all our readers not to waste a florin on such an insufficient guide.

Messrs. Burgoyne, Burbidges & Co., the wholesale druggists, have suffered much in recent years from a keen sense of the deficiencies of the pharmaceutical literature of this country. "For many years" they "have been of opinion that amongst all those publications which address themselves to the chemist and druggist there does not exist one combining all those elements of useful and general information which are so essentially necessary to him in the exercise of his business or profession." Weekly these gentlemen have had to mourn over the "light" and frivolous style of one pharmaceutical organ, while the "classical" faults of another have added monthly to the accumulated sadness. We trust we are accurately applying Messrs. Burgoyne's adjectives. Anyway, the patience of our esteemed friends has at last failed them, and after all these years of protracted suffering they have at last resolved to "fulfil the mission" to which they feel themselves called, and "to supply, or to endeavour to supply, the want above alluded to." It is superfluous to say that the *endeavour* of such a firm is the certain prelude of success. Conscious of our own imperfections, but desiring some definite information as to the points wherein we have failed, we naturally turn to the new "magazine, in every sense of the word, of truly generally useful literature and information," for the discovery of the "elements so essentially necessary." We see it all now; our sins are many and our collapse is certain. Among the "essentially necessary elements" which we have neglected are the health and occupations of Colonel Baker, the movements of the Queen and the Prince of Wales, Calvinist hymnology, and, above all, Messrs. Burgoyne, Burbidges & Co.'s Prices Current.

The irrepressible Society of Public Analysts has now established an "organ" of its own, happily entitled "The Analyst." Hitherto the *Chemical News* has lent a little space for reports of the society's proceedings, thus nourishing in its bosom an ungrateful bantling, whose first impulse of independent life is to compete in the literary world with its generous parent. "The Analyst" is edited by six eminent gentlemen, styled the Committee of Publication, but lest these gentlemen should be overworked they are to be aided by six others, who are styled "Abstractors." The first number contains a paper by Dr. Muter "On the Analysis of Butter," in which the author describes a new method, which seems very exact, both in reference to obtaining the density of the fat tested as well as in regard to the estimation of the fatty acids. There is also a paper by Mr. Dupré "On the Examination of Whisky and other Spirits for Methylated Spirit and Fusel Oil."

Bentley & Trimen's "Medicinal Plants" has reached its seventh part, and fully maintains its high character. The literary section of this work is written in a very interesting style, and aims at being a treatise on Materia Medica, as well as on Botany. The connection of this text with the admirable plates which characterise the work will give it a permanent and exceptional value.

THE CHEMICAL SOCIETY.

Thursday, March 16, 1876.

Professor Abel, F.R.S., President, in the chair.

Before commencing the ordinary formal business of the society, Dr. J. H. Gladstone rose, and in a short speech proposed a vote of thanks to the president for the exceedingly enjoyable visit to the Royal Arsenal at Woolwich on the previous Tuesday, and for his generous hospitality on that occasion. This was seconded by Dr. Gilbert, and carried by acclamation. The papers read were, 1. "On Crystallised Glycerin," by Dr. P. F. van Hamel Roos; 2. "Notes on the Fatty Acids, and on a Suggested Application of Photography," by Mr. W. H. Hatcher; 3. "On Stibine," by Mr. F. Jones; 4. "On the Use of Platinum in the Ultimate Analysis of Carbon Compounds," by Mr. F. Kopfer; and 5. "On the Action of Organic Acids and their Anhydrides on the Natural Alkaloids, Part V., by Mr. G. H. Beckett and Dr. C. R. A. Wright. The meeting was then adjourned until March 30, the anniversary.

Thursday, April 6, 1876.

Professor Abel, F.R.S., President, in the chair.

The first paper read after the formal business of the society was a "Preliminary Notice on the Action of Sulphuric Acid on Naphthalene," by Dr. J. Stenhouse and Mr. C. E. Groves. From amongst the products of the reaction the authors have succeeded in isolating two new isomeric compounds which they call naphthalene sulphones. Three notes from the laboratory of the Yorkshire College of Science were then communicated by Professor T. E. Thorpe, namely, "On the Action of the Copper Zinc Couple on Potassium Chlorate and Perchlorate," by Mr. H. Eccles; "On Thallium Chlorate," by Mr. J. Muir; and "On the Isometric Relations of Thallium," by Mr. Thorpe himself. Finally, Dr. H. E. Armstrong read a paper "On the Nomenclature of the Carbon Compounds," the discussion of which was adjourned until the next ordinary meeting, which will be on Thursday, April 20. On Friday, April 28, there will be a special meeting, when Professor Andrews will deliver a lecture "On Certain Methods of Physico-Chemical Research."

LEAD IN AËRATED WATERS.

The following has been forwarded to us for publication. It has already appeared in the *Indian Medical Gazette*:—

Dear Sir,—I have recently examined a large number of samples of aërated waters from various parts of India, including some from Bombay, Madras, and Calcutta, with a view to determining whether they contain lead, and approximately the quantity present. You will see from the accompanying table that in so many as 36 out of 50 samples analysed, lead was detected; and though in no case was the weight of lead in solution large absolutely, yet we must remember that, to use Professor Taylor's words, "lead is an accumulative poison, and affects some persons powerfully in the smallest quantities," and beyond doubt these impure waters must therefore be unwholesome, and both manufacturers and consumers ought to take warning from the facts now made public. I should be glad to learn from any of your readers if they have met with cases of chronic lead poisoning which might be traced to the consumption of impure aërated water.

Yours truly,
F. N. Macnamara, M.D.

Medical College Laboratory, Calcutta:
January 25, 1876.

Nos.	Description of Aërated Water	Quantity of Lead per Bottle in Grains	Nos.	Description of Aërated Water	Quantity of Lead per Bottle in Grains
1	Potash	Trace	26	Gingerade ..	None
2	Lemonade ..	Trace	27	Lemonade ..	·00324
3	Soda	·001674	28	Lemonade ..	None
4	Soda	·00185	29	Soda	A trace
5	Soda	Trace	30	Potash ..	·0324
6	Soda	Trace	31	Potash ..	·00139
7	Soda	Trace	32	Aërated ..	·0016
8	Soda	Trace	33	Tonic ..	·0048
9	Soda	None	34	Soda	A trace
10	Soda	·00278	35	Soda	None
11	Soda	None	36	Soda	·0016
12	Soda	None	37	Soda	A trace
13	Aërated ..	Trace	38	Soda	Trace
14	Tonic	None	39	Lemonade ..	·0067
15	Tonic	·00360	40	Vichy	None
16	Seltzer	None	41	Seltzer ..	None
17	Gingerade ..	None	42	Soda	Trace
18	Soda	·0185	43	Soda	·0016
19	Soda	Trace	44	Soda	·0079
20	Potash	·0155	45	Soda	Trace
21	Potash	·0049	46	Soda	·0045
22	Lithia	None	47	Soda	·00287
23	Soda (Syphon)	Trace	48	Soda	·00296
24	Aërated ..	None	49	Soda	·00247
25	Gingerade ..	Trace	50	Soda	None

PRESCRIBING CHEMISTS—MORE PROSECUTIONS THREATENED.

THE *Students' Journal* is edited, we believe, by the founder of and secretary to the Medical Defence Association, and the subjoined article, which appeared in its issue of March 25, may therefore be taken in some sort as the official reply of the association to certain comments which appeared in our editorial columns last month. The writer says:—

"Although the Medical Defence Association has scarcely got into working order, the operations of that body have already caused no little consternation among chemists throughout the metropolis, more particularly among those superior and learned individuals who delight to call themselves 'prescribing chemists.'"

Then, after giving a condensed report of the discussion on the subject in the Pharmaceutical Council, the article continues:—

"The Chemist and Druggist derives much comfort from the notice that has been taken of the proceedings of the Defence Association by the Council of the Pharmaceutical Society, and in an article headed 'Rumours of War,' says:—'It may be taken for certain that the profession will not be permitted to gather fully the fruits of their victory without encountering and conquering the opposing force of the whole pharmaceutical body.' Further, the article suggests that the Defence Association should make a grand *coup*, once for all, by marching straight against the councillor who boldly declared that, according to Baron Bramwell's ruling, he infringes the law every day. This case, The Chemist and Druggist says, would be defended with the utmost strength of the Pharmaceutical Society. No doubt, the case of the councillor referred to will occupy the attention of the Defence Association in good time, if he continues to infringe the law daily; meanwhile, if the Pharmaceutical Society is anxious for a trial of strength with the Defence Association, an opportunity will soon present itself, for we understand that proceedings are about to be taken against other prescribing chemists. As to the result we have no fear,

the Pharmaceutical Society notwithstanding. If the facts can be proved, conviction must follow; there can be no doubt as to the law, for cases without number have been decided, in which it has been clearly laid down that chemists have no right to prescribe for patients. They can sell any preparation or compound, and state that it is good for this or that disease, but it must be sold under its own name, be it 'paregoric,' syrup of squills, or lenitive electuary. When a chemist selects his own drugs, and puts up a bottle of mixture for a patient, he goes beyond what he is authorised to do. The Chemist and Druggist has discovered that there is a clause in the Apothecaries' Act which provides that none of its sections shall interfere with the trade of the chemist and druggist as carried on at the time of the passing of the Act, and imagines that, therefore, chemists and druggists are protected against the penal clauses of the Act, even if they combine a prescribing practice with their legitimate business as vendors of drugs and dispensers of prescriptions. The particular reasons for arriving at this conclusion are reserved for another article; meanwhile our contemporary advises the Defence Association in their future proceedings to trust mainly to the Medical Act of 1858, 'in the establishment of which they would have the sympathies and co-operation of all parties except the actual offenders.'

"Doubtless the Defence Association will feel grateful for this kind and disinterested advice, especially since, under the Medical Act of 1858, it would be almost impossible to convict in a single case of illegal medical practice unless the offender were an idiot as well as a knave, and pretended that he was a registered medical practitioner. But we imagine that the Defence Association will trust to the Apothecaries' Act, and go on their way rejoicing, perfectly content to exist without sympathy or co-operation from without, provided that they are able to teach chemists and druggists in a practical manner that they go beyond their province in assuming the functions of medical men. It will, no doubt, be very humiliating to many chemists to be compelled to relinquish their prescribing practices; but those who cannot settle down to their legitimate business will be able to enter upon the study of medicine and qualify for the profession. If they do this chemists as a body will sustain a great, but not irreparable, loss, whilst the ranks of the profession will gain a number of 'noble' recruits."

THE LIFE AND WORK OF LIEBIG.

(*Continued.*)

Lecture II.

Analysis of Researches and Discoveries continued—Advancement of General and Organic Chemistry by Elementary Analysis—Lectures and Laboratory Teaching.

If in the contemplation of human occupations we inquire after their general purport or their ultimate object, we seem to come to a conclusion which compels us to believe that in comparison with the general powers and laws governing the universe they are perfectly trivial. Mill has defined the general purport of human occupation as the carrying of things from one place to another. If we consider that there was a time when there were on this globe no beings which we call organised, and that it is perfectly certain that there must be a time again when there shall be on this globe no beings that we term organised, we involuntarily come to the conclusion to which many ancient philosophers came, that everything was idle, that there is no object in existence, and that it would have been much better if man had not been born at all. But when we again consider that it is possible to enjoy life, it seems necessary that we should arm ourselves with faith as to the improvability of human affairs, which will be mainly that of the Epicurean school, namely, that we should endeavour by the exercise of all our powers to make this existence, such as it is, as happy and as agreeable as we can. Now the sources of happiness of the human mind are many and various. They are physical and they are metaphysical, so called, and to the metaphysical belongs that peculiar innate craving, the desire for knowledge. The want, therefore, that all ages have after they have satisfied their physical wants, is to endeavour to obtain a kind of food for their minds, which is generally defined as an idea of the laws which govern the world, and for which the ancient term, as meaning the love of knowledge, was philosophy. In modern times we find that those men have been the greatest philosophers who have apprehended both these objects of the human intelligence, namely, who have at once sought the material well-being of man, and at the same time have increased that knowledge which in itself is not useful in the sense in which we generally use the term, but affords only pleasure to the mind.

One of these men was Oersted, the great Danish philosopher, the discoverer of the principle of electro-magnetism, upon which are based those wonderful instruments, the telegraphs. In one of his philosophical discourses Oersted says the picture of the world which even the highest philosophers have framed for themselves has frequently suffered by want of appreciation of natural things. He then continues:—

"That an idea of the world is a fundamental part of every philosophy I do not need to prove. But that this philosophy must be partly empty, partly and in many parts erroneous, if it does not receive the essential portion of the truths which are taught to us by natural science, is not less certain."

Although the philosophers of the present time are not unacquainted with the results of natural science, yet they so far neglect them that natural science has hardly any influence upon their teaching.

In the last lecture I showed you the contrast between the philosophers of Germany at the end of the last century and the beginning of the present and the philosopher whom we have come together to remember and consider. I now come to the interchange of ideas which took place between a more modern philosopher and Liebig himself, and this modern philosopher is Mill. In one of the prefaces which Liebig prefixed to his "Animal Chemistry," he uses of Mill's work on philosophy these remarkable words:—"The author cannot disguise how great has been the use which, for his purposes, he has found in the study of the System of Logic of John Stuart Mill; nay, he believes that he has no other merit in what he has previously said, but that he has carried out some of the principles of inquiry into natural things which this eminent philosopher has previously enunciated, and that he has applied some other principles to special events in nature." If we now go to Mill's works we shall find that in his "Inductive Logic" he tells in one of his chapters on the explanation of natural laws how the researches of Liebig on respiration, on contagion, and others must be considered as admirable examples of the severity of the deductive method. And it will strike you at once that there must be an essential and great difference between the philosophy of the beginning of this century and that of John Stuart Mill, which gives a distinct colour to the mode of thinking of the present day. In order that we may more fully appreciate the points of contact and the differences, I will now proceed with a short analysis of the early labours of Liebig, and I shall do so in this manner. Whenever I come to a cardinal discovery or research I shall make a short halt, enlarge upon it as far as will allow of illustration and demonstration; in that way I hope we shall get over the ground agreeably and profitably, and without too much occupation of our time.

In the year 1823 was published the first paper of Liebig: it was in French, under the title of "On a Green Colour," and in the same year, that on the "Fulminates of Silver and Mercury." An Englishman named Howard, remarkable for several other discoveries, first made this peculiar compound, and it was called for many years the "fulminating compound of Howard." So it was originally named in Liebig's paper. You know that a considerable use is now made of fulminating compounds, for it has been discovered not only that they could be used as they had formerly been in the form of percussion caps, but that by their peculiar action they determine a peculiarly violent explosive function of gunpowder, of nitro-glycerine, of gun-cotton, or of various other explosives, which thereby either became for the first time useful as explosives or had their usefulness very largely increased. We see, then, that the research made in the year 1823 on these fulminating compounds, which then had no use whatever in trade, commerce, or manufactures, has now a bearing in its consequences and is of immense usefulness. The quantities of fulminates which are used in the world at large are very considerable, and you see here another illustration that in scientific research it is not at all requisite that there should be a direct practical object; but that on the contrary it is frequently very much better to work on in the field with which the inquirer is acquainted, no matter how remote it may appear from any practical application, and to exhaust a subject for the time, so that at a subsequent time there should be nothing to be added thereto, and then the application will appear at a certain time by a convergence of circumstances, or if you like to call it so, by accident.

In the year 1824 we find Liebig engaging in those questions which then agitated the minds of chemists. They knew that there were two varieties of carbonate of lime, of which the one is called arragonite, and the other chalk spar. The analyses of these compounds, such as they were at that time, were sufficient to prove that though they had different appearances and different forms of crystals, yet they had one and the same chemical composition. However, it was held by chemists at that time that identical chemical composition involved of necessity identical physical properties, and various explanations were offered of these chalk crystals. One of them was the theory that carbonate of lime was present in the one, say the chalk spar, and that in the other, the arragonite, there might be present calcium metal, which was less oxidised, and an acid which was more oxidised. These explanations were all rejected, and as is frequently the case, the best analyses were doubted, and in the general fight for supremacy the one or the other chemist had the best of it, according as he could best persuade his followers. Already in 1824 we find Liebig investigating this question, and he found that he could produce artificially these carbonates of the earths, including those of baryta and of strontia, and he shows that if carbonate of lime be precipitated from a boiling solution it takes the form of arragonite, and if precipitated slowly from a cold solution it assumes the form of chalk spar. Here then is a principle which might lead to the explanation, viz., that absence or presence of heat, or of more or less heat, might have a determining influence in producing various forms. But the solution was not admitted, because, as I have said, nobody believed that these bodies were identical in composition.

The acid which Liebig found to be combined with the fulminate of silver and mercury, and called fulminic acid, was ascertained by him and Gay-Lussac, with whom conjointly he made this research, to have a certain composition. The results were published in vol. 25 of the *Annales de Chimie*, under the title of *Analyse du Fulminate d'Argent*. A few years later Wöhler published a research on and analysis of an acid consisting of nitrogen, carbon and oxygen, which was called cyanic acid, because it was obtained from a body called cyanogen, and he observed that this very acid had the same composition as the fulminic acid of Gay-Lussac and Liebig. Here again the incredulity of the chemical world was so great that some rejected the analysis of Liebig, and some that of Wöhler, and Berzelius would know nothing of the proposition that there could be bodies having the same chemical composition and yet being different in chemical properties and in physical appearance. Wöhler's research on cyanic acid appeared in 1825, and it was on his paper as a theme that Liebig wrote.

In that year also he decomposed the fulminate of silver by sulphuretted hydrogen.

In 1826 he investigated various questions connected with mineral waters, others connected with cyanates, worked on bromine and on some double salts, one of which had a very important bearing upon a subsequent event in his life. He found in pan-deposits of the salt works at Salzhausen a peculiar double salt of potassium and calcium carbonate; and that double salt he afterwards employed when he formed his first artificial manure for the purpose of making, as he believed advantageously, potassium salt insoluble in water. Therefore this is important, as evidently having given him at that time a certain method upon which he worked for several years, until he subsequently recognised his error, as we shall see in a future lecture. He also analysed some double salts of cobalt and others, and with that the year 1826 closes. Let me add that during the whole of this time he was engaged, without publishing, in perfecting and elaborating methods which we shall have presently to speak of.

In 1827 we find him again appearing in French with a "Lettre sur quelques Combinaisons Particulières," and also with a memoir upon the bitter substance produced by the action of nitric acid upon indigo, silk, and aloes, which was afterwards known under the name of carbazotique acid, and is now called picric acid, owing to its very bitter taste. This substance has become a dyeing material for silks and various other tissues. It is made in large quantities, and it is very curious that the impure acid is preferred by dyers to the pure, from which many chemists draw the inference that the natural dyeing ingredient is not the picric acid itself, but that it ought really to be white, or colourless, and that that which dyes is a yellow matter, which hitherto chemists have not succeeded in removing from the crystallised acid.

(*To be continued*).

THE MANUFACTURE OF SULPHURIC ACID.

A TRIAL of very considerable interest and importance to manufacturing chemists occupied the Court of Exchequer four days last February. The details are somewhat complicated, but by giving them in narrative form we hope to make the facts clear without filling too much space.

The plaintiffs were Messrs. Faure & Kessler, of Clermont-Ferrand, near Lyon, France, and the defendant was Mr. Hugh Wallace, chemical manufacturer, of Battersea. It should be mentioned that there was also a cross-action instituted by Mr. Wallace, but as that was dependent on the result of the first, it will be understood that Messrs. Faure & Kessler are uniformly referred to as the plaintiffs, and Mr. Wallace as the defendant.

The Solicitor-General, Mr. Webster and Mr. Cock appeared for the plaintiffs, Mr. A. G. Ditton, of Ironmonger Lane, being the solicitor. The defendant was represented by Mr. Waddy, Q.C., Mr. Vaughan Williams, and Mr. Wallace, who were instructed by Messrs. Ingle, Cooper & Holmes. The trial took place before Mr. Baron Pollock and a special jury.

Messrs. Faure & Kessler are the patentees of certain apparatus for the manufacture of sulphuric acid, by the employment of which a great saving in the use of platinum is effected. By the usual method sulphuric acid is made in leaden chambers, but in the concentration it is found necessary to employ platinum pans, as beyond a certain density, and at a certain temperature, the lead is dissolved by the acid. By the process patented by Messrs. Faure & Kessler the concentration is conducted in shallow pans in which a certain amount of platinum is employed, but the quantity of which is reduced to a minimum, as, instead of using platinum alembics, they use these shallow pans with leaden domes above them. This apparatus was patented in England in 1872. Shortly afterwards the plaintiffs sent circulars to English manufacturers. One of these induced the defendant to consider the matter.

In February, 1873, defendant's son, Mr. Roger Wallace, visited the works of Messrs. Faure & Kessler, at Clermont-Ferrand, when he was shown the apparatus at work. He seems to have taken great pains to examine it minutely. On his return to England a correspondence ensued, Mr. Roger Wallace writing the letters in French as agent for his father. The ultimate result of this correspondence was a contract whereby it was agreed that the plaintiffs should provide plans for the erection of an apparatus at Mr. Wallace's factory at Battersea, with all the latest improvements, defendant undertaking to pay a royalty of 485*l.* if the apparatus fulfilled the promise of the patentees, payment to be divided into certain instalments, the first to be made fifteen days after the commencement of working. The contract stipulated that Mr. Kessler was to come to London to superintend the erection of the works; and it was also guaranteed that the apparatus should be capable of concentrating 6 tons of sulphuric acid within a day of 24 hours. Further, it was agreed that Mr. Wallace should have a commission of 5 per cent. on the next ten apparatus erected in this country under the plaintiffs' patent, and that after then it should be decided whether he should be their agent.

The works were erected in March, 1874. Mr. Kessler was unable to come himself at that time, but the firm sent instead an engineer in their employ, named Roussel. The defendant made no objection, and the works were completed. Much discussion occurred in court respecting the early results of concentrating under Mr. Roussel's management. Whatever dissatisfaction might exist, however, none was expressed by defendant direct to plaintiffs at the time. After Mr. Roussel's return to Clermont, plaintiffs received several letters from Mr. Roger Wallace, who said that, owing to various causes, such as requisite repairs, and a short supply of acid, they had not yet been able to give the apparatus a sufficiently long trial. On April 14, however, six weeks after Mr. Roussel's return, Mr.

Roger Wallace wrote a letter, marked private, containing the following passage:—

"We have not yet turned out the quantity of acid agreed upon, and yet, contrary to our agreement, which was, that after it had worked fifteen days to our satisfaction we were to commence to make our payments (as yet it has never worked to my father's satisfaction), you ask us for payment. Now, I think that 10 per cent. on the total cost would be a fair remuneration for my trouble, inasmuch as I should have a great deal of travelling, writing, and have to keep an extra clerk," &c. The letter afterwards proceeds:—"If your reply is favourable your apparatus will be at work next Monday. If not, never again in our factory."

For the defence it was maintained that the defendant himself, not being acquainted with French, knew nothing of this compromising proposal, and Mr. Roger Wallace testified that he alone was to blame in the matter. Plaintiffs would not agree to the demand, and in June, 1874, Mr. Kessler came to London. He then found that the concentrators had been pulled down and beaten out of shape, and that defendant had returned to the use of platinum alembics. After an animated discussion defendant offered to allow plaintiffs to erect a new apparatus on his premises at their own expense, and to pay them the sum already agreed upon if the same should prove successful. Mr. Kessler naturally declined the proposal, and the present suit was shortly afterwards commenced. At the same time Mr. Wallace sued Messrs. Faure & Kessler for the sum of 555*l.*, the amount alleged to have been lost by him in making the alterations necessary for the introduction of the new apparatus, which, as he contended, had proved a failure.

Very strong evidence in favour of Messrs. Faure & Kessler's process was given by Mr. Bannister, manager of the chemical works of Muspratt & Co., of Liverpool, and also by Mr. Thomas, of Paris. The latter had an apparatus similar to that erected for Mr. Wallace, and he said he could concentrate 7 tons of acid in it in 24 hours.

For the defence, Dr. Letheby was called. He was confident that 6 tons of acid per day could not be concentrated by this apparatus, and he doubted if colourless acid ever would be produced by it.

Another complication was introduced into the action by certain references to Messrs. Johnson, Matthey & Co., platinum dealers. In opening the case the Solicitor-General intimated a theory to the effect that this firm was really defending the case through Mr. Wallace. To rebut this insinuation the defence called Mr. Sellon, one of the partners in the firm of Johnson, Matthey & Co. He entirely disclaimed any such interest in the trial, and declared that his firm had not undertaken to indemnify Mr. Wallace. In cross-examination, however, Mr. Sellon admitted that the success of Messrs. Faure & Kessler's apparatus must prove injurious to his firm, as it would considerably reduce the demand for platinum.

The Judge, in summing up, expressed his opinion of the importance of the case, inasmuch as it affected the interests of those who were introducing a new process of manufacture into this country. The questions for the jury to consider were—first, whether Messrs. Faure & Kessler had fulfilled their contract. There were two points here for them to decide. The first was whether the substitution of Mr. Roussel for Mr. Kessler, in superintending the construction of the works, had been condoned by the defendant; and secondly, whether the apparatus, when erected, was such as should have given Mr. Wallace reasonable satisfaction after a fair trial. If they found for the plaintiffs on these points they must return a verdict for the full amount claimed by them, as there was no dispute about the price agreed upon, and such a verdict would, of course, bar any investigation into the claim made by Mr. Wallace. If, however, they found that the plaintiffs had not fulfilled their contract it would be the duty of the jury to estimate the damages to be awarded to Mr. Wallace.

After half an hour's consultation the jury found for the plaintiffs, and consequently judgment was given for Messrs. Faure & Kessler in both cases, the amount of their claim, 485*l.*, being awarded.

A rule *nisi* for a new trial has since been obtained by the defendant, and it will probably be argued in May.

PRECIPITATE OF SULPHUR.

At Greenwich, on the 10th inst., Mrs. Mary Kirby, chemist, of Trafalgar Road, Greenwich, was summoned for an offence under the Adulteration Act. The officer stated that on the 8th ult. he went to the defendant's shop and asked for two ounces of precipitate of sulphur. On receiving it he told the defendant that it had been bought to be analysed. The defendant said that she had no reason to believe anything was wrong, and that it was what was usually sold as milk of sulphur. The analyst's certificate showed that the article sold contained 45 per cent. of sulphate of lime. A fine of 5*s.* and 2*s.* costs was imposed.—*Times.*

Correspondence

THE GERM THEORY.

TO THE EDITOR OF "THE CHEMIST AND DRUGGIST."

Sir,—During the summer of last year I undertook the task of investigating, from a chemical point of view, the action of antiseptics on animal and vegetable substances, including the cellular and non-organised ferments. I had commenced to work upon the infusions, and was proceeding with them satisfactorily when, in October, the temperature fell generally below 60° F., and this being an important consideration, I abandoned the research for the time being, with the intention of renewing it during the forthcoming summer. I did not experiment with "hay" or "turnip," but my object, nevertheless, was to select an infusion which would decompose in the shortest possible space of time. The one determined upon after many trials invariably became turbid on the morning of the third day after preparation at a temperature of 60° F. At 80°, however, and upwards, something more than the same change occurred within 24 hours. Amongst the numerous specimens (from 60 to 70) of this particular infusion, placed under different antiseptic conditions, one was boiled in a flask and protected from contact with any but filtered air in the usual way; whilst another, *unboiled*, was placed absolutely out of contact with air of any description, whether filtered or calcined.

Feeling much interested in the letters of Dr. Bastian and Professor Tyndall on infusions and the germ theory in recent numbers of the *Lancet*, I withdrew these specimens (the two referred to) from the warm cupboard where they had been deposited for security during the winter, and finding them perfectly bright and good after four months' keeping, placed them at once in a continuous temperature ranging from 80° to 100° F. There they remained for several days, and I am bound to say that in neither case was there the slightest indication of turbidity or change. I then raised the heat to 120° and upwards, but still with completely negative results.

In the experiments hitherto conducted the infusions have been *boiled* to destroy the germs which they are supposed to contain, and which under favourable circumstances, and even as I gather in "moteless" air, develop sooner or later (either as cause or effect, it is difficult to say which) into *vibriones* and *bacteria* in ever increasing numbers. If this be so, how is it that my *unboiled* infusion after so long a time exhibits no trace of their presence? Some further explanation may be forthcoming as I proceed with my investigation, but at present the cause, if not altogether obscure, is at all events not clearly apparent.

In reference to this inquiry I may mention that I do not think it is altogether a question of mere temperature, the electrical condition of the atmosphere having evidently much to do with it. For instance, the same temperature of the atmosphere, as indicated by the thermometer, in summer and in winter, the latter produced by radiation from artificially heated surfaces, will not produce exactly similar results. I shall, therefore, consider none of my experiments conclusive until the substances resisting the high temperature resulting from the combustion of carbon have been exposed for a sufficient length of time to the direct and powerful rays of a midsummer sun.

I am, sir, yours obediently,

W. Willmott.

King's College Hospital:
April 10, 1876.

THE REIGN OF LAW.

TO THE EDITOR OF "THE CHEMIST AND DRUGGIST."

SIR,—Having a taste for physic, I was (to quote a few fashionable West-End circulars) "advised by numerous friends" to qualify for a chemist, and, acting on such advice, I, having duly registered myself in Bloomsbury Square, bought a snug little business in a populous neighbourhood. An acquaintance of mine, by name Augustus Lex, who is well known to the trade, agreed to lend me his advice and assistance for the first few days of my business career, for, as he said, I was young and inexperienced, and he could give me a few wrinkles.

On a fine morning in April, very early in the month, I first took down my shutters, and, retiring with my friend Augustus Lex behind the counter, we waited for the first lucky customer. He soon presented himself in the person of a small boy, who, from his appearance, might have seen four winters, but was evidently in course of preparation for a fifth by the acquisition of a few extra coats of dirt as protection against cold. In the broken language of childhood he asked for "a pen'oth of 'cipity,'" which I was about to hand over, thankful to take my first penny and to provide the means of cleanliness and comfort, when Augustus Lex pulled me by the arm. "What are you about?" said he; "white precipitate is a poisonous preparation of mercury, and the purchaser must sign the Poisons Book." Of course I paused, and the would-be customer, being too young to sign his name, went away unserved.* Whilst mourning over my lost nest-egg a small crowd approached the shop, from whose midst issued two men, one supporting another whose head had evidently been cut in a street fight, for his hair was matted with blood, which dropped from his nose guttatim. I ran for a basin of water, and, seizing my scissors, was about to remove some of the hair to expose the source of the sanguine stream, when Augustus Lex again came to my side, saying, "What rashness is this? Don't you know that if this half-drunken man gets erysipelas, as he probably may, and dies in consequence, you thus lay yourself open to a charge of manslaughter? Forbear! my friend, forbear! or dread the consequence!" I did forbear. I sent my bleeding patient away to the nearest surgeon or hospital, and regretted in silence another lost customer and a lost shilling. Another customer appeared, and my spirits rose. "One ounce of castor oil." How carefully I labelled the bottle and wrapped it in white demy, neatly sealing it at both ends. "Three-pence, please." "Oh! mother never pays more than three-halfpence at the oil shop, and she only gave me three-halfpence." What could I do? Was I to lower my dignity to the level of an oil shop? No! I took back the bottle, which was dirty within, though neatly wiped and labelled without, and, having emptied it into the train oil, returned it to the child, who ran with it, doubtless, to the favoured oil shop. Two or three more customers came in, but went away empty-handed. One wanted to know if I kept wax candles; another wished to invest in an ounce of shag; whilst a third desired to borrow a funnel. Presently a lady appeared upon the scene, and, having gazed admiringly at the coloured bottles in the window, walked in and imparted to me in confidence that she was suffering from diarrhœa, and wished me to make her up some medicine to arrest it. Augustus Lex, concealed behind the dispensing screen, was making signals to attract my attention. I went to him under pretence of getting a pestle and mortar. "My dear friend," said Augustus, "you are about to infringe the Apothecaries' Act. Have nothing to do with this woman; it is illegitimate practice. What would be the consequence if she went from bad to worse, and ultimately died of exhaustion? Send her away, my friend; send her away." And I sent her away. The day was now far advanced, and I had taken not one penny; but the longest lane must have a turning, and a turning showed itself at last. A woman came in for three Seidlitz powders, for which I asked fourpence-halfpenny, but took threepence, as she informed me that "she never paid more at the grocer's," and could there procure them at ninepence per dozen. After this I had the luck to sell two patents, both of them poisons, but Augustus Lex laughingly told me that no entry in the Poisons Book was necessary, and the purchaser assured me that he had hitherto bought them of a linen-draper in a main thoroughfare at the West End. My next customer was an old lady for an ounce of antimony wine. "Now," I thought to myself, "I will show my friend Augustus that I am getting up to business;" so I took down the Poisons Book, and was about to enter the sale, when he came behind me and whispered, "Do you know that lady?" Of course I did not, and I told him so. "Well, then," said he, "You must have her introduced to you by some one whom you do know, and who knows her; at least, so says the Act." Under these circumstances I declined to serve the antimony wine.

I will not proceed further with the day's doings, but will merely state that my first day in business was, thanks to my friend Augustus Lex, pecuniarily a miserable failure. Prescriptions, of which I had thought I might secure two or three, I had none: "For," said a communicative neighbour, "the surgeons about here all keep dispensers, and supply their own medicines." I found this to be the case; nay, more, not satisfied with the dispensing of their own medicines, many of these members of a liberal profession kept open shop and divided with the neighbouring grocers and oilmen the small profits to be obtained on the retailing of Epsom salts and antibilious pills.

Sitting, on that evening, after I had carefully put up my shutters, chewing the end of a cigar (which the business had *not* paid for) and bitter reflections (which had been thereby provided), I happened to take up a counter bill to light my neglected weed, and was struck by the name heading it. It was a bill lauding the virtues of "McDuffer's Anodyne Mixture for Infants during the Period of Dentition!" McDuffer, when first I knew him, was acting in the humble capacity of light porter to a country chemist. Did he then dream of the glorious future in store for him? Did he then see in himself the future benefactor of babies, the soother of suffering infancy? Perchance he did, for he resigned his humble appointment to unite his fate to that of the widow of the village grocer, from whose small establishment was first issued to an appreciative world that "Anodyne Mixture," the yearly profits from the sale of which can now barely be told in four figures. If anybody asked me my opinion respecting McDuffer's qualifications to prescribe for a baby I should candidly confess that if I had a puppy which I valued at anything over half-a-crown I should decline to let it take any physic of his recommendation. But nobody does ask me, and as everybody and his wife (especially the latter) use the "Anodyne Mixture" for their babies, I suppose they think that there is something in it. I know that there is opium in it, but that is a trifle, for the fact is not generally known, as it is not labelled poison, for, being a patent medicine, it is not affected by the Poisons Act.

From thinking of McDuffer my thoughts reverted to the youth who succeeded him as errand boy and bottle washer extraordinary in the service of the country pharmacist. Young Gullem, it was generally opined, was going to the bad, and the prevailing impression, which was pretty frequently expressed, was that he would terminate his career under the auspices of a well known Government functionary, with the assistance of a few yards of rope, for a juvenile weakness for toss-penny (indulged in during the hours of divine service on Sunday mornings) ripened into an appropriation of the contents of the pharmacist's till, and the ultimate appearance of Master Gullem as a billiard-marker at one of the hotels in our market town. So far, the prognostications of a discerning public respecting his future seemed in a fair way of being verified. About this period I left the village, and for many years heard nothing of Gullem; but a few months since, whilst perambulating the East End of London, on the look out for a likely position for a business, I was attracted by the showy appearance of a "dispensary," and, looking further, was somewhat startled at reading on a huge brass plate, "Dr. Gullem, Accoucheur, &c." The name was familiar to me, but I could not think it possible that my sometime acquaintance had qualified as an M.D. And, again, when last I heard of him he was rapidly advancing on the road to meet the Government official with the rope. Had they not met yet? There could, however, be no harm in going in and consulting Dr. Gullem, so in I went. Eight or ten people, mostly women with children, were sitting on forms round the shop, and behind a counter stood a youth of tender years and mottled countenance, who was busily engaged compounding medicines. No time was wasted in wrapping up, but little in labelling, and none in weighing the drugs. Breaking in on this gentle youth's occupation, I ventured to request an interview with the doctor, and, being shown into a little room at the back of the shop, on the door of which was printed in large white

* We are sorry to interfere with our correspondent's narrative, but we owe it to our readers to remark that the sale of ammoniated mercury does not require an entry in the Poisons Book. It is a poison in the second part of the schedule.—ED. C. & D.

letters, "Consulting Room," I there found the veritable Gullem. Not with a hempen cravat round his neck. Oh, no! That portion of his muscular anatomy was encased in the whitest of white neck-cloths, whilst the blackest of doe-skin clothed his limbs. "Should auld acquaintance be forgot?" Not so. We dined together that day in the city, and over a bottle of genuine Moet, which Gullem insisted on standing, he gave me his history from the time I had lost sight of him. Among the frequenters of the billiard-room at which he acted as marker was a certain doctor (?) who used to attend markets and fairs to dispose of his pills and his potions. This doctor, seeing that Gullem knew rhubarb from magnesia, and could distinguish the difference between senna and castor oil, told him that he was a fit subject for a Philadelphian diploma, for the purchase of which he advanced the money, with the understanding that Gullem should act as his assistant until the amount was worked out. The diploma duly arrived, and the partnership between the two doctors (?) flourished until the senior partner made a slight mistake and swallowed a few ounces of hydrochloric acid, under the supposition that it was whisky, which caused a dissolution of partnership. On the occurrence of this event, Dr. Gullem came to London, took the shop which had attracted my notice, called it a "dispensary," put his plate on the door, made the acquaintance of a young legally-qualified man in the neighbourhood (who for the sake of the fees would attend cases for him which were likely to terminate fatally, and give the necessary certificate), and commenced that practice which had proved, as he assured me, a decided success?

I was suddenly roused from my cogitations by a sharp pain in my lip, which intimated that the cigar, at which I had been assiduously puffing, was used up. I threw it from me and retired to bed, to dream that I was being crushed to death in the embrace of Augustus Lex, whilst Dr. Gullem and Mr. McDuffer were rejoicing at the prospect of my speedy dissolution.

On the following morning I suggested to Augustus Lex that he should go and stay with other of his friends, for that I thought I could manage without him. I have managed without him, and the result of my management is that I have now a very tidy little prescribing retail.

I am, sir, yours obediently,

London: March 20, 1876. E. P. W.

HOW TO EVADE THE APOTHECARIES' ACT.

TO THE EDITOR OF "THE CHEMIST AND DRUGGIST."

Dear Mr. Editor,—I was rather pleased with your reply to "Perplexed," in your last edition. I am quite persuaded the majority of practising surgeons have as much to lose as the prescribing chemists if they push this matter to extremes, for if it is illegal for a chemist to prescribe simple mixtures it certainly must also be illegal for unqualified assistants, not only to prescribe, but to visit also and take upon themselves the responsibilities of a properly qualified medical man, and yet nine out of every ten surgeons keep such. Take my own case, for instance: I served my time to a chemist; I then became dispenser to a surgeon. I acted as such for about twelve months; then I was sent out to visit, mostly children at first, but during the last three or four years I was considered competent to visit any case. Now, sir, it appears to me that so long as I remained under the protection of this surgeon I was considered competent to prescribe to any extent, without let or hindrance, but directly I stepped behind a chemist's counter my prescribing then became illegal. But I am pleased to say the public don't quite take this view of the matter, but will still believe I am quite as competent there as in the doctor's employ, much to the annoyance of the said doctor, who threatens me with the lash of the law. I have heard it said it is easier to evade than break the law, so I have adopted the following plan:—I have had a set of labels printed like this—"Brown's Indigestion Mixture," "Brown's Cough Mixture," &c., and, presuming there is no law to prevent the patients telling me or to my listening to their complaints, I then put up what I think proper, affixing one of these labels, and also a patent medicine stamp, selling it to the person as a patent. Whether or not this is any protection I cannot tell. I leave that to your superior judgment to decide.

Yours obediently,

A. P. S.

THE DISPENSING QUERY.

TO THE EDITOR OF "THE CHEMIST AND DRUGGIST."

Sir,—If the letters in your issue for March are intended as replies to your invitation for a casting vote on the dispensing query, they certainly fall far short of the mark.

The letter of Mr. Phillips has an air of authority about it which is quite charming. "Medicus" is content to live in bliss because he can find no reference to the subject either in the Pharmacopœia or the "Companion" to it by Squire; while that of "Umpire" goes for nothing.

It is quite superfluous, indeed, it would be an impertinence, on my part towards the intelligent readers of The Chemist and Druggist who know the history of sweet spirit of nitre, chemically and otherwise, to go into details on the subject; but I would like to remind Mr. Phillips that although the Pharmacopœia describes as one of the characters of that preparation that "it effervesces feebly or not at all when shaken with a little bicarbonate of soda," the acid which causes that effervescence is not necessarily a constituent. It is an unwelcome intruder, in fact, an impurity; and on account of the difficulty in getting a pure spirit and from its liability to generate acid, the compilers of the Pharmacopœia made a small allowance, and on that account only. Perhaps Mr. Phillips can tell us how far the neutralisation of the acid alters the chemical and medicinal properties, or in what degree the interference would be mischievous.

And now, Mr. Editor, a word with yourself. You would not, I am sure, have made the invitation for a casting vote on the question had you remembered your article, entitled "Fastidious Dispensing," in The Chemist and Druggist of March 14, 1874. That article bears on a similar case, and a reference to it would have been considered conclusive by any intelligent mind. The authority of Professor Attfield, whose remarks you quote, for the interference, is amply sufficient, and your own remarks as to the propriety of the proceeding are just and to the point.

Not content with my own ideas on the question I have taken the opinion of friends in the trade, whose opinions are worth having, and they all agree with me that in dispensing iodide of potassium with sweet spirit of nitre, as in the prescription referred to, the latter ought to be free from acid, and if the spirit in stock contains acid it ought to be neutralised. I may mention that one of these friends was for some years in a first-class dispensing establishment in Edinburgh, and he tells me that when he was with that firm it was the custom to keep a small piece of lump carbonate of magnesia in the bottle containing the spirit of nitre.

These remarks as to the chemical part of the question, with regard to the presence of acid, will, I think, be found sufficient; and as to the therapeutical part there can be no doubt. The presence of nitrous acid in any quantity, and more especially if it be excessive, as it often is, must be injurious when the spirit is administered to infants and delicate females, and as I have quoted Professor Attfield as an authority on the one hand I will refer to Professor Christison on the other, as to the bad effects of the presence of nitrous acid in a therapeutical point of view.

Having a case in point the other day, I took the liberty of calling on the medical gentleman on the subject as to how he wished the prescription dispensed, when he informed me that he expected the acid to be neutralised.

I have only to add that this is not a new question, and the discussion might have been avoided if the medical gentleman referred to by "V. S." had had the manliness to acknowledge his ignorance of the subject.

I am, &c.,

G. B. K.

THE POSITION OF THE DRUG TRADE.

TO THE EDITOR OF "THE CHEMIST AND DRUGGIST."

Sir,—Can anyone inform me if the Pharmaceutical Council intend to defend the position of chemists and druggists by trying to remove the great and increasing evils existing with regard to the sale of poisons and patent medicines (many of which also contain poisons) by an immense number of unqualified persons, pettifogging dealers, would-be druggists, in fact, adventurers in almost every class of trade, both in town and country, trenching

upon our prerogative, in retailing laudanum, paregoric, syrup of poppies, Godfrey's cordial, and so forth, which are daily sold by numerous individuals, not registered and possessing no legal right whatever according to the Pharmacy Act, 1868?

Free trade certainly does exist with these poisons, &c., be it legal or illegal. Anybody can take out a patent medicine license and sell them. Surely patent medicines ought never to have been exempt from the operation of the Act. It is an injustice to the trade that any patent medicine containing poison can be vended by any person who chooses to pay the license; therefore the Pharmacy Act, with regard to the sale of poisons, I am obliged to say, with others, is a complete farce.

Methinks the time has arrived when chemists generally should fight for their rights by petitioning Parliament to amend the Pharmacy Act, so as to place in the hands of registered and qualified chemists both patent medicines and all medicines of a dangerous character, to be sold by them exclusively, and thus put an end to ignorant and uneducated people selling infants' teething powders, &c., with impunity. If this is not done it will be useless paying exorbitant fees for the examinations, and then have the gratification of finding yourself competing with all classes of unregistered and unqualified drug traders, totally unacquainted with the nature and action of the articles referred to.

In the Midland counties the trade seems to be dwindling down into huckstering or cheap-jack manœuvring, especially when we have such grand examples set us by several druggists in some of the large towns advertising patent medicines at little over the cost price, and "physicians prescriptions dispensed here cheaper than anywhere else."

The wholesale trade, in thus condescending to supply these improper persons with drugs of a prohibited character, are more to blame than the retailers. It behoves the Pharmaceutical Council to protect our interests, and do their duty by prosecuting the offenders.

Yours very truly,

ONCE AN A.P.S.

Derby: April 1, 1876.

PAREGORIC ELIXIR.

WITHOUT OPIUM.

TO THE EDITOR OF "THE CHEMIST AND DRUGGIST."

SIR,—Seeing some Winchester pint bottles labelled as above in a shop in the North of England it occurred to me that this name was strangely paradoxical. It is well known that paregoric elixir is the English household word for our Latin tinct. camph. co. This being the case, surely no chemist is correct in calling a preparation that does not contain the opium by that name. The reason for this is obviously to enable the unregistered shop-keeper to sell it as paregoric. I am informed that this article is manufactured and sold in large quantities by many of the North Country wholesale druggists, a label of which I enclose, received from one of them. The mischief of this false trading is in the injury it does to the retail chemist, who certainly has enough to contend with in these days of co-operative store prices and grocers and others selling patent medicines at ruinously reduced prices, thus seriously lessening his returns, without such preparations being vended by the wholesale trade with the object of placing an article in the hands of grocers and shop-keepers that legitimately should be sold by the chemist only.

March 28, 1876.

Respectfully yours,

CHAS. TROKE.

TO THE EDITOR OF "THE CHEMIST AND DRUGGIST."

SIR,—Will you permit us to draw the attention of the manufacturers of patent medicines to a fact that will most certainly tend to decrease the sale of these articles in a very material degree. In this neighbourhood—Sheffield and Barnsley especially—grocers are being supplied with patent medicines by a Leeds wholesale house, and are selling single bottles of all the 1*s.* 1½*d.* sizes at 10½*d.* Of course the trade of the druggist in them is utterly destroyed at one fell swoop, many of them having already ceased to keep stocks. Remonstrance with the offenders is useless: they apparently glory in the evil they are doing.

Having succeeded in demoralising and almost destroying their own trade by their insane policy of underselling, they now turn their attention to that of the druggists, and will, if they have the power, ruin that also. What can possess men, apparently of some intelligence, to deliberately plot a plan for the utter destruction of the trade they and their neighbours must live by, passes our comprehension, and is in our estimation about the most despicable and dishonest course that any man can pursue. The occupation of the highway robber is respectable in comparison; his depredations injure a few temporarily, but the policy of the persistent underseller injures a whole class permanently, and drives into dishonest courses thousands who would otherwise retain their integrity. This policy has done more to degrade and debase the standard of commercial morality than all other influences whatsoever, and is dragging it lower day by day.

The conduct of the wholesale drug house in supplying these foulers of their own nests we will not comment upon. They have been, we believe, repeatedly informed of what their clients are doing, but persist in supplying them nevertheless. They being evidently reckless how many sink so that they get to shore, are beyond the reach of criticism, and we shall address our further remarks to the "proprietors." Surely we do not need to tell these usually wide-awake gentlemen that their interests must suffer by this practice of underselling. When it is no longer worth while selling patent medicines nobody will sell them. Neither makers nor vendors make or vend from motives of pure benevolence: there is generally an eye to interest involved, and as soon as the trade becomes unprofitable the druggist will cease to sell patents, and will push medicaments of his own preparation off in the place of them. At present, if a druggist is asked for a bottle of Winslow's Syrup he, as a rule, supplies it without a remark, because he obtains a fair profit upon the transaction; but as surely and as soon as the transaction ceases to be profitable will he endeavour to persuade his customer that his own wares are both better and cheaper. In this way proprietors must inevitably suffer if this sort of thing is allowed to go on, and we call upon them to protect at once their own and the trade's interest by resolutely refusing to supply their goods to the persistent underseller.

B. NEWHAM & Co.

March 21, 1876.

[We cordially agree with our correspondents. Proprietors of patent medicines will reply, "How can we help our articles being sold by cutting dealers?" *Écoutez, Messieurs!* here is a hint worth taking by a few of the shrewdest among you. Make known to the trade that your goods shall be supplied direct from yourselves, and only to retailers who will not debase the price. You will thus secure by one stroke the valuable sympathy and co-operation of ten thousand of the best agents in the world. Is not that a stake worth playing for?—ED. C. & D.]

TO THE EDITOR OF "THE CHEMIST AND DRUGGIST."

DEAR SIR,—The chemists and druggists of the United Kingdom do not seem altogether happy under the sway of the august body of Bloomsbury. Poisons Act regulations vex their souls. Dispensing and prescribing agitate their bosoms. They find that it costs much more to become members of the body than formerly, but that the trade itself is no better than it was, but rather the reverse.

In the matter of the sale of patent medicines much stir has been lately made, but I query if there would have been any had grocers not taken to the sale of them at rates below what is considered proper.

No maker of a speciality is likely to object to the vending of his article at less prices than he advertises them if he gets a larger sale at the prices he charges for them. Consequently, the chemists are not likely to get help from them. Now, chemists as a rule will not help the maker of a new article. When asked for assistance they say, "Create the demand first, and then of course we will sell." When a demand has been created they want the sales for themselves, and affect a right in the article which they do not possess. When, then, a sale is made they say those who sell the article and help the manufacturer must be restricted from selling such article. This notion is entirely antagonistic to free trade and common sense. A manufacturer wants to meet the consumer, and, of course, he is glad to obtain a distributor who will help him in his endeavour. The chemist, therefore, should become a man of business, and apply himself

to meeting the requirements of the people who are appealed to by the manufacturer. For one, I have a great objection to the lowering of prices of advertised goods, but I think the chemists should, instead of crying out, pay attention to some other branch of their business. In the case of Prescribing *versus* Dispensing it would be well if medical men would give the trade their dispensing in return for the chemist giving up prescribing'; but here comes the fact that in country districts a medical man cannot do without his surgery, while chemists are very useful in minor cases of disease. Common sense would say, "Don't let us have so much legislation. Law making means law breaking, and law breaking means penalties and discontent." The whole business of the chemist and druggist should stand on its merits, and that means capacity for trading. Examinations and qualifications are well when there is anything to be examined upon and qualified for, but the necessity for this is not apparent to every chemist and druggist, scores of whom hardly know what it is to dispense a prescription.

The Pharmaceutical Society do no good in preventing paltry sales of drugs by small shopkeepers, but, in the case of many chemists, do much harm, and certainly do much to interfere with the comfort of many villagers, who find an all-sorts' shop of great value to them. My scribble is intended to convey that common sense is better than over-weening ambition.

Pharmacy may be a science, but there must be many who can only take the part of vendors, and to compel them to expend time and money for no ultimate advantage is an absurdity in the eyes of

Yours faithfully,

SCRIBBLE.

CHIPS.

TO THE EDITOR OF "THE CHEMIST AND DRUGGIST."

SIR,—As you invite correspondence on subjects of interest to the trade, allow me to suggest a few concentrated ideas for solution.

1. Scammony, manna, and other useful Eastern drugs, are very dear at the present time. How can they be made cheaper? One way that occurs to my mind is—encourage the return of the Jews to Palestine, who are far more industrious and commercial than the Turks.

2. A chemist's shop-window, especially in country towns, should be one of the most attractive in the place. How can that desideratum be brought about? By wholesale druggists and advertisers supplying attractive window show-cases, &c.

3. Might not chemists greatly increase their sale of drugs in common use if they were to be satisfied with English names for such simple articles as arrowroot, mustard, &c.?

4. A bottle crane would be a great saving of time and trouble in chemists' shops: a long stick, with sliding tube and padded clasp, something after the principle of tooth forceps.

Yours, &c.,

March 21, 1876. A LITTLE MAN.

ADDING INSULT TO INJURY.—Some of our English readers think they are oppressed more than mortals ever were since the captivity of the children of Israel in Egypt, but how would they bear the incidence of a law lately passed by the legislature of the State of Minnesota, U.S., levying an annual tax of ten dollars on every druggist towards the maintenance of the State Inebriate Asylum. The druggists concerned are holding meetings to protest against this unjust imposition.

THE MOST USEFUL DRUGS.—According to the *Medical Times and Gazette* a party of ten medical men were dining together not long since, and one of them, during dessert, started the proposition, that supposing all present were limited in their practice to a selection of six pharmacopœial remedies, which would be chosen as being most useful, compound drugs to be excepted. Each of the party wrote the names of the six drugs he should select, and handed to the doctor who started the proposition. On examining the lists it was found a majority of votes were given in favour of opium, quinine, and iron; between mercury and iodide of potassium the votes were equally divided, as they were also between ammonia and chloroform.

WHY is a doctor better taken care of than his patients?—Because, when he goes to bed, somebody is sure to rap him up.

A GOOD brown oak stain is produced by preparing the wood with a solution of 1 oz. catechu, boiled in 1½ pints of water. When dry, brush over a solution of bichromate of potash 1 oz. to 1½ pints of water.

A WATCHMAN employed by Messrs. McKesson & Robbins at their chemical works in Brooklyn, U.S., was severely bitten by a bloodhound kept on the premises, but not belonging to the firm. The man brought an action against his employers, estimating his damages at five thousand dollars. The jury awarded him fifteen hundred of those consolers.

A NEW MUCILAGE.—The *Journal de Pharmacie* states that if to a strong solution of gum arabic, measuring 8⅓ fluid ounces, a solution of 30 grains of sulphate of aluminium dissolved in two-thirds of an ounce of water be added, a very strong mucilage is formed, capable of fastening wood together, or of mending porcelain or glass.

THE following notice is conspicuously posted over a counter in a savings' bank in Clinton Place: "Never stamp a check before presenting it at the bank, but give the teller two cents and ask him to lick the stamp and cancel it. The teller expects to lick all stamps, as it saves buying lunch, and is therefore disappointed when not allowed to do so."

SCIENTIFIC FARMING.—A noble lord, in conversation with his gardener one day, said, "George, the time will soon come when a man will be able to carry the manure for an acre of land in one of his waistcoat pockets." To which the gardener replied, "I believe it, sir; but he will be able to carry all the crop in the other pocket."

AN EXCHANGE improves the occasion of a boy in Detroit getting a brass kettle fixed immovably on his head. He comments: "It is strange they didn't think to carry him to a brass-foundry, and have it melted off. Or they might have dissolved it off by laying the boy to soak in a tank of dilute nitric acid. It is curious how thoughtless some people are in moments of emergency."

A FRENCH DOCTOR advertised a cosmetic—"the balm of a thousand flowers." It finally got him into court, charged with swindling the purchaser, because it would be impossible to collect and combine the odour of "one thousand flowers." But the witty Frenchman, with a ready smile, put them down with the reply "Honey,"—which was one of the ingredients in the "balm."

A YOUNG MAN in Chicago was recently found dead in his bed, and the supposition was that he committed suicide by poisoning, but upon analysing the contents of his stomach nothing but the following was found in it:—Pickles, pound cake, lemonade, cold turkey, beer, fried oysters, cold punch, ham sandwich, sponge cake, beef tea, mince pie, champagne, lobster, game pie, fruit cake, tea, chicken salad, whisky, coffee, Bologna sausage, port, cheese, sardines, and sherry. The jury returned a verdict of "Died through the visitation of friends."

DEATH FROM USING "INFANTS' CORDIAL."—The Manchester city coroner held an inquest lately on the body of Sophia Taylor, aged twelve weeks, late of 145 Lower Mess Lane. Ann Taylor, the mother, stated that she took the child to bed with her, when it seemed in good health. About ten o'clock the next morning she found it dead in bed. The night before she had given it about half a spoonful of "Matthews' Cordial," which she had obtained at a "cake shop." It was kept in a bottle there. The child had also a dose of "Winslow's Soothing Syrup" about a week ago. The jury returned a verdict of "Died from an overdose of a certain narcotic called 'Matthews' Cordial,'" and censured the practice of "cordial" being sold by persons not druggists, and the omission of the label from the bottle.

Perils of the Road and Railway.—The Registrar-General shows, in his annual classification of the causes of deaths in England, that in the year 1873, for which detailed returns have recently been issued, there were among the violent deaths 1,290 which were connected with railways, including deaths of railway servants. It is worthy of remark that the violent deaths caused by horse conveyances of one kind or other—namely, 1,250—were very nearly the same number as the above. The railway deaths comprised 1,185 of males, and only 105 of females; killed by horse conveyances, 1,056 males and 194 females.

Poisoned Wheat.—C. H. T. (Nottingham) thus writes to the *Daily Telegraph*:—"The sale of poisoned wheat is and has been prohibited under 10*l.* penalty for some thirteen years; but according to the Royal Commissioners' Report on Vivisection, page 169, question 3,218, Dr. J. Crichton Browne, a gentleman holding a responsible public appointment, says in palliation of the pain inflicted by some of his experiments on living animals: 'Now it so happens that this pyerotoxine is sold in large quantities as "Barber's Poisoned Wheat" for the destruction of birds, and numbers of animals die of it in convulsions every year, and I have never heard the sale of this wheat objected to or condemned.'"

Circular Crystals.—An interesting paper was read at the last meeting of the Royal Society of Edinburgh by Mr. Dallas on circular crystals. The author remarked that notes on this phenomenon had been seldom communicated. Sir D. Brewster had been only able to get such crystals of microscopic dimensions, but some time ago he (Mr. Dallas) had found that by crystallisation by means of gum arabic, circular crystals of much greater size were formed. This took place with certain salts, but not with all that he had tried: among the more successful were sulphate of copper, binacetate of lead, muriate of morphia, and other similar salts.—*British Medical Journal.*

Poetical Soap.

Messrs. Water and Oil
One day had a broil,
As down in the glass they were dropping.
And would not unite,
But continued to fight,
Without any prospect of stopping.

Mr. Pearlash o'erheard,
And, quick as a word,
He jumped in the midst of the clashing;
When all three agreed,
And united with speed,
And Soap came out ready for washing.

Scientific American.

A French newspaper (the *Gaulois*) reports an extraordinary suspected crime on the part of a dentist, who, it says, has just been consigned to the Mazas prison on the charge of poisoning certain of his patients. He is stated to have induced them to pay him frequent visits, and, under pretence of attending to their defective teeth, to have introduced small doses of poison into their hollow molars. The suggestion is that the dentist has been employed by the heirs of the deceased patients, and more than two hundred witnesses, the *Gaulois* says, are prepared to come forward. The report would have some exceptional interest if it were not for the fact that scarcely any Parisian newspaper is worthy of the slightest credit. French journalists think it clever to get up imaginary reports of sensational cases.

Californian Cod-Liver Oil.—"There is a firm in San Francisco," says the *Oakland News*, a Californian paper, "who purchase the thousands of dogs slaughtered by the pound master of that city, or that may have been otherwise killed, for which they pay forty cents each. The carcasses are conveyed to their manufactory at South San Francisco, where the skins are removed and sold to the tanneries, the hair taken off and resold to plasterers, the hide tanned, made into gloves, and sold in the market. The denuded carcase is then thrown into a huge cauldron and boiled until the bones are easily separated from the flesh, when they are removed and sold to the sugar refineries, where they are ground to a fine powder and used to clarify sugar. The oil that rises to the surface of the boiling mass is skimmed off and made into cod-liver oil, and the remainder is used for fattening hogs." The man who wrote the foregoing at least deserves credit for his self-denial in indulging in no remark respecting sausages.

Trade Notes.

Novelty in Vacuum Pans.—Lately there was on view at the Greenock Copperworks a neat little vacuum pan of similar construction to those used in sugar refineries. Its diameter at the widest part is 6 feet, and its depth from the boiling line 6½ feet. It has a gross capacity of 79·5 cubic feet, and a heating surface of 173·5 superficial feet, which latter consists of three steam worms of 3½ inches diameter, and of the combined length of 177 feet. The worm displacement is 13·5 cubic feet, thus making the net capacity of the pan 66 cubic feet, or 412½ imperial gallons. The pan, which is bell-mouthed at the top, is of very handsome design and excellent workmanship, having very much the appearance of a distillatory apparatus. It is intended for the coffee-essence manufactory of Messrs. T. & H. Smith, Edinburgh. The preparation of coffee-essence is rather a novel use for a vacuum pan.

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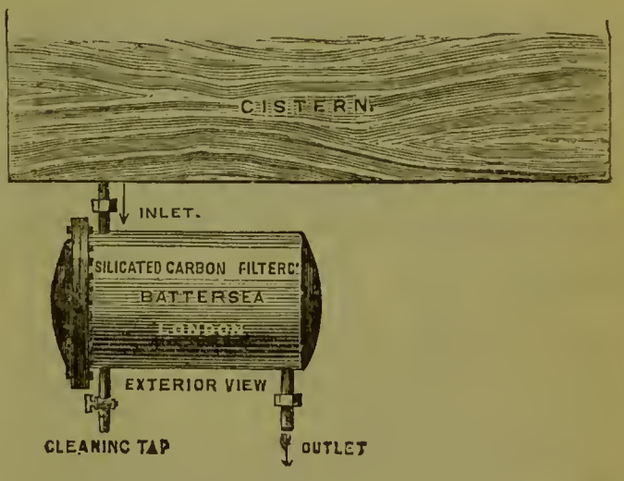
The Silicated Carbon Filter Company have recently brought out a form of main supply filters, specially adapted for mineral water manufacturers. It is extremely simple in construction, and can be attached to the main service or the cistern without any extra piping. By an ingenious arrangement of the



taps, the filter will supply either filtered or unfiltered water, and the mere passage of the unfiltered water cleanses the filter and keeps it in good working order. Those of our readers who have added the profitable manufacture of mineral waters to their ordinary business will find this filter a valuable addition to their plant, as it entirely deprives water of organic matter and renders it brilliant and wholesome.

***

W. C. Bromwich, Drysalter, &c., Birmingham.—A meeting of creditors in the matter of a petition filed by this debtor, who carried on business in King Edward's Road, and described as a drysalter and vendor of patent medicines, was held at the offices of Mr. Parr, solicitor, Colmore Row, on the 22nd ult. The statement showed liabilities 252*l.* 13*s.* 6*d.*, assets 48*l.* 10*s.* 2*d.* No offer being made, it was resolved to wind up the estate in liquidation, and Mr. Luke Jesson Sharp was appointed trustee. The debtor's discharge was granted.

***

Mr. Rendle, late of Ivy Bridge, has purchased Mr. Gimblett's business at 107 Broad Street, Reading.

***

A friend of ours, desirous of registering a design at the Registration Office, and knowing nothing of the process to be followed, called in at one of the many private offices where

registration or patenting is undertakeu. The fee asked was two guiueas, or one guinea if drawings were provided by the proprietor of the design. Our friend, thinking this sum rather too high, proceeded to the public office, and got through his registration in less than fifteen minutes for the net sum of 5*s.*, he having with him pleuty of suitable lithographs of the design he wished protection for, value 1*d.* each. We relate this little narrative for the benefit of any of our readers who may wish at any time to register a design.

***

Our Government has arranged with that of Spain for the reciprocal protection of trade marks in the two countries. The Swiss Goverumont is also in negotiation with ours with a similar object.

***

Mr. Sydney Smith has purchased the business for many years carried on by the late Mr. William Mitchell, at 1 Wellington Place, Easton Road, Bristol.

***

Mr. Hickisson has sent us a specimen of the cards to which he attaches one dozen of his 6*d.* "Daughter of the late John Bond's" marking inks. It is very showy, with an embossed gold medal raised on the uppermost section.

***

The new substance, Vaseline, respecting which much information is given in our February number, is now advertised to the trade by Messrs. Corbyn & Co., and by Mr. Martindale, both of whom appear to be agents for the American patentee. It will be remembered that the chief pharmaceutical virtue of this product lies in its inability to absorb oxygen, thus rendering it a probably valuable basis for those ointments which are now of an alterable character. No doubt fair attention will be given to its claims.

***

Fenton's Plate Alkali is a liquid polish for gold, silver, and electro ware. It is sold in 1*s.* bottles, and is much more conveniently and quickly applied than plate powder can be, while its excellent detergent and polishing qualities are readily demonstrated. No mercury is contained in this preparation, and from what we have seen of it we can confidently recommend it. It is made by Messrs. Fenton Bros., of Sheffield, and sold through the usual channels.

More Delicacies.—This fastidious nineteenth century seems never to tire itself with the invention of new luxuries. We read that a society of rat eaters has been formed at Gembloux, in Belgium; the members meet once a week, and the proceedings are wound up by a grand banquet, in which preparations of that delicious animal hold a prominent position. But we have yet to record the climax, or shall we say the *cimax*. From homœopathic literature we learn that Dr. Wahle, of Rome, and Dr. Berridge, of London, have been making "provings" with triturations and dilutions of our intimate friend the bed bug, as a remedy in cases of intermittent fever.

Hard Times for the Petroleum Producers.—The petroleum trade had a banquet lately at Oil City. After the brokers, the refiners, and the dealers had been toasted, General Hartley replied for the producers. The General took a doleful view of the position of the producers. He said:—"His trying and bitter experience for the past three years reminded him of an old farmer down in Washington county, who had a great many sheep, and somebody asked him one day how he contrived to keep so many. 'How is this, McGinley,' said the stranger. 'Your barns have no hay; there is no corn in your cribs; the hills are bleak and bare; how do you manage it?' And McGinley told him 'that the sheep lived by eating each other's wool.' And so the noble producer has been living off his wool and others' wool, and what he had hoarded in the more prosperous days, for of late he had not made enough in development to buy him a pair of high-topped boots."

Terms.—Announcements are inserted in this column at the rate of one halfpenny per word, on condition that name and address are added. Name and address to be paid for. Price in figures counts as one word.

If name and address are not included, one penny per word must be paid. A number will then be attached to the advertisement by the Publisher of The Chemist and Druggist, and all correspondence relating to it must be addressed to the "Publisher of The Chemist and Druggist, Colonial Buildings, Cannon Street, London, E.C.," the envelope to be endorsed also with the number. The publisher will transmit the correspondence to the advertiser, and with that his share in the transaction will cease.

FOR DISPOSAL.

Best copaiba capsules, in oval boxes, well known maker, in quantities to suit purchasers. 12/45.

1 pair Druitt's lower bicuspid forceps, fig. 4, equal to new, 4*s.* 9*d.* Smart, Littlehampton.

Pharmaceutical Journal, present series, complete, clean and perfect. What offers? 8/203.

Ice-cream soda machine and syrups, cost 50*l.*, will be sold at less than half. Hall & Deacon, Penge Pharmacy, Penge.

Good second-hand 4-grain pill machine (mahogany), cut 24; price 7*s.* 6*d.* E. Fake, Harleston, Norfolk.

Foreign cigars, 30 boxes cheap, send 3 stamps for samples. A. Hubbard, Stafford Street, Walsall.

Eighteen vols. "Leisure Hours," 1857 to 1875 inclusive, 9 bound, all perfect, and in good condition, price 2*l.* Apply, X. Y. Z., Sussex House, Forest Hill, Kent.

Vulcaniser in good working order, thermometer, safety valve, and two flasks, price 30*s.* Ward Shaw, Charles Street, Hull.

Herbarium Plantarum for preparing for Minor botany, excellent collection, and cheap. Single specimens, 1*s.* T. Tame, chemist, Trowbridge.

Pharmaceutical Journal, from commencement of weekly issue to end of 1875 (one number lost). Offers wanted. H. Hunter, chemist, Whitehaven.

English concertina, equal to new, in rose-wood case, cost 4*l.* 4*s.*, price 3*l.* Briet's, 3-pint gazogene, perfect, 10*s.* Flinders, 145 Upper Street, N.

A steel mill, suited either for grinding seeds or crushing linseed; height, 4 feet 6 inches; good condition; price, 2 guineas. J. Wheeler, Southend.

Water or air mattress, new, perfect, 72 by 36 inches; cash 2*l.* 10*s.*, exchange to 2*l.* 15*s.* Jefferson, Chemist, Rawtenstall, Lancashire.

Chemist and Druggist, first eight years ever published; also 1868, 1874, 1875; cash offer wanted. Davies, March, Cambs.

For sale or exchange.—4 handsome iron scroll window brackets to place carboys on. Cash 20*s.*, or offers. Ward, Chemist, Berwick.

Pharmaceutical Journal, shilling edition, twenty years, from commencement, some bound in half-calf, all at 2*d.* per number. "Omega," 36 Beresford Street, Walworth, London.

42 lbs. hops, 10*d.* lb.; sample, one stamp. *Pharmaceutical Journal* posted Saturday, cheap. H. O. Brown, Barrow, Ulceby.

Attfield's "Chemistry," good condition, 7*s.*; Meadow's "Eruptions," 2*s.*; several thousand pound hair oil labels, 4*s.* 6*d.* thousand. Sylvester, Rusholme, Manchester.

The Lancet, 1875, complete, price 7*s.* 6*d.*; *The Chemist and Druggist* 1875, 4*s.* 6*d.*; *Pharmaceutical Journal*, vols. 1 to 5, new series, 50*s.*; "Year-book of Pharmacy," 5 vols., 1871 to 1875, price 24*s.*; 2 vols. *Illustrated London News*, 1875, price 30*s.*, bound. C. J. Kirkman, Dedham, Colchester.

All in good condition.—Show-case of homœopathic medicines (Allshorn's), 7 dozen tincturos, 9 dozen pilules, 6 dozen globules ; assorted. What offers ? W. S. Harvey, Margate.

Muspratt's "Chemistry," 2 large volumes, handsomely bound, with steel-plate engravings of all the most eminent chemists ; cost 3*l.* ; price 2*l.* ; carriage paid to London. W. C. S., 72 High Street, Sittingbourne.

Quain's Anatomical Plates, life-size, 87 in number ; case of post-mortem instruments ; case of amputating instruments ; stomach pump and enema combined ; all very cheap. J. Fryer, Batley Carr, Dewsbury.

Entire second-hand fittings of a chemist's shop—counters, drawers, window enclosure, wall-cases, carboys, specie jars, glass cases, gold-labelled shop bottles, jars, &c., price 47*l.* 10*s.* Lloyd Rayner, 333 Kingsland Road, London, N.

Good condition and carriage paid. Balfour's "Botany," 7*s.*, cost 12*s.* ; Garrod's "Materia Medica," 5*s.* ; Attfield's "Chemistry," 7*s.* 6*d.* ; Parke's "Practical Hygiene," 7*s.* 6*d.*, published 16*s.* ; *Pharmaceutical Journal*, a set ; Squire's "Companion," 5*s.* ; Fownes's "Chemistry," 5*s.*, published 12*s.* 6*d.* ; Ashton's "Diseases of the Rectum," 4*s.* 6*d.*, cost 8*s.* ; Gregory's "Hand-book Chemistry," 2*s.* 6*d.* ; Faraday's "Chemical Manipulation," very scarce, 15*s.* ; Thudicum "On Pathology and Analysis of Urine," coloured plates, 7*s.* 6*d.*, cost 14*s.* ; Turner's "Chemistry," 5*s.*, published 21*s.* ; Pereira's "Materia Medica," 1865, 8*s.* 6*d.* ; list of various works on chemistry, homœopathy, and medicine. Letters only, M. Percy, 24 Whitcomb Street, Leicester Square, London.

Two glass shelves, with bevelled edges, 7 feet long, ¼-inch thick, one 5 inches and the other 6 inches wide, price 1*l.* for the two ; 2 pairs dispensing scales and weights, as shown on page 16 Mather's catalogue, price 12*s.* 6*d.* each ; 3 pairs tooth forceps, lance, and 1 pair of curved capping scissors, price 10*s.* the lot ; ½-gallon tincture press, stand on feet, price 15*s.* ; Maw's quart ditto, 7*s.* 6*d.* ; Fowne's "Chemistry," eleventh edition, perfectly new, 10*s.* 6*d.* ; Druitt's "Vade Mecum," tenth edition, 8*s.* ; Sutton's "Volumetric Analysis," second edition, perfectly new, 8*s.* 6*d.* ; Tome's "Dental Surgery," perfectly new, 8*s.* 6*d.* ; "Speculum, on the Use of the" (Lee), 2*s.* ; "Obstetric Aphorisms," Dr. Swayne, 2*s.* ; ⅓-dozen Holloway's Ointment, 27*s.*, price 6*s.* 8*d.* Address, H. R., 24 Belgrave Street, Liverpool.

Two solid mahogany handsome dispensing counters, 7 and 8½ feet long ; one 12 feet 2 long handsome mahogany-top counter with drawers ; one 8½ feet long mahogany-top counter with a 6 feet 4 return end counter to match ; one 14 feet long mahogany-top counter ; 4½ feet long dispensing screen, similar to Maw's fig. 155 ; one 2 feet long, three 2 feet 3 long, one 2 feet 8 long upright mahogany cases, similar to Maw's fig. 39 ; one 2 feet 3 long mahogany case and desk, similar to Maw's fig. 38 ; mahogany label chest for slip labels, as Maw's fig. 26 ; 7 handsome specie jars, with gilt glass covers, royal arms, &c., height from 20 to 32 inches ; 10 nests gold labelled shop drawers, from 2 feet to 12 feet long. Lloyd Rayner, 333 Kingsland Road, and 2 Downham Road, Kingsland, London, N.

A surgery cabinet, 6 ft. long and 7 ft. 6 in. high, consisting of drawers, cupboards and shelving in excellent condition ; made about 2 years only. Supplied with mahogany box, scales, with weights, and 2 glass pans, 3 powder knives, 1 No. 5 pestle and mortar, 1 No. 5 compo funnel, one 6 in. graduated pill tile, one 10 oz. graduated measure, one 4 oz. ditto, one 2 drachm ditto, fourteen 32 oz. narrow mouth stoppered rounds, seventeen 20 oz. ditto, thirteen 6 oz. ditto, five 6 oz. ditto, engraved for acids ; twenty-four 8 oz. wide-mouth stoppered rounds, four 4 oz. ditto, 2 glass rods, six 1 lb. extract jars, with japanned covers ; loose chip boxes, nested pill boxes, a gross of mixed phial corks, a yard of adhesive plaster. Also powders as follow :—pulv. rhei 3 ozs., ferri. am. cit. 2 ozs., ferri et quin. cit. 1½ ozs,, bism. tris. 2 ozs., senegal rad. co. 2 ozs., emp. canthar. 4 ozs., and other powders ; and about 6 boxes of Cox's coated pills with formula attached ; an assortment of medicine labels ; also a portion of a book of Silvorlock's labels, original cost about 20*l.* No reasonable offer refused. Can be viewed at Treble & Son's factory, 42 Gloucester Street, Hoxton, London, N.

Pereira's "Materia Medica," by Bentley & Redwood, 15*s* ; Proctor's "Pharmacy," 8*s.* ; Lescher's "Pharmacy," 4*s* ; Southall's "Materia Modica Specimens," 15*s.*, cost 25*s.* ; offers wanted for Rhind's "Vegetable Kingdom," half-bound in leather, cost 29*s.* 6*d.* ; and for 42 parts of Muspratt's "Chemistry," viz., 1 to 9, 21 to 38, and 47 to 63 ; wanting, 3 and 27. H. E., 28 Mildmay Grove, N.

A handsome mahogany cigar case, nearly new, containing 12 compartments with plate-glass slides, plate-glass tablet, with gold writing, price, &c., 61 inches long, 20 inches broad, 6½ inches deep in front, 12 inches deep at back ; similar in style to fig. 53A Maw's catalogue ; cash offers will oblige ; five 10*s.* 6*d.* vols. Muspratt's "Chemistry," clean, 30*s.* or offers. Robinson & Allis, Alford.

Handsome Spanish mahogany soda-water stand, marble top ; sponge case, as Maw's 92, plate-glass ; a 6-feet plate-glass counter case, as Maw's 105 ; a plate-glass case, as Treble's No. 6 ; a Spanish mahogany desk, upright case in front ; a 3-feet best plate-glass counter case, trays, &c. ; Treble's universal counter case ; several flat counter cases ; a very handsome dispensing screen, 6 feet 3 long, case at each side, looking-glass centre, and marble slab in front, 8*l.*—a bargain ; a pair of scales, as Maw's No. 7 ; also No. 6, No. 922, and No. 1, 3 tooth-brush cases ; 30 dozen shop bottles ; drawers, carboys, specie jars, fancy jars, gold covers, and fancy labels ; upright carboys ; 18 6-lb. white ointment jars ; 100 brown stone japanned covers ; 10 dozen, 6 and 8 oz. olive jars ; and several squares of plate looking-glass. All to be sold very cheap. Natali Bros., 213 Old Street, City Road, E.C.

Attention is invited to the following exceedingly low-priced articles, all in sound condition and correctly described :—Maw's half-gallon tincture press on feet, 12*s.* ; Maw's 24 five-grain pill machine, with marble slab, 12*s.* ; mahogany and plate-glass show case, plate-glass top, front and at ends, sloping top with two lift-up hinged doors and moveable shelf inside, 2 feet 2 inches long, 14 inches high at back, 7 inches high in front, 7 inches deep, price only 20*s.* ; six white flint-glass specie jars, all about 18 inches high, with vermilion and gilt covers and gold labels, all as good as new, labelled for colocynth, rhubarb, magnesia, jalap, &c., price 15*s.* each separately, or the lot at 12*s.* 6*d.* each ; two neat upright show bottles (with colours), about 13 inches high, and mahogany stands, price 7*s.* 6*d.* the pair ; two show carboys (with colours) and stands, 10*s.* the pair ; two show carboys (with colours) and stands, larger size, 12*s.* 6*d.* the pair ; set tooth instruments in roll-up leather pouch, consisting of two Foxe's keys ; 1 pair each straight and curved forceps, gum lancet, punch, &c., price 12*s.* J. B. Leslie, Chemist, Trippet Lane, Sheffield.

WANTED.

A writing-table, as fig. 223 Maw's catalogue. In good condition. R. Cuthbert, Huddersfield.

Soda-water machine, also American ice-cream soda apparatus for counter. Full particulars and lowest price to A. F., 44 Seven Sisters Road, N.

I will post *Pharmaceutical Journal* every Monday for *The Chemist and Druggist*, posted five days after publication. Swinbank, Bedale.

Bell-metal pestle and mortar, in good condition. State diameter, weight, and price. Leuty & Co., Russell Gardens, Kensington, W.

The Chemist and Druggist for October, 1874, and September, 1875 ; full price paid, or exchange for other numbers. Young, Chemist, Leicester.

A good 4-grain pill machine, for Maw's 2-grain, nearly new, cuts 30 pills, warranted ; will pay bonus 5*s.* if for 24 pills, 7*s.* 30, 10*s.* 36. Delivered to any London house. T. Mann, New Hampton, Middlesex.

Vulcaniser, good as new (C. Ash & Sons' make), small size ; Tomes' "Manual of Dental Surgery," latest edition ; implements and tools for working vulcanine. Send list of articles and price. 144 Mytholmroyd, *viâ* Manchester.

The publisher of *The Chemist and Druggist* desires to make up for a foreign house a complete set of that journal. Gentlemen with back numbers are requested to communicate, stating price. Address, "America," *The Chemist and Druggist* Office, 44 A, Cannon Street, London, E.C.

LIQUIDATIONS.

(By arrangement or composition.)

BABB, WALTER WEBBER, Newfoundland Street and Milk Street, Bristol, chemist. March 6.

BENSON, JOSEPH H., Beckington, surgeon. March 6.

BRADLEY, FREDERICK, Newbold Street, Leamington Spa, M.D. March 23.

BROMWICH, WILLIAM C., trading as HENRY HOLLAND, King Edward's Road, Birmingham, drysalter and patent medicine vendor. March 6.

CARVER, CHARLES HANDASYDE, Enfield Highway, surgeon. March 23.

EYELEY, JOSEPH F., Dursley, Gloucestershire, physician and surgeon. March 31.

SMITH, WILLIAM BESTOE, Sudbury, surgeon. March 11.

STEAD, CHARLES F., Newcastle, Staffordshire, chemists' assistant and tobacconist. March 18.

WALLS, JOHN H., 35A Wilson Street, Finsbury, and Albert Road, South Norwood, dealer in druggists' sundries. March 15.

WHITE, WILLIAM HENRY, 110 Vine Street, Hulme, druggists' sundryman and perfumer. March 10.

WOODHEAD, LEVI, Union Street and Shakespeare Street, Halifax, druggist, March 27.

BANKRUPTCY ANNULLED.

FALL, JOSEPH (Jan. 17), Wool, Dorset, surgeon. March 20.

BANKRUPTCIES CLOSED.

HAMPSON, JOHN D. C., Upper Gloucester Place, and Clifton Road, East, dentist. (The property has been realised.) Bankruptcy closed Feb. 25.

HUGHES, HUBERT, Bridge Street, Bridgnorth, Salop, chemist. (A dividend of 2*d.* has been paid). Bankruptcy closed May 8, 1874.

PARTNERSHIPS DISSOLVED.

(Including the list omitted from our January number.)

ARMSTRONG BROS., Newgate Street, Bishop Auckland, grocers and druggists. Jan. 18.

ARROWSMITH, ARROWSMITH & GIMSON, chemists, Epsom.

BAISS BROS. & Co., Jewry Street, Aldgate, drug merchants; as far as regards J. Baiss, Jun.

BARTHES, A., & Co., Savage Gardens, Crutched Friars, cork importers and manufacturers of corks. Dec. 22.

BALDERSON & KNOX, Caledonian Road, chemical workers.

BRADY & ARUNDELL, Gateshead, surgeons. Dec. 31.

BUCKLEY & FAWCITT, Bradford, surgeons. Jan. 20.

CARRUTHERS & BAGNALL, Lancaster, chemists, manure manufacturers and dealers in agricultural implements. Dec. 31.

GROSSMITH, J. L., and DAVIS, G., Newgate Street, perfumers.

PHILPOT & ROBERTSON, Peckham Rye, surgeons.

RICHARDS & ROSS, Brighton, surgeons.

STONE, J. J., F. W., and W. C., Exeter, patent medicine vendors.

THOMPSON, E., & SONS, 1 King Charles Street, Leeds, druggists. Jan. 1.

SCOTCH SEQUESTRATION.

HEATLEY, GEORGE SMITH, Pathford, Ford, veterinary surgeon. March 22, with protection.

[The following list has been compiled expressly for THE CHEMIST AND DRUGGIST by L. de Fontainemoreau & Co., Patent Agents, 4 South Street, Finsbury, London; 10 Rue de la Fidélité, Paris; and 33 Rue des Minimes, Brussels.]

Provisional Protection for six months has been granted for the following:—

184. W. W. Hill, of Oxford Street, Middlesex. An improvement in bottles, jars, and other vessels, and in stoppers therefor. Dated January 18, 1876.

198. W. Little, of Heckington Hall, near Sleaford. Improvements in the manufacture of cleansing and disinfecting fluids for washing sheep and for other purposes. Dated January 18, 1876.

214. P. Jensen, of Chancery Lane, London. New or improved stopper appliance for bottles. Dated January 19, 1876.

380. J. Cockshott, of Manchester. A new or improved combined apparatus to be used by chemists, druggists, and others for dispensing purposes. Dated January 31, 1876.

614. J. Williams, of Hanley, Stafford. Improvements in bottles for aërated or effervescent liquids and in stoppers therefor. Dated February 15, 1876.

685. T. L. B. Edgcombe, of Erskine Street, Liverpool. Improvements in the cleansing and drying of glass bottles and in apparatus for that purpose. Dated February 18, 1876.

734. C. Claxton, sen., and C. Claxton, jun., of Lincoln. Improvements in stoppers for bottles for aërated and effervescent liquids. Dated February 22, 1876.

748. C. Allen, of Church Street, Saint Ebbes, Oxford. Improvements in bottle stoppers for aërated liquids. Dated February 23, 1876.

791. E. Breffit, of London, and T. Neville, of Lichfield. Improvements in stoppers for bottles. Dated February 25, 1876.

979. E. H. Stockwell, of Greek Street, Soho Square, Middlesex. A new or improved stopper for flasks and bottles. Dated March 7, 1876.

985. F. B. Michell, of Truro, Cornwall. Improvements applicable to stoppering and filling of bottles, and drawing off contents of same. Dated March 7, 1876.

1025. E. Breffit, of Upper Thames Street, London, and J. Edwards, of Castleford, York. Improvements in stoppers for bottles or other vessels, also applicable to other purposes, and in apparatus for filling and discharging the contents of bottles or other vessels. Dated March 9, 1876.

Letters Patent have been granted for the following:—

3734. L. Vallet, of Liverpool. Improvements in and applicable to stoppering or closing bottles. Dated October 27, 1875.

Specifications published during the month:—

Postage 1*d.* each extra.

1875.

2415. N. Thompson. Stoppers for bottles, &c. 6*d.*

2547. U. Catlow and R. Hoyle. Stoppers for bottles, &c. 6*d.*

2776. D. Elias. Stoppers for bottles, &c. 4*d.*

Obituary.

BILLINTON.—March 24, Mr. James Billinton, chemist and druggist, of Wakefield, Yorkshire. Aged 59 years.

FOWLER.—March 4, Mr. Stanley Fowler, pharmaceutical chemist, of Elgin Crescent, Notting Hill. Aged 37 years.

GOODMAN.—Feb. 25, Mr. Thomas Goodman, chemist and druggist, of Oldham Road, Manchester. Aged 66 years.

GREEN.—March 11, at Ryde, Isle of Wight, at the residence of Mr. H. H. Pollard, with whom he had been apprenticed, Mr. George Green, pharmaceutical chemist. Aged 22 years.

HIPSEY.—March 13, Mr. John William Hipsey, chemist and druggist, of Epping. Aged 34 years.

HODGMAN.—Dec. 26, Mr. William Croft Hodgman, chemist and druggist of Hucknall Torkard, Notts. Aged 42 years.

HODSON.—March 12, Mr. William Higgott Hodson, chemist and druggist, of Burton-on-Trent. Aged 42 years.

HUSBAND.—March 2, Mr. Matthew Husband, pharmaceutical chemist, Exeter. Aged 65 years.

MARSHALL.—March 19, after a lingering illness, Mr. R. Marshall, pharmaceutical chemist, of Boston.

MURPHY.—Feb. 12, Mr. John Murphy, chemist and druggist, of Nile Street, Hoxton. Aged 40 years.

PIKE.—Feb. 12, Mr. Samuel Robert Pike, chemist and druggist, of Amersham. Aged 38 years.

PULLAN.—Feb. 19, Mr. George Pullan, chemist and druggist, of Knaresborough. Aged 60 years.

RITSON.—Feb. 12, Mr. Isaac Ritson, chemist and druggist, of Wigton. Aged 39 years.

ROBERTS.—Feb. 25, Mr. John Roberts, of Caledonian Road, N. Aged 32 years.

ROGERS.—Feb. 20, Mr. John Rogers, chemist and druggist, of Bridge Street, Sheffield. Aged 63 years.

TAIT.—March 11, Mr. William Tait, of the firm of Duncan, Flockhart & Co., Edinburgh. Aged 58 years.

TRAVIS.—Feb. 12, Mr. William Travis, chemist and druggist, of Royton, Lancashire. Aged 46 years.

URWICK.—March 13, at Bradford, Mr. Charles Urwick, eldest son of Mr. W. W. Urwick, of Pimlico. Aged 19 years.

WHITEHOUSE.—March 15, Mr. George Henderson Whitehouse, chemist and druggist, of Bradford, York-hire. Aged 41 years.

Monthly Price Current.

The prices quoted in the following list are those actually obtained in Mincing Lane for articles sold in bulk. Our Retail Subscribers must not expect to purchase at these market prices, but they may draw from them useful conclusions respecting the prices at which articles are offered by the Wholesale Firms.

CHEMICALS.	1876.						1875.					
	s.	d.		s.	d.		s.	d.		s.	d.	
ACIDS—												
Acetic .....per lb.	0	3½	to	0	0		0	4	to	0	0	
Citric ..... ,,	2	8	..	2	9		4	0	..	0	0	
Hydrochlor.....per cwt.	5	0	..	7	0		4	0	..	7	0	
Nitric .....per lb.	0	5	..	0	5½		0	5	..	0	5½	
Oxalic ..... ,,	0	5	..	0	0		0	6½	..	0	7	
Sulphuric ..... ,,	0	0¾	..	0	1		0	0¾	..	0	1	
Tartaric crystal.. ,,	1	5½	..	0	0		1	6½	..	0	0	
powdered ,,	1	5¾	..	0	0		1	6¾	..	0	0	
ANTIMONY ore .....per ton	280	0	..	300	0		250	0	..	270	0	
crude .. per cwt.	42	0	..	0	0		36	0	..	0	0	
star..... ,,	60	0	..	0	0		55	0	..	0	0	
ARSENIC, lump..... ,,	27	6	..	28	0		30	0	..	0	0	
powder.... ,,	12	0	..	12	3		15	3	..	16	0	
BRIMSTONE, rough ...per ton	132	6	..	135	0		155	0	..	160	0	
roll .. per cwt.	10	0	..	10	3		10	0	..	0	0	
flour.... ,,	12	6	..	14	0		11	6	..	12	6	
IODINE, dry .....per oz.	0	5¾	..	0	0		0	8¾	..	0	0	
IVORY BLACK, dry .. per cwt.	8	6	..	0	0		8	6	..	0	0	
MAGNESIA, calcined..per lb.	1	6	..	0	0		1	6	..	0	0	
MERCURY .....per bottle	200	0	..	0	0		400	0	..	0	0	
MINIUM, red ..... per cwt.	24	6	..	25	0		24	6	..	0	0	
orange .. ,,	37	0	..	0	0		36	0	..	0	0	
PRECIPITATE, red . per lb.	4	6	..	0	0		6	8	..	0	0	
white ,,	4	5	..	0	0		6	7	..	8	0	
PRUSSIAN BLUE .. ,,	0	0	..	0	0		0	0	..	0	0	
SALTS—												
Alum .....per ton	145	0	..	155	0		165	0	..	175	0	
powder..... ,,	160	0	..	167	6		185	0	..	0	0	
Ammonia :												
Carbonate ..... per lb.	0	5	..	0	0		0	7	..	0	7¼	
Hydrochlorate, crude, white ..... per ton	560	0	..	0	0		700	0	..	0	0	
British (*see* Sal Am.)												
Sulphate..... per ton	375	0	..	380	0		375	0	..	385	0	
Argol, Cape .....per cwt.	87	6	..	90	0		90	0	..	97	0	
Red..... ,,	74	0	..	91	0		76	0	..	90	0	
Oporto, red. ,,	33	6	..	34	0		33	0	..	34	0	
Sicily ..... ,,	0	0	..	0	0		60	0	..	62	0	
Ashes (*see* Potash and Soda)												
Bleaching powd...per cwt.	7	9	..	8	0		10	0	..	10	3	
Borax, crude..... ,,	32	0	..	49	0		40	0	..	55	0	
British refnd. ,,	53	0	..	0	0		56	0	..	0	0	
Calomel .....per lb.	4	0	..	0	0		5	1	..	0	0	
Copper :												
Sulphate ....per cwt.	24	0	..	24	3		25	0	..	25	6	
Copperas, green..per ton	62	6	..	67	6		65	0	..	70	0	
Corrosive Sublimate p. lb.	3	5	..	0	0		4	3	..	0	0	
Cr. Tartar, French, p. cwt.	109	0	..	110	0		113	6	..	114	0	
brown ,,	85	0	..	95	0		92	6	..	98	0	
Epsom Salts ....per cwt.	5	3	..	6	6		5	6	..	6	6	
Glauber Salts .... ,,	4	6	..	5	6		6	6	..	7	0	
Lime :												
Acetate, white, per cwt.	11	0	..	20	0		13	0	..	21	0	
Magnesia : Carbonate ,,	42	6	..	45	0		42	6	..	45	0	
Potash :												
Bichromate ....per lb.	0	4½	..	0	5		0	6½	..	0	0	
Carbonate :												
Potashes, Canada, 1st sort .....per cwt.	26	6	..	27	0		34	0	..	34	6	
Pearlashes, Canada, 1st sort .....per cwt.	27	6	..	28	0		40	0	..	41	0	
Chlorate .....per lb.	0	9½	..	0	0		0	9½	..	0	9¾	
Prussiate ..... ,,	0	11½	..	0	11¾		1	1¼	..	0	0	
red .... ,,	3	2	..	3	3		3	2	..	3	3	
Tartrate (*see* Argol and Cream of Tartar)												
Potassium :												
Chloride.....per cwt.	7	0	..	0	0		7	0	..	0	0	
Iodide .....per lb.	7	6	..	0	0		11	0	..	0	0	
Quinine :												
Sulphate, British, in bottles .....per oz.	7	2	..	0	0		7	0	..	0	0	
Sulphate, French ,,	6	6	..	0	0		6	9	..	0	0	
Sal Acetos .....per lb.	0	8	..	0	8½		0	9½	..	0	10	
Sal Ammoniac, Brit. cwt.	44	0	..	45	0		44	0	..	45	0	
Saltpetre :												
Bengal, 6 per cent. or under .....per cwt.	18	6	..	19	0		20	6	..	21	3	
Bengal, over 6 per cent. per cwt.	17	9	..	18	3		19	0	..	20	3	
British, refined ,,	21	6	..	22	9		23	9	..	24	9	
Soda: Bicarbonate, p. cwt.	11	0	..	11	3		14	6	..	14	9	
Carbonate :												
Soda Ash ..per deg.	0	2	..	0	0		0	2⅛	..	0	0	
Soda Crystals per ton	85	0	..	0	0		97	6	..	0	0	
Hyposulphite, per cwt.	0	0	..	0	0		0	0	..	0	0	
Nitrate .....per cwt.	11	6	..	0	0		13	0	..	0	0	
SUGAR OF LEAD, White cwt.	40	0	..	0	0		42	0	..	44	0	
SUGAR OF LEAD, Brown, cwt.	27	0	..	0	0		38	0	..	39	0	
SULPHUR (*see* Brimstone)												

	1876.						1875.					
	s.	d.		s.	d.		s.	d.		s.	d.	
VERDIGRIS ..... per lb.	1	1	to	1	5		1	1	to	1	5	
VERMILION, English ,,	3	0	..	0	0		5	2	..	0	0	
China ,,	0	0	..	0	0		0	0	..	0	0	
DRUGS.												
ALOES, Hepatic ....per cwt.	60	0	..	160	0		60	0	..	180	0	
Socotrino .. ,,	65	0	..	205	0		100	0	..	200	0	
Cape, good.. ,,	36	0	..	39	0		36	0	..	89	0	
Inferior .... ,,	23	0	..	35	0		29	0	..	35	0	
Barbadoes .. ,,	40	0	..	210	0		40	0	..	185	0	
AMBERGRIS, grey.....oz.	53	0	..	62	0		70	0	..	90	0	
BALSAM—												
Canada.....per lb.	1	3	..	0	0		1	3	..	2	0	
Capivi ..... ,,	2	3	..	2	6		2	10	..	3	0	
Peru ..... ,,	4	10	..	5	0		6	0	..	6	6	
Tolu..... ,,	6	0	..	6	3		5	9	..	6	0	
BARKS—												
Canella alba.....per cwt.	0	0	..	0	0		16	0	..	27	0	
Cascarilla ..... ,,	19	0	..	25	0		19	0	..	22	0	
Peru, crown & grey per lb.	1	5	..	2	11		0	9	..	2	2	
Calisaya, flat ,,	2	6	..	4	7		3	0	..	3	6	
,, quill ,,	2	6	..	4	7		3	0	..	4	2	
Carthagena ,,	1	5	..	2	2		0	6	..	1	8	
E. I. ..... ,,	2	6	..	6	0		1	0	..	4	0	
Pitayo ..... ,,	0	7	..	1	9		0	4	..	2	0	
Red ..... ,,	1	9	..	4	6		1	0	..	4	0	
Buchu Leaves..... ,,	0	1	..	1	1		0	2	..	1	0	
CAMPHOR, China ..per cwt.	65	0	..	0	0		74	0	..	75	0	
Japan .. ,,	0	0	..	0	0		77	6	..	0	0	
Refin. Eng. per lb.	1	0½	..	0	0		1	1	..	0	0	
CANTHARIDES..... ,,	3	6	..	3	9		3	0	..	5	0	
CHAMOMILE FLOWERS p. cwt.	35	0	..	60	0		35	0	..	50	0	
CASTOREUM .....per lb.	6	0	..	26	0		6	0	..	24	0	
DRAGON'S BLOOD, lp. p. cwt.	110	0	..	200	0		80	0	..	220	0	
FRUITS AND SEEDS (*see also* Seeds *and* Spices).												
Anise, China Star per cwt.	100	0	..	112	0		110	0	..	0	0	
Spanish, &c. ,,	26	0	..	40	0		30	0	..	35	0	
Beans, Tonquin....per lb.	1	6	..	4	6		2	0	..	3	0	
Cardamoms, Malabar good ..... ,,	4	0	..	4	8		3	6	..	5	0	
inferior.... ,,	0	10	..	3	9		2	0	..	3	5	
Madras.... ,,	2	2	..	3	2		2	9	..	4	0	
Ceylon .... ,,	5	0	..	5	3		5	8	..	5	10	
Cassia Fistula....per cwt.	8	0	..	14	6		12	6	..	15	0	
Castor Seeds .... ,,	5	0	..	10	6		7	0	..	11	6	
Cocculus Indicus ,,	13	0	..	15	0		14	0	..	16	0	
Colocynth, apple ..per lb.	0	6	..	0	11		0	11	..	1	0	
Croton Seeds ....per cwt.	33	0	..	40	0		44	0	..	0	0	
Cubebs..... ,,	28	0	..	29	0		21	6	..	23	0	
Cummin ..... ,,	18	0	..	24	0		16	0	..	21	0	
Dividivi ..... ,,	10	0	..	16	0		11	0	..	17	0	
Fenugreek ..... ,,	18	0	..	22	0		8	0	..	16	0	
Guinea Grains .. ,,	21	0	..	0	0		25	0	..	0	0	
Juniper Berries ,,	7	0	..	10	0		9	0	..	10	6	
Nux Vomica.. .. ,,	13	0	..	15	0		9	0	..	17	0	
Tamarinds, East India,,	14	6	..	16	0		18	0	..	20	0	
West India ,,	8	6	..	20	0		11	0	..	18	0	
Vanilla, large .... per lb.	30	0	..	51	0		60	0	..	72	0	
inferior ,,	13	0	..	28	0		50	0	..	59	0	
Wormseed per cwt.	0	0	..	0	0		0	0	..	0	0	
GINGER, Preserved, per lb.	0	5½	..	0	10		0	6½	..	0	7	
HONEY, Chili .... per cwt.	35	0	..	48	0		38	6	..	0	0	
Jamaica ,,	35	0	..	48	0		0	0	..	0	0	
Australian ,,	0	0	..	0	0		0	0	..	0	0	
IPECACUANHA .... per lb.	3	8	..	4	6		4	0	..	4	8	
ISINGLASS, Brazil.. ,,	2	0	..	4	9		3	2	..	5	1	
Tongue sort ,,	2	3	..	5	0		3	0	..	5	8	
East India ,,	1	0	..	5	0		1	0	..	5	6	
West India ,,	3	9	..	4	3		4	6	..	5	0	
Russ. long staple	9	0	..	12	6		8	6	..	13	0	
,, inferior	0	0	..	0	0		4	0	..	8	0	
,, Simovia	3	0	..	3	6		3	3	..	5	0	
JALAP, good..... ,,	0	8	..	0	10		0	9	..	0	10	
infer. & stems ,,	0	6	..	0	7		0	8	..	0	9	
LEMON JUICE .... per degree	0	1	..	0	2		0	2¾	..	0	0	
LIME JUICE.....per gall.	1	6	..	2	0		1	6	..	2	0	
LIQUORICE, Spanish per cwt.	0	0	..	0	0		40	0	..	70	0	
Liquorice Root ,,	16	0	..	38	0		11	0	..	16	0	
MANNA, flaky .....per lb.	5	6	..	6	0		2	6	..	3	0	
small ..... ,,	1	6	..	1	9		1	2	..	1	5	
MUSK, Pod.....per oz.	13	0	..	45	0		20	0	..	45	0	
Grain..... ,,	37	0	..	60	0		46	0	..	60	0	
OILS (*see also separate list*)												
Almond, expressed per lb.	1	3	..	0	0		1	1	..	0	0	
Castor, 1st pale.... ,,	0	3⅝	..	0	3¾		0	4⅞	..	0	5	
second .... ,,	0	3¼	..	0	3½		0	4	..	0	4½	
infer. & dark ,,	0	3	..	0	0		0	3½	..	0	4	
Cod Liver ..... per gall.	3	4	..	6	6		5	6	..	7	9	
Croton ..... per oz.	0	2½	..	0	0		0	3	..	0	4	
Essential Oils :												
Almond .....per lb.	25	0	..	0	0		24	0	..	0	0	
Anise-seed ..... ,,	6	3	..	0	0		9	0	..	9	0	
Bay .....per cwt.	0	0	..	0	0		65	0	..	70	0	
Bergamot ..... per lb.	10	0	..	15	0		10	0	..	25	0	
Cajeput.....per bottle	2	9	..	3	0		2	4	..	2	8	
Caraway.....per lb.	9	0	..	9	3		5	3	..	6	0	
Cassia ..... ,,	3	11	..	4	1		4	4	..	4	6	
Cinnamon .....per oz.	2	6	..	6	6		1	0	..	7	0	
Cinnamon-leaf .. ,,	0	0	..	0	0		0	2	..	0	3	
Citronelle ..... ,,	0	1⅝	..	0	0		0	1⅞	..	0	2	
Clove .....per lb.	9	4	..	9	6		10	6	..	10	9	
Juniper ..... ,,	1	10	..	0	0		1	3	..	2	0	
Lavender .....per lb.	1	8	..	7	0		1	1x	..	5	0	
Lemon..... ,,	7	0	..	9	6		7	0	..	11	6	

	1876.		1875.	
Essential Oils, *continued*:—	s. d.	s. d.	s. d.	s. d.
Lemongrass ....per oz.	0 2½ ..	0 2⅝	0 2¾ ..	0 2⅞
Neroli ..... „	3 0 ..	6 6	0 4 ..	3 0
Nutmeg ..... „	0 7 ..	0 0	0 7 ..	0 8
Orange.....per lb.	6 0 ..	9 0	8 0 ..	10 0
Otto of Roses....per oz.	13 0 ..	25 0	15 0 ..	22 0
Patchouli ..... „	2 0 ..	3 6	2 9 ..	4 0
Peppermint:				
American ....per lb.	16 0 ..	17 0	22 0 ..	24 0
English ..... „	32 0 ..	33 0	32 6 ..	36 0
Rosemary ..... „	2 0 ..	2 6	1 4 ..	1 10
Sassafras ..... „	0 0 ..	0 0	2 0 ..	3 0
Spearmint ..... „	14 0 ..	16 0	6 0 ..	18 0
Thyme..... „	0 0 ..	0 0	1 9 ..	2 0
Maco, expressed ..per oz.	0 6 ..	0 10	0 3 ..	0 3½
Opium, Turkey .....per lb.	19 6 ..	21 6	36 0 ..	38 0
inferior ..... „	14 0 ..	18 0	20 0 ..	35 0
Quassia(bitter wood)per ton	100 0 ..	180 0	0 0 ..	0 0
Rhubarb, China, good and fine .....per lb.	2 10 ..	4 8	1 11 ..	5 9
Good, mid. to ord. „	0 9 ..	2 4	0 3 ..	1 6
Dutch trimmed „	0 0 ..	0 0	0 0 ..	0 0
Russian ..... „	0 0 ..	0 0	0 0 ..	0 0
Roots—Calumba..percwt.	25 0 ..	28 0	18 0 ..	22 0
China ..... „	19 0 ..	24 0	18 0 ..	20 0
Galangal..... „	19 0 ..	22 0	20 0 ..	25 0
Gentian ..... „	23 0 ..	24 0	17 0 ..	19 0
Hellebore ..... „	0 0 ..	0 0	30 0 ..	33 0
Orris ..... „	26 0 ..	75 0	30 0 ..	70 0
Pellitory..... „	0 0 ..	0 0	38 0 ..	39 0
Pink.....per lb.	0 0 ..	0 0	0 10 ..	1 3
Rhatany..... „	0 4 ..	1 0	0 4 ..	2 0
Seneka..... „	3 6 ..	3 10	3 7 ..	4 0
Snake ..... „	0 6 ..	0 7	1 0 ..	1 4
Saffron, Spanish .. „	31 0 ..	36 0	18 0 ..	23 0
Salep .....per cwt.	0 0 ..	0 0	170 0 ..	200 0
Sarsaparilla, Lima per lb.	0 6 ..	0 0	0 6 ..	0 9
Para..... „	0 0 ..	0 0	1 0 ..	1 3
Honduras ..... „	1 3 ..	1 9	1 7 ..	1 11
Jamaica ..... „	2 1 ..	2 10	1 9 ..	2 6
Sassafras .....per cwt.	0 0 ..	0 0	13 0 ..	14 0
Scammony, Virgin ..per lb.	24 0 ..	40 0	25 0 ..	36 0
second & ordinary „	6 0 ..	22 0	7 0 ..	24 0
Senna, Bombay .... „	0 1 ..	0 4	0 1 ..	0 5
Tinnivelly ..... „	0 2 ..	1 3	0 1 ..	0 8
Alexandria..... „	0 4½ ..	2 8	0 3½ ..	1 5
Spermaceti, refined „	1 6 ..	0 0	1 2 ..	1 3
American ..... „	1 2 ..	0 0	1 0 ..	1 1
Squills..... „	0 3 ..	0 4	0 1¾ ..	0 3
GUMS.	£ s.	£ s.	£ s.	£ s.
Ammoniaci drop .. per cwt.	1 10 ..	2 11	4 5 ..	1 15
lump.. „	1 0 ..	1 9	3 0 ..	4 0
Animi, fine washed „	10 0 ..	10 10	12 0 ..	13 10
bold scraped „	8 15 ..	9 15	10 10 ..	11 15
sorts ..... „	6 0 ..	8 5	6 10 ..	10 15
dark ..... „	3 5 ..	6 10	4 10 ..	5 10
Arabic, E.I., fine pale picked .. „	3 5 ..	3 15	2 18 ..	3 10
srts.,md.tofin. „	1 8 ..	3 2/6	1 16 ..	2 16
garblings .. „	1 2 ..	2 3	0 19 ..	1 10
Turkey,pick.gd.to fin. „	6 0 ..	9 0	7 0 ..	11 0
second & inf. „	2 10 ..	5 10	3 0 ..	6 15
in sorts .. „	1 10 ..	2 0	1 10 ..	2 15
Gedda .... „	1 2 ..	1 6	1 0 ..	1 8
Barbary, white .. „	0 0 ..	0 0	0 0 ..	0 0
brown .. „	1 9 ..	1 16	1 6 ..	1 12
Australian..... „	1 17 ..	2 6	1 4 ..	2 8
Assafœtida,cm.to fin „	0 18 ..	1 16	0 9 ..	2 4
Benjamin,1st & 2nd „	8 0 ..	29 0	20 0 ..	39 0
Sumatra 1st & 2nd „	7 10 ..	12 0	7 10 ..	12 0
3rd	3 10 ..	5 0	2 7/6 ..	4 5
Copal, Angola red „	6 0 ..	6 15	5 10 ..	5 15
Benguela „	4 0 ..	5 0	3 10 ..	4 10
	s. d.	s. d.	s. d.	s. d.
Sierra Leone, per lb.	0 7½ ..	0 11	0 4½ ..	0 10½
Manilla....per cwt.	15 0 ..	27 0	35 0 ..	40 0
Dammar, pale .... „	57 0 ..	60 0	0 0 ..	0 0
Singapore .... „	57 0 ..	60 0	55 0 ..	54 0
Euphorbium .... „	12 0 ..	20 0	11 0 ..	15 0
Galbanum ..... per lb.	1 0 ..	1 6	1 6 ..	2 0
Gamboge,pckd.pipe per cwt.	180 0 ..	235 0	180 0 ..	280 0
Guaiacum .....per lb.	0 6 ..	2 0	0 8 ..	2 6
Kino.....per cwt.	50 0 ..	80 0	60 0 ..	90 0
Kowrie, rough .. „	32 0 ..	50 0	30 0 ..	50 0
scraped sorts „	50 0 ..	68 0	51 0 ..	67 0
Mastic, picked ....per lb.	4 0 ..	5 8	4 6 ..	6 0
Myrrh, gd. & fine per cwt.	172 6 ..	200 0	119 0 ..	280 0
ord. to fair.... „	65 0 ..	172 0	80 0 ..	115 0
Olibanum, p. drop „	58 0 ..	60 0	60 0 ..	68 0
amber & ylw. „	45 0 ..	55 0	53 0 ..	60 0
garblings.... „	22 0 ..	30 0	20 0 ..	39 0
Senegal ..... „	2 10 ..	2 15	2 0 ..	2 15
Sandarac..... „	85 0 ..	107 6	90 0 ..	100 0
Shellac, Orange.. „	107 6 ..	180 0	240 0 ..	292 6
Liver .. „	100 0 ..	130 0	205 0 ..	270 0
Thus ..... „	20 0 ..	22 0	21 0 ..	23 0
Tragacanth, leaf „	280 0 ..	390 0	220 0 ..	390 0
in sorts „	25 0 ..	175 0	30 0 ..	190 0
OILS.	£ s.	£ s.	£ s.	£ s.
Seal, pale .....per tun	34 10 ..	35 0	35 0 ..	0 0
yellow to tinged „	30 0 ..	33 0	33 0 ..	34 0
brown ..... „	28 0 ..	29 0	29 0 ..	30 0
Sperm..... „	96 0 ..	97 0	106 0 ..	107 0
Cod ..... „	44 0 ..	44 10	40 10 ..	41 0

	1876.		1875.	
Oils, *continued*:—	£ s.	£ s.	£ s.	£ s.
Whale,SouthSea,pale,per tun	34 10 to	35 0	35 0 to	0 0
yellow „	32 0 ..	34 10	28 10 ..	35 0
brown „	28 0 ..	30 0	26 0 ..	28 0
East India, Fish „	24 10 ..	0 0	23 0 ..	0 0
Olive, Galipoli....per ton	0 0 ..	0 0	0 0 ..	0 0
Trieste..... „	0 0 ..	0 0	42 10 ..	43 0
Levant .... „	0 0 ..	0 0	41 0 ..	0 0
Mogador .... „	0 0 ..	0 0	40 5 ..	0 0
Spanish .... „	0 0 ..	0 0	0 0 ..	0 0
Sicily ..... „	0 0 ..	0 0	42 10 ..	0 0
Cocoanut, Cochin.. „	40 10 ..	0 0	43 10 ..	44 0
Ceylon „	38 10 ..	39 0	37 15 ..	38 0
Sydney „	32 0 ..	38 10	37 0 ..	37 10
Ground Nut and Gingelly:				
Bombay	0 0 ..	0 0	0 0 ..	0 0
Madras	34 0 ..	0 0	35 0 ..	0 0
Palm, fine.....	38 0 ..	0 0	35 10 ..	0 0
Linseed	22 10 ..	22 15	25 0 ..	25 10
Rapeseed, English, pale ..	33 10 ..	0 0	0 0 ..	0 0
brown	31 10 ..	31 15	30 5 ..	30 10
Foreign, pale ..	34 0 ..	35 0	33 10 ..	0 0
brown	0 0 ..	0 0	0 0 ..	0 0
Cottonseed	29 0 ..	0 0	25 10 ..	0 0
Lard	68 0 ..	66 0	70 0 ..	0 0
Tallow	30 0 ..	54 0	22 0 ..	28 0
Turpentine, American,cks.	24 0 ..	0 0	25 6 ..	0 0
French „	0 0 ..	0 0	0 0 ..	0 0
Petroleum, Crude	0 0 ..	0 0	0 0 ..	0 0
	s. d.	s. d.	s. d.	s. d.
refined, per gall.	0 10⅜ ..	0 11	0 10⅜ ..	0 11½
Spirit „	0 8¼ ..	0 8½	0 9¾ ..	0 10
SEEDS.				
Canary.....per qr.	120 0 ..	160 0	180 0 ..	210 0
Caraway, English per cwt.	44 0 ..	45 0	0 0 ..	0 0
German, &c....	0 0 ..	0 0	18 0 ..	29 0
Coriander	12 0 ..	23 0	8 0 ..	18 0
Hemp.....per qr.	40 0 ..	45 0	36 0 ..	38 0
Linseed, English per qr. ..	60 0 ..	66 0	59 0 ..	66 0
Black Sea & Azof	50 0 ..	0 0	53 0 ..	54 0
Calcutta „	50 0 ..	0 0	56 6 ..	0 0
Bombay „	51 0 ..	0 0	60 0 ..	61 0
St. Petrsbrg.„	0 0 ..	0 0	54 0 ..	56 0
Mustard, brown..per bshl.	0 0 ..	0 0	0 0 ..	0 0
white.. „	10 0 ..	13 0	10 0 ..	12 0
Poppy, East India, per qr.	53 0 ..	53 6	54 0 ..	0 0
SPICES.				
Cassia Lignea ..per cwt.	52 0 ..	70 0	56 0 ..	75 0
Vera ..... „	22 0 ..	44 0	24 0 ..	50 0
Buds ..... „	92 6 ..	97 6	115 0 ..	122 6
Cinnamon, Ceylon:				
1st quality .....per lb.	2 3 ..	3 9	2 9 ..	4 3
2nd do. ..... „	2 0 ..	2 11	2 0 ..	3 3
3rd do. ..... „	1 11 ..	2 6	1 8 ..	2 10
Tellicherry ..... „	0 0 ..	0 0	3 3 ..	3 5
Cloves, Penang .... „	1 10 ..	2 0	2 2 ..	0 0
Amboyna ..... „	1 5 ..	1 6	1 8 ..	1 9
Zanzibar..... „	1 2 ..	1 4	1 0 ..	1 6
Ginger, Jam., fine per cwt.	100 0 ..	202 6	110 0 ..	200 0
Ord. to good .... „	60 0 ..	95 0	79 0 ..	100 0
African ..... „	40 0 ..	0 0	58 0 ..	0 0
Bengal..... „	38 0 ..	0 0	50 0 ..	60 0
Malabar ..... „	0 0 ..	0 0	50 0 ..	0 0
Cochin ..... „	62 0 ..	120 0	76 0 ..	125 0
Pepper,Blk,Malabar,per lb.	0 4⅜ ..	0 5	0 6⅝ ..	0 7½
Singapore ..... „	0 4¼ ..	0 0	0 5¾ ..	0 0
White Tellicherry „	0 10 ..	1 4	0 11 ..	1 6
Cayenne ..... „	3 0 ..	3 4	1 6 ..	3 1
Mace, 1st quality .. „	2 2 ..	3 1	2 11 ..	3 6
2nd and inferior .. „	1 0 ..	2 1	1 8 ..	2 10
Nutmegs, 78 to 60 to lb.	3 4½ ..	4 3	3 8 ..	4 4
90 to 80 „	2 11 ..	3 4	3 3 ..	3 6
132 to 95 „	2 6 ..	2 11	2 7 ..	3 2
Pimenta.....	0 3 ..	0 3¼	0 3 ..	0 3¼
VARIOUS PRODUCTS.				
COCHINEAL—				
Honduras, black ..per lb.	1 10 ..	2 6	1 11 ..	2 10
„ silver .. „	1 7 ..	1 10	2 0 ..	2 4
„ pasty .. „	1 6 ..	0 0	1 9 ..	1 11
Mexican, black.... „	1 8 ..	1 11	1 10 ..	2 0
„ silver.... „	1 7 ..	1 8	1 8 ..	1 0
Teneriffe, black .. „	1 9 ..	3 2	2 0 ..	3 8
„ silver .. „	1 8 ..	1 10	1 11 ..	2 2
SOAP, Castile.....per cwt.	26 0 ..	33 0	33 0 ..	34 0
SOY, China	1 11 ..	2 0	1 9 ..	0 0
SPONGE,Turk.fin.pkd pr lb.	12 0 ..	16 0	12 0 ..	16 0
Fair to good „	4 0 ..	11 0	4 0 ..	11 0
Ordinary .. „	1 0 ..	3 6	1 0 ..	3 6
Bahama.... „	0 6 ..	3 0	0 6 ..	3 6
TERRA JAPONICA—				
Gambier .....per cwt.	25 6 ..	0 0	26 6 ..	0 0
Free cubes .... „	35 6 ..	37 6	40 0 ..	41 0
Cutch ..... „	25 6 ..	26 0	28 0 ..	29 0
WOOD, Dye, Bar ..per ton	£3 5 ..	£3 10	£4 15 ..	5 0
Brazil ..... „	0 0 ..	0 0	9 0 ..	27 0
Cam..... „	19 0 ..	24 0	25 0 ..	34 0
Fustic, Cuba ..... „	8 10 ..	9 0	9 0 ..	9 10
Jamaica ..... „	6 10 ..	7 0	8 10 ..	9 6
Logwood,Campeachy„	9 0 ..	10 0	9 0 ..	10 0
Honduras .... „	7 0 ..	7 15	7 0 ..	7 10
St. Domingo .... „	6 0 ..	7 0	6 0 ..	6 15
Jamaica ..... „	6 10 ..	7 0	6 0 ..	6 15
Lima, first pile .... „	10 ..	11 0	13 0 ..	14 0
Red Sanders .... „	6 15 ..	0 0	6 10 ..	0 0

AN increase of national expenditure comes *mal à propos* at a time when national commerce is in anything but a flourishing condition, and when nearly all our branches of industry are depressed and unprofitable. In estimating for the coming year the Chancellor of the Exchequer shows a commendable prudence in not anticipating much elasticity in the revenue. The experience of the quarter just past was clearly indicative of the excessive lethargy which now possesses nearly every branch of trade, both home and foreign; and Sir Stafford Northcote at least deserves the credit of not having neglected the obvious signs of the times. If his budget had not been shadowed over with the gloom of that extra 1½ million, it would have been an excellent one; that it has anything cheerful about it is extremely creditable to its author. Tradesmen generally will be thankful for the small mercy of the removal of that irritating tax on the small boy kept for the shop, but occasionally employed for an hour or so in the kitchen; while the concessions in regard to the income-tax, though this year alloyed by the extra penny, will probably be permanent boons to the most hardworking half of the middle classes of this country. So that without palliating in the least the serious blemish of increased expenditure, which, however, is only the Chancellor of the Exchequer's misfortune, we think it fair to acknowledge that the Budget of 1876 will compare favourably with those of any of its recent predecessors.

Trade during the past month has remained in its now chronic state of stagnation. Weakness characterises the chemical markets throughout. Prices have in most instances yielded more or less to the excessive dulness. Since the commencement of the present month there has been a little more firmness in tone, due to genuine business. But this is limited, and by no means of assured permanency. Speculation seems clean knocked out of the market altogether. Citric acid has receded, as we anticipated last month, being now quoted 2*s.* 8*d.* to 2*s.* 9*d.*; lemon juice holders still await buyers. Mercury has kept perfectly steady during the month. Iodine has arrived in considerable quantities, but the same prices as heretofore continue to be quoted. The serious depreciation in the value of silver, the financial results of which are likely to prove very embarrassing to our Indian Government, have occasioned a slight fall in the price of nitrate of silver. Glycerine is dearer, and English made quinine has advanced to 7*s.* 2*d.*

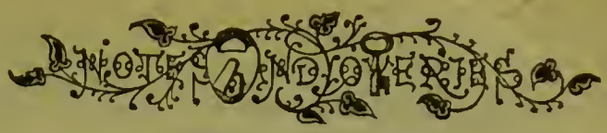
The drug markets share in the general depression. There is an abundant supply of goods, but no eagerness in buying. Consequently the tendency is, of course, towards drooping prices. Castor oil continues very low. Best qualities can be bought at lower rates than for years past. Cod liver oil, on the other hand, is likely to be dearer, the stormy weather of the past winter having considerably interfered with the fishing. Opium, without showing any change of price, is a trifle firmer, owing to unfavonrable rumours respecting the growing crop. A feature in the bark market has been the high prices obtained for East India cinchona, which, previously varying from 1*s.* to 4*s.*, is now quoted at from 2*s.* 6*d.* to 6*s.* Calisaya bark has been readily purchased. Balsam Capivi is now received more abundantly, and can be bought cheaper. Russian isinglass is again a little lower. Scammony is also cheaper, virgin being now 24*s.* to 40*s.*

No trade has been done in olive oils; linseed oil has fallen 1*l.*; rapeseed oil is also cheaper.

American turpentine, 24*s.*; petroleum a trifle stronger.

Canary seed continues to decline. Ordinary qualities of shellac selling at almost any price.

Sponge, it is said, will be dear this year, owing to the stormy weather experienced during the fishing season.



We ask our readers not to hesitate about writing to us on all subjects connected with the trade. We shall not publish correct names if any substitute is given us. Short, pithy notes, fragments of trade information, answers to queries, questions, all will be welcome. Our own staff is very apt to get idle unless kept constantly on the mill. All of us will be the better for the interchange of ideas and experiences. The Italians say, "Every man needs another once in ten years;" a French proverb tells us that "One barber shaves another;" and the ancient Greeks had observed that "One hand washes the other" (χεὶρ χεῖρα νίπτει). This consensus of opinion may fairly induce the members of our guild to make use of the common ground which we offer.

Apprentice (Birmingham).—The poisonous *Pharaoh's Serpents* are thus made:—Dissolve mercury in dilute nitric acid by the aid of heat, observing, however, to have an excess of the metal. Decant the solution, and pour it into an equal weight of a solution of sulphocyanide of ammonium or potassium. Collect the precipitate on a filter, and, after washing, set it in a warm place to dry. The compound is to be pulverised in a mortar and mixed with gum tragacanth (1 ounce of the latter to 1 lb. of the sulphocyanide), making into a mass with water. (2) Macmillan's Primers are sold at 1*s.* each.

This correspondent, referring to an answer in our last to "J. J. T.," remarks that if candidates might pass the Minor as soon as they felt competent to do so, but might not commence business before attaining their majority, the difficulties would be met. We confess that to us the grievance seems a very microscopic one.

L. W.—Can an Irish pharmaceutical chemist legally carry on business in England under the title of pharmaceutical chemist? Not unless he is also on the English register.

Damon (*Boston, U.S.*)—Ginger-ale, or ginger-beer as it is generally called in this country, is either aërated water with a tablespooufnl of syrup of ginger in each bottle, or is made by fermentation in the following manner:—Bruised ginger, 1 oz.; cream of tartar, 3 oz.; 2 or 3 lemons, sliced; lump sugar, 1 lb. Dissolve in a gallon of boiling water, and stir frequently till lukewarm. Then add 1½ or 2 ozs. of yeast. Keep the mixture moderately warm and let it ferment for 24 hours. Decant and strain through flannel, and let it work another day or two. Then skim it, decant again, strain, and bottle. It is usually put into half-pint stone bottles, the corks of which are securely tied over.

M. C. J.—If to tinct. opii you add the correct proportions of benz. acid, camphor, aniseed oil and proof spirit, you will of course prepare tinct. camph. co. exactly; and you could not be liable under section 15 of the Pharmacy Act. But we cannot see that any advantage would be gained by thus giving yourself double trouble.

T. W. P.—Two formulæ for glycerine jelly were given in our Notes and Queries of last December, and two recipes for teething powders were given in the same column, April, 1874.

Libitum.—A registered chemist and druggist may be, legally, the proprietor of two or twenty shops, if he so please; and he is not required, according to the present state of the law, to employ a registered assistant at any one of them. Of course the law recognises the proprietor as the responsible party for the transactions of any of his shops.

Student.—You can probably improve the polish of your marble slab by rubbing it first with rotten-stone and water, and afterwards with putty-powder and water.

M. S.—We do not see very clearly the use of a "mill" in making Sheep Dipping Composition, but if a paint mill would be of any use to you, refer to Mr. Cranston's advertisement in our Diary. Jars might be bought from any earthenware dealer, or in very large quantities from Doulton, of Lambeth.

Plato evidently has the soul of a philosopher, for he inquires into first principles. He asks "Why it is a phial (say 3iss. long) empty, but corked, with an ordinary slip label attached, floating in water, the label is uppermost?" The slip label referred to, we presume, is made of paper; the phial of glass. Now the former substance is of less specific gravity than is the latter; consequently, attached to one side of the phial, that side is of less

specific gravity than its opposite. We might, therefore, anticipate the result which Plato has observed. This, we are aware, is only a proximate cause; the law of gravity itself is a little beyond us. A second question is, briefly, why opium sliced, if burned in process of drying, turns black? The answer is for exactly the same reason that other vegetable matter, wood for instance, turns black under similar circumstances. The other constituents are driven off, and carbon only remains.

Shellac.—French polish can be made by dissolving about 6 ozs. of pale shellac in 1 pint of wood naphtha or methylated spirit. Generally, however, for 1 oz. of the shellac is substituted 1 oz. of mastic or sandarac, with the object of making the polish tougher. If a red polish is required, the spirit should be coloured by steeping in it some red sanders previous to dissolving the gums. The addition of 2 ozs. copal varnish and 4 ozs. linseed oil is generally considered an improvement. As a "first-class" perfume for hair oil, we fancy otto of roses has no rival—3ss. to the pint, or a little more. The best additions to otto of rose are bergamot, geranium, cassia (in very small quantity), and lemon (to be used moderately). We suggest the following:—

Otto, 5ss.
Oil Rose geranium, 3ss.
Oil Bergamot, 3ij.
Oil Cassia, ℥x.
Oil Lemon, 3ij.

Sufficient for 3 pints of oil, which, we need hardly add, should be perfectly pure.

S. H. wants "the best and recentest work on Domestic Medicine, and the price."

Removing Glass Letters from Glass.—In reply to "Iota," February 15, if he has not obtained the desired information, *W. L. B.* informs him on a former occasion he wished to know how to remove letters from plate-glass: he wrote to the makers, who advised him to apply a warm iron to the letter, then insert a thin knife between it and the glass. *W. L. B.* thinks there would be less danger of injury to both in gradually increasing the temperature by sponging with warm water, the adhesive matter, being a solution of indiarubber, would soon yield.

J. Wild.—Thanks. The subject of your note is referred to on another page.

H. A. C. writes:—"I had the following prescription to dispense, and the result was a turbid mixture. The chemist who dispensed it before sent a clear mixture not requiring to be shaken; can you enlighten me on the matter, as I have tried to mix it several ways?

℞. Acid. Nit.-Mur. dil., 3ij.
Tr. Laricis, 3iij.
Oxym. Scillæ, 3iij.
Aquæ, ad. 3ij."

Larch bark contains a considerable proportion of a compound of calcium with an organic acid, which is probably of a resinous nature, a resinate of calcium in fact. This is much more solnble in spirit than it is in water, if it be at all soln ble in the latter, so that when the tincture is diluted a separation of the compound takes place which causes the mixture to have an opalescent appearance. The resinous acid is much less soluble in the diluted tincture and in water than the compound is, so that if the calcium be removed from the compound by addition of a strong acid (nitro-muriatic or acetic as in the above prescription) a very evident separation of the resin at once occurs, and the result is, the turbid mixture which has puzzled our correspondent. The chemist who sent it out before must have resorted to filtration to get the mixture clear.

The same correspondent wishes to prepare an ammoniacal solution of quinia by using the sulphate, liq. ammoniæ, British Pharmacopœia, and water, and declares his want of success. Liq. ammoniæ will dissolve only a limited proportion of quinia, and in his attempt this proportion must have been exceeded. We do not know of any aqueous and ammoniacal solution of quinia used in pharmacy, and presume there must be objections to the use of such a solution; one containing spirit and ammonia is not uncommon. The following is the formula usually employed:—

Quiniæ Sulphas, 1.
Liq. Ammoniæ, 10.
Sp. Vini Tenuior, 50.

Animal.—You will find what you want in the *Veterinary Journal*, published by Baillière, Tyndal & Cox; or the *Veterinarian*, published by Adlard, of St. Bartholomew's Close.

Alpha.—Non-poisonous sheep-dipping composition. Perhaps the following may meet your want—

Common size	1 ounce	Melted together
Soft soap	1 „	
Glycerine	1 fluid ounce	
Carbolic acid	1 „ „	

To make a wash, dissolve one pound in two quarts of boiling water, and then add two gallons of cold water.

Argus asks for our opinion of the two following prescriptions, which he frequently has to dispense, and which are said to be used with good effect. They are by eminent prescribers:—

℞. Iod. Potassii, 3ij.
Tinct. Digital., 3ss.
Tinct. Mur. Ferri *ad*, 3ij.

20 drops, 3 times a day, in a glass of water—used in heart disease.

℞. Syr. Iodid. Ferri, 3vi.
Spt. Ether Nitrosi, 3iss.

Dose: a teaspoonful twice a day in water.

These are both in extensive use in Continental practice, and are admirably adapted to fulfil the design of the prescriber. In the first iron is introduced, not only to liberate a certain amount of iodine, but to counteract the otherwise depressing influence of the digitalis. Bromide of potassium has of late been supposed to be preferable to the iodine salt, but this is not admitted by either German or French physicians. Bromine would then be set free. A modification of the second recipe is official in the Berlin Pharmacopœia, under the popular name of liquor anodynus martiatus. In the treatment of heart disease, the first recipe has been found singularly efficacious.

Ginseng.—Monobromide of camphor is an antispasmodic and hypnotic, and has been used largely by some of the chief Paris doctors. It is insoluble in water, but soluble in alcohol, ether, fixed and volatile oils, &c. It has been given in doses of from 20 to 80 centigrammes, but it should not be administered by anyone not familiar with its action. See references to it in this journal, November, 1874, and January, 1875.

A Subscriber.—We cannot answer your first question for certain, but we presume, when a gentleman says he has a patent for a certain product, that statement is true. If he has in this case, of course you may not follow his process, nor in any case may you colourably imitate his labels. But the mere title in this instance is such as, we think, could not be protected. If you will tell us more definitely what you want to know, we will try to inform you better. (2) The sale of East Indian arrowroot as a substitute for West Indian would be, we should judge, an adulteration; but there can be no possible objection to selling it under its own name. Hanbury says that the samples he has seen offered in the London drug sales as East Indian arrowroot are not a Curcuma starch, as generally supposed, but Maranta.

Nemo.—We gave an excellent form for "milk of roses" last October. W suppose you have tried that and do not find it inseparable; but this, we must remark, depends on the skill and the patience of the operator. We give another formula:=

Blanched Almonds, 2 ozs.
Rose Water, ½ pint.
Make an emulsion and strain.
Melt curd soap shaved, ½ oz.
Spermaceti, ¼ oz.
Almond Oil, ½ oz.

Pour this into a *warm* marble mortar and stir, well adding the emulsion little by little. This should also be warm. A perfectly homogeneous liquid should be obtained. To this should be added:—

Alcohol, 3½ oz.
Otto, ℥vj.
Bergamot, 3j.
Tinct. Musk, ℥xv.
Tinct. Benzoin Sx., 3j.

Malt.—So far as we know "spruce beer" is only made by fermentation. Half a pint of essence of spruce, with spices, hops, or whatever is required for flavouring, is boiled in two gallons of water for ten minutes, and then added to 12 gallons of warm water, in which 12 lbs. of moist sugar are dissolved. A pint of yeast is added, and the whole fermented for a day and night. Treacle is used sometimes instead of sugar. We cannot say whether this is ever called "black beer," but we should think the latter means porter.

Lead Poisoning.—It is said that as a precaution against lead poisoning the interior surface of lead pipes may be treated with a solution of sulphur in caustic potash or soda; the solution is to be applied boiling hot, and left in the pipes for about a quarter of an hour. As sulphuret of lead is insoluble in rain or spring water it forms a safe coating. A strong proof of this is, that spring or well water percolating through mines of sulphuret of lead never contains traces of the latter metal. When water contains lead, it may, according to Dr. Kirsting, be removed by filtration, but only when the filter consists of fresh charcoal.

CORRESPONDENTS will please observe that the Editor cannot undertake to send private replies to the class of queries which are answered in this page. He will be much obliged if readers will communicate items for this department as well as draw from it. All communications should give (in confidence) the name and address of the writer, though any *nom de plume* may be adopted. No query can be attended to in the current month which reaches this office after the 10th.