PSYCHOLOGY

AN ACCOUNT OF
THE PRINCIPAL MENTAL PHENOMENA,
WITH NUMEROUS EXAMPLES

An Exposition in Popular Form, Designed for the Use of Students and of Readers in General

BY

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"On earth there is nothing great but man,
In man there is nothing great but mind."
—FAVORINUS.

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THE AUTHOR TO HIS NIECE
MABEL ELIZABETH COOK

PREFACE

Billions of human beings must have lived and died on this earth, yet in a sense the mind of every one of them was what the mind of any of us is. Knowledge of this sameness of mind is psychology.

Every human mind has sensations through the nerves, perceives things, dreams, remembers matters or forgets them, imagines impossible existences, conceives general notions, exercises judgment, reasons, systematizes, makes inventions, puts forth volitions, is subject to desires, affections, and emotions, has some purpose for living, and is connected with the past of the universe.

The question arises, in what way can this great theme best be set forth? the answer to which is that, for all purposes, no such way exists. There can be no final presentation of the subject of psychology, just as there can be no final translation of Homer. One presentation will be useful for one purpose, another for another. No account of the mind has been without its merits.

The design of the present attempt is to treat of the mind by means of examples, to show the great importance of the several aspects of mind from bodies of fact, it being hoped in this way to secure both clearness and point.

A great advantage of proceeding by examples is that the student is always able to follow up a case with examples which he may himself discover. The way is opened up for investigation; psychology is made teachable. It will be found, indeed, that every aspect of the mind has a world of facts of which it is the indwelling principle.

The endeavor is also here made to present the several topics of psychology systematically, so that the learner may the more readily acquire and retain the substance of what is stated.

The method of treatment here attempted, it is believed, will be especially useful not only to those just entering on the study of the mind, but also to those who wish to gather up their knowledge of the subject into one view. It should be useful to pupil and teacher, to clergyman and layman.

Any errors in citing examples which may have been made will easily be corrected, analogous examples being found, since the examples are always cited with the principle in view.

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CHAPTER I

SENSATION

It is a curious fact that we exist on this earth as part mind and part body, a fact not sufficiently taken into account. More curious still, the body is a machine of the mind by means of which the mind has sensations. What, then, are sensations? Nervous tinglings in the mind whereby it has intimations of things.

Sensations, according to the old division of them—which, indeed, for our purposes is accurate enough—are of five kinds, originated as they are from the skin and muscles, from the tongue, from the nose, from the ears, and from the eyes.

To take the first case, the brain, which is somehow the organ of the mind, is connected by the nerves with the skin and muscles, so that what affects the skin and muscles affects the mind also. What is more, the skin and muscles, taken by themselves, give rise to three kinds of sensations, namely, those of pain, those of heat, and those of resistance or pressure.

It seems strange, no doubt, to say that pain is in the mind, even bodily pain, yet such is the case. For, put your hand hurriedly into a brier-bush and you have a feeling of which you are deeply conscious, it being, therefore, in the mind.

We should have no feeling of pain in the body, however, but for the nerves, as indeed an example shows. It is known, for instance, that a mixture of salt and pounded ice, if applied for a time to the flesh, say of the arm, has the effect to render it almost insensible to pain, it being possible then to sear the flesh with a hot iron without creating any great pain. This mixture has the effect, indeed, to lessen the rapidity with which the blood circulates, whence we learn that we feel pain in the skin or muscles, only provided the circulation of the blood be up to a certain degree, strange as it may seem that the mind should be influenced by the swiftness of the blood.

We should not feel heat either were the nerves of the skin and muscles inactive. We have an example in the case of a scar. For where there is a scar, no matter how large it may be, there is no feeling of heat or cold, the nerves of heat having been destroyed. A negro having learned this fact, we are told, desired that he might have a horse, scar all over, as he did not wish to provide a stable for his horse in winter.

Neither should we feel the resistance of objects to the skin and muscles were it not for the nerves. Suppose the nerves of the skin do not do their duty. The patient is not able with his hands alone to distinguish an onion from an apple, not feeling the roughness or smoothness of things by means of the skin as we do. Suppose the nerves of the muscles do not do their duty. The patient does not know in the night-time where his limbs are, can, in fact, convince himself that he has limbs only by making a search for them, being unable to tell whether the muscles of them relax and contract or not.

Touch is a general term, sometimes used to designate the three feelings which have been considered, feeling of pain, feeling of heat, and feeling of resistance, it being understood, of course, that feelings the opposite of these are included in the designations.

The organ of giddiness, as it is called, is perhaps also a case of touch, for the semi-circular canals of the ear are supposed to be such an organ, a sort of spirit-level in the head, so to say, enabling us to keep our balance when we walk, the fluid in the canals, it being supposed, affecting the nerves in certain ways as we change position. Fishes are thought to know their position in the water by means of this organ. Deaf persons, it is said, —many of them at least—are not subject to dizziness as we are, the spirit-level in their heads having gotten out of order. They have the advantage, doubtless, that they are never sea-sick.

We have next to take into account that sensations of taste are dependent on the nerves.

This is proved in the first place by the action of drugs. In Africa and other parts of the world grows a vine, called gymnema, the leaves of which, if chewed, have the effect that for a certain time afterward sugar does not taste sweet. Were the nerves of the tongue continually in the condition gymnema puts them in, the whole business of the confectioner, as well as that of the sugar refiners, would be at an end. Gymnema also, whether in the form of the plant or in the form of the drug, makes quinine taste as chalk, not an unmixed evil, indeed.

Quinine taken in sweetened coffee, moreover, does not taste as bitter as it otherwise would, the coffee having some peculiar effect on the tongue.

A form of cocaine, known as hydrochlorate, exercises such a power over the nerves of the tongue that nothing whatsoever for a time tastes bitter. One relates that in his boyhood he tasted aloes in the evening and could still taste it in the morning. If, however, previously to his tasting it, he had put into his mouth hydrochlorate of cocaine, he would not have had this experience.

Diseases of various kinds show the dependence of taste on nervous conditions. Jaundice, for example, has the effect to produce a bitter taste in the mouth; diabetes, a sweetish one. Certain people in Georgia are known as clay-eaters, for, owing to an abnormal condition of their bodies, they eat earthy matter with a relish. And persons suffering from certain maladies are known to crave for ashes and even for slate-pencils to eat.

Different parts of the tongue are appropriated to different uses, this again showing the necessity of the nerves to taste. It seems that in general the tip of the tongue is more sensitive to what is sweet, the back of the tongue to what is bitter. Darwinians say we can easily tell what our ancestors ate ages ago, those nuts, fruits, roots, and the like, which are sweet or sweetish to the taste. Primeval animals, they say, selected their food by means of the tongue. Whatever was pungent or acidulous they rejected. Other things taken into the mouth were thrown out if bitter, most bitter things being harmful, strychnine, for instance. We, of a truth, with our vast quantities of sugar and sweetmeats, live in what was to primeval man the sweet by-and-by.

The dependence of taste on the nerves is farther exemplified in that the tongues of persons differ. One person, for example, tastes sweet better with one part of the tongue, and another person with another part of the tongue.

Moreover, the fact that it takes time to taste anything proves that the nerves are indispensable to taste. The effect of quinine on the tongue, for example, was found in a certain experiment to require 2,196 ten thousandths of a second to travel from the tongue to the brain, that of sugar only 1,639 ten thousandths of a second, the sweet effect travelling faster than the bitter.

The delicacy of taste is still another thing which demonstrates that we have to have nerves to taste things. For example, a smaller portion of quinine than of sugar can be tasted with the tongue, the nerves of it being more sensitive for the one than for the other. Should we take three hundred and ninety thousand parts of water with which to mix one part of quinine, a man could yet taste the quinine in each and every portion of the mixture. Sugar, on the contrary, a man cannot taste in such small, though yet in very small, quantities. In order that he may taste it in each and every part of the mixture we cannot take more than one hundred and ninety-nine thousand parts of water to put with one of sugar, that is to say, if there were two hundred thousand parts of water a man could not taste the sugar. But women can taste smaller quantities of things than men can taste, the nerves of their tongues being somehow different from those of men. When four hundred and fifty-six thousand parts of water are mixed with one of quinine, women can still taste bitter in each and every part of the entire mixture. Sweet they can so taste when two hundred and four thousand parts of water are mixed with one of sugar.

Thirdly, it is by means of the nerves—namely, those of the nose—that we smell things.

Nothing can be smelled at all unless it is capable of affecting the nose in certain definite ways. Hydrogen, for example, is one of those things which nobody ever smells, the reason which some assign for this being that its particles vibrate so extraordinarily fast that they do not have time to be smelled. A particle of hydrogen, it is said, vibrates forty-four hundred thousand billion times a second, to do which, it would seem, it must in a second move through a distance many times that around the earth, another instance in which truth may be stranger than fiction.

An example of how the nerves are affected in definite ways to produce particular smells is furnished by arsenic and sulphur, the bad smell of so many things being due, as is supposed, to the presence of one or the other of these ingredients. For instance, green paper when burning has a disagreeable odor on account of the arsenic in it, and sulphuretted hydrogen, one of the worst smelling things in the world, gets its odor from sulphur.

The fact that the sense of smell can be dulled by applying to the nose certain drugs shows likewise the part the nerves play in smell. We have the case of men, for example, who being obliged to work amid the intolerable odors of a soap factory were able to do so by using as snuff a certain mixture of sugar and morphine, this having the effect to paralyze temporarily the nasal nerves.

It is said, also, that a man who snuffed this preparation made a good living by showing, for a price, how he could smell of a bottle of which nobody else could sniff; but one day he had, by mistake, used strychnine instead of morphine, thus forming a mixture which increases the power of smell. He snuffed this, and, uncorking his bottle, brought it close to his nose, his failure then being most ludicrous.

Certain diseases of the nose render smelling impossible, a thing which could not be were smell not dependent on the nerves. A Dutchman, the nerves of whose nose were totally paralyzed, was entrusted to take two small boys from one place to another, not knowing their language, nor they his. Coming into the vicinity of a slaughter-house, which was concealed from view by trees and shrubbery, he was surprised to observe that the boys manifested great uneasiness and unwillingness to proceed—he had, as a matter of fact, to drive them past the place with a stick. Presently, however, arriving at a place where was a flower garden hidden from sight by a wall, he was puzzled to know why the boys were pleased with it and manifested a desire to linger there.

The dependence of smell on the nerves is also exemplified in animals which do not have these nerves. Most whales, for example, have no nerves of smell. If one of this kind, therefore, were approaching the island of Ceylon, he could not be apprised of the fact; he could not smell the spice-laden breezes as the sailors smell them. A whale of this kind could have swum up Chicago River when it was in its most filthy condition, previous to the opening of the Drainage Canal, without experiencing the least annoyance, what to us must seem miraculous.

What has been said has special importance owing to the use of smell. Dogs, as we know, live in a world of smells, so to say, and are serviceable chiefly on that account, as an example will show. Some convicts had escaped one night from the jail of a country town, but, greatly to their misfortune, it so happened that a showman had been the same night in the town with several bloodhounds. The dogs, taken to the jail by the officers, smelled about, and, finding the trail, overtook the convicts before dawn. The scented air rising from the tracks of the men had some peculiar effect on the nerves of the dogs' noses, causing in the minds of the dogs certain sensations which were to the dogs signs that the tracks were those of the men who had been in the jail. Without these sensations the dogs could not have tracked the men. We read that Bruce, the Scottish Chieftain, being pursued by bloodhounds, eluded them. For, reaching a brook in advance of the dogs, he waded a distance in the water, and then got up into a tree by means of an overhanging limb. The dogs coming to the brook were unable to follow him, the tracks, so to say, having been washed down stream.

Romanes made an experiment of importance. Eleven men walked behind him, each stepping in his tracks. His dog was afterward put upon the trail and succeeded in finding him, being able to smell out his master's tracks under the eleven others.

We have the instance of a dog which walked nearly a thousand miles to get back to the place from which it had been taken, an event so notable that a monument was erected to the dog.

Turtles, going good distances through the sea, find Ascension Island, there to deposit their eggs, a place which sailors themselves cannot find without calculating its latitude and longitude.

It has, indeed, been objected to the theory that animals are guided by smell in finding their way that they do not always go the same route, do not, for example, always return home by precisely the same route as was followed when they were taken from home; but this is nothing to the point. For, on similar grounds, it could be proved that we make no use of sight in finding our way home, since we often return to our home some other way than we came from it.

Working ants, it is said, do not carry on business on the basis of sight at all, not being able to see very much, but carry on business on the basis of smell altogether.

It is a mistake to suppose that men even are not assisted by smell. A certain blind man, we are told, could by smell alone tell if cats were in the house, notwithstanding the fact that several doors intervened between him and them. A blind man, named Mitchell, knew by smell, it is asserted, what were the characters of men, whether, for example, one was a rogue, a miser, or what not. But why do we speak of this when there is Jaeger? This eminent man, a designer of woolen clothes, claims to have proved that every nation, kindred, tribe, family, and individual may be known by the smell, thinks that even the secret of heredity can be gotten at by it, the soul itself discovered.

It is strange, for a fact, how small a thing can be recognized by smell. If the third part of an ounce of musk be divided into a thousand parts, and each of these into another thousand, and finally the last parts into a hundred each, we can yet smell these smallest parts, any one of them by itself. A piece of musk will scent a room for years without any perceptible loss of weight, though it would seem that some of that musk must be in every part of the room continually, to say nothing of what is wafted away.

Smell has importance even as related to cookery, what we call tasting things being for the most part smelling them. For example, if a blind man were to hold his nose he could not from the taste alone tell whether he were eating beef, mutton, or pork. A man blindfolded and his nose held cannot tell by tasting them a slice of onion from a slice of apple as one after the other is laid on his tongue. At the table it is not the flavors of things that delight us, but their smell, for, as we have said, we taste nothing but sour and salt, bitter and sweet.

Not only the food itself, but the accompaniments of the feast, were made to minister to smell by the ancients. Athenæus relates that, at the banquet he has described, the dishes had been made by baking perfumed clay with aromatic woods as fuel. Other cases of the ornamental uses of odors were found in the Roman theatres, the air of which was perfumed. Incense in houses of worship was another instance. Somebody proposes that we have galleries of smells, just as we have galleries of pictures. The Japanese actually do have a game of smells, this possibly taking the place of billiards with us, the game consisting in the matching of smells, a hundred and twenty being in common use.

Fourthly, the hearing of sounds takes place by means of nerves, the nerves pertaining to the ears. For, except on the supposition that certain other persons' ears differ from ours in their nervous make-up, how shall we account for the fact that they can hear notes an octave higher than any which we can hear? Birds, it is believed, can hear the crawling of worms in the earth, and are thus enabled to find them. For all we know to the contrary, insects may be able to hear the growth of the grass, the ascent of sap in trees.

Defects of hearing teach us the same thing. For there was once, as is known, a man by the name of Cowles who could hear most things as well as any of us can hear them, but who could not in the least hear the sibilant sound in words which we represent by the letter s, whence, in speaking, he did not utter this sound at all. What was stranger still, he did not hear the songs of birds. Putting his ear close to a cage in which canaries were warbling, he could not catch the slightest sound. He was about twenty-five years of age when he made this discovery, and up to that time, whenever he heard anybody speak of the songs of birds or read about any such thing, he supposed that the language was figurative; he had no idea that it described a reality. Birds, he supposed, were mute. He could not hear a fife or a piano, and must have thought that persons playing these instruments were merely taking gymnastic exercise.

It only remains now to show how sight, like the other senses, depends on the nerves.

To do this we have, in the first instance, to mention the effects of santonine on the nerves of the eyes. It so happened, it is said, that a boy who was accustomed to see the stars and stripes floating from the school-house near where he lived, one day saw that the flag was yellow; but when speaking to his mother about the matter, she assured him that the flag was just the same as it had always been. The truth is the boy had been given a dose of santonine for a vermifuge, this drug having the effect, by its action on the nerves of the eyes, to make things look yellow. What better example, then, could we have to show that knowledge gained by the eyes depends on the state of the nerves, not merely in general, but in particular?

Another example, however, may make the matter plainer—the fact that some persons cannot tell black from scarlet, the nerves of their eyes somehow differing from ours. Wilson, indeed, tells of an undertaker who covered a coffin with scarlet cloth, thinking it black. We have also the ludicrous example of an old bachelor, who lived alone by himself, on whom his friends played a practical joke. In collusion with the tailor they caused to have made for him a scarlet suit instead of the black one which he had ordered. He, not perceiving any difference between the two colors, appeared next Sunday at church in this gay attire, much to the merriment of the people. Moreover, Quakers, it is said, were often imposed on in this way. They had scruples against exhibiting themselves in showy gowns on festive occasions, but were given scarlet instead of black ones, without their knowing the difference, they being persons, of course, whom their friends knew to be unable to distinguish red from black.

Again, an orange, which to us appears yellowish, it is said, appears whitish to one who has taken a certain preparation of cocaine in a certain dose. Moreover, it has often been asserted that there are persons who cannot tell gold from silver coins, if the coins are of the same size, and it has been inferred consequently that what is yellowish to us they see as if it were whitish. Such a person, it is presumed, would also see an orange as whitish. To some, too, an orange looks blackish, they seeing no colors as we do, but merely lights and shades, things appearing to them as they do to us in engravings. Huddart, more than one hundred and fifty years ago, wrote of a man who was unable to distinguish an orange from an apple except by its shape. If, then, all those who see oranges different should ever get together, what a bedlam there would be! For some of them would maintain that oranges are white, others that they are black, we ourselves that they are yellow.

Still another class of cases may be mentioned as showing the dependence of sight on the nervous constitution. Many persons, owing to the nature of the nerves of their eyes, cannot distinguish between red and green; the color of the red stripes of an American flag, for instance, they cannot distinguish from the color of the Irish flag. Dalton, when a boy, hearing some bystanders remark on the beauty of the uniforms of British troops, these uniforms, as most of us are aware, being red, innocently enough asked those persons wherein the color of the clothes differed from that of the grass. Like many other people, he could not tell ripened cherries from the leaves on the trees unless he were near them, the nerves of his eyes differing from ours.

Many persons can see no difference between a red and a green light, the consequence being that they make sad mistakes. Two ships, for example came into collision off the coast of Virginia owing to the fact that the pilot of one of them could not distinguish a red from a green signal, the result being that ten lives were lost.

Strange to say, this state of the nerves is sometimes induced by the excessive use of tobacco. The tobacco of a certain pilot, for example, is known to have entailed on humanity a cost of two hundred thousand dollars, since, because of its use, he wrecked a rich cargo in the harbor of Fernandina, not being able to perceive any difference between red and green.

Having now considered the several senses in detail, we are in a condition to take up the nervous system as a whole.

The mind of each of us has as its organ a brain, and from the base of this brain extends what is called the medulla oblongata to the spinal cord. The medulla oblongata, which may be described either as the lower part of the brain or as the upper part of the spinal cord, has been held to be a centre of nervous action. The nerves of the skin and muscles are connected with it by the spinal cord, the nerves of the nose and eyes are connected with it by the brain, and the nerves of the tongue and ears go directly into it. The medulla oblongata, therefore, it is thought, is a general centre, the capital of the nervous system, as it were. That this is so was argued from the fact that both the brain and the spinal cord of an animal might be removed and the animal still live, while the removal or injury of the medulla oblongata was fatal. For example, a rat whose brain had been taken out, would yet make jumps to escape whenever noises were made resembling the mewings of a cat. Moreover, a frog whose brain was removed brushed off with its foot acid which had been put on its body. It seemed, indeed, as if there were a mind or minds in its medulla oblongata looking after things. Again, the lancet, a fish very low in the scale of existence, manages to get along very well, though it has no brain at all, possibly using some sort of medulla oblongata.

The brain proper, however, we are led to believe, performs a higher function for the mind than the medulla oblongata, being, as is supposed, the more immediate organ of the mind.

The human head is a world in itself, having the form of an ellipsoid, about six inches in latitude and eight in longitude, twenty-five inches or more in circumference. Its importance, however, lies not in its size, but in its use, it having all the organs of sense, even skin and muscles.

If we might conceive of a man whose head actually, and not in his own estimation, was as large as the earth, twenty-five thousand miles in circumference, yet would such a man have not a whit of advantage over us, for we can pass through time with a small quite as well as with a big head, just as we can cross a river in a small boat quite as well as in a large one, to use an illustration from Horace.

By what means impressions made by things on the ends of the nerves are transmitted to the brain we may not be able to say, though we can easily enough conceive how it is possible. For if the nerves consist of particles standing one next after another, the influence exerted on the first may be transferred to the next, and so on till the influence reaches the brain and finally the mind. To use a crude example, applicable in some respects, though not in others, we may instance a series of cog-wheels. When the wheel at one end is turned, it turns correspondingly the wheel at the other end, and this notwithstanding the length of the series. Moreover, we have the example of electricity, how it conveys messages. On this analogy, the nerves might be considered as the wires of the animal body.

At any rate, whenever impressions are made by things on the skin, muscles, tongue, nose, ears, or eyes, we have corresponding to such impressions certain sensations in the mind.

These sensations are not shadows of objects or anything of the sort, but are merely signs, intimations of things. When we feel a stick, for example, with the hand, the sensation in the mind is not an image of the stick, but the mind forms the image of the stick by using the sensations as clues. The forming of the image of the stick by the mind, indeed, is perception, and not sensation at all.

We come now to the most important consideration of all, that the nerves are necessary to our getting any specific knowledge of things. Indeed, this must hold without exception, unless the mind is possessed of something like a clairvoyant power, independent of the nerves, by means of which it may know things.

Oysters know very little as it is. What would they know without some means of sensation?

Plain enough it is that a person who should be born blind, deaf, and without touch, taste, or smell, could never know anything specifically of things as we know it; could have, in short, no experience of things as pleasant, or painful, warm or cold, resistant or yielding, salt, sour, bitter or sweet, fragrant or fetid, noisy or musical, shadowy or tinted.

Of such a person it could be said that he would sleep as comfortably on a stack of thistles as on a couch of down, and would be no colder in January than in June. If he ran his head against a stone wall he would not know it. He would eat the sourest apples without complaint and walk undisturbed in the midst of stench. He would not be stunned by the explosion of a powder-mill. Midnight and noontide would be the same to him.

It is plain, also, that he would have none of that knowledge which we ourselves, or others from whom we have learned it, have deduced from knowledge acquired by the senses, not, indeed, unless, as was said, he were possessed of something like a clairvoyant power, and one, too, not dependent on nerves.

He could know nothing of geography. He could not know that the Caspian Sea is the northern end of the Indian Ocean or that the Antarctic is the southern end of it. He could not know that Lake Genesaret is below the surface of the sea or that Lake Titicacca is above it. He could not know that of all rivers on the earth the Amazon is the largest and longest, or that the Jordan is well-nigh the smallest and shortest. He could not know that Java rests in eternal calm or Greenland in eternal snow. He could not know that the Himalaya Mountains are the highest in the world or that the Ozark are among the lowest. He could not know that in Kentucky is a country under ground or that in Africa are countries in the midst of deserts.

He could know nothing of astronomy. He could not know anything of high or of low tide, anything of new or of full moon. He could not know that the earth is round or be able to believe that it is flat. He could not know that there are seas on Mars or rings around Saturn.

He could know nothing of botany. He could not know anything of trees or shrubs, anything of grasses or grains, anything of cabbages or cucumbers, anything of weeds or flowers. He could not know what plants belong to the same family. He could not know that there is a plant the leaves of which, if they poison us, the fruit thereof will cure us.

He could know nothing of zoölogy. He could not know anything of horses, cattle, dogs, or cats, anything of snakes, lizards, or toads. No feeling of wonder could he have over the duck-mole, no comparison of size institute between elephant and mouse. He could have no more idea of the Darwinian than of the apostolic succession.

He could know nothing of history. He could not know anything of the kitchen-middeners or of the mound-builders. He could not know whether the Egyptians lived before or after the Romans, whether or not there were any Egyptians. He could not know that it now counts more for Marcus Aurelius that he wrote his meditations than it does that he was Emperor of Rome.

He could know nothing of morals. He could not know that honesty is the best policy. Of good or bad manners he could have no notion, whether, for example, it is better to eat with a knife than with a fork.

He could know nothing of jurisprudence. He could not know anything of immemorial usage or of the rules of evidence. He could not know that the Romans were, as Draper says, the first people to discover that next to the privilege of making the laws is the privilege of saying what the laws mean.

He could know nothing of politics. Of constitutions and governments he could not know anything, could be neither a royalist nor a republican, neither a centrist nor a rightist, neither a single nor a double taxer.

He could know nothing of art. He could not know that the Parthenon is the best of buildings, the Jupiter the best of statues, the Madonna the best of pictures, the Messiah the best of oratorios, the Iliad the best of epics, the Hamlet the best of tragedies, the De Corona the best of speeches.

He could know nothing of theology. He could neither believe that there is but one God nor that gods be many. He could be neither a Catholic nor a Protestant, neither a supralapsarian nor a sublapsarian. He could have no opinion as to whether the Holy Ghost proceeds from the Father only or from the Son also.

The world itself could not contain the books which should enumerate and describe the things whereof he could have no knowledge. For of things specifically it is plain he could know nothing at all. Should we concede, as indeed we may, that he might have innate ideas, manifest or latent, yet plainly these without experience would be empty.

All this, it seems, follows, as was said, unless we might suppose that he could get some faculty of clairvoyance independent of nerves.

Taking things as we know them, it would appear that we got ourselves born merely for the purpose of arriving at a specific knowledge of things, seeing that getting one's self born is the same thing as getting a nervous system.

If our bodies were made up of nothing but the nerves of sense, this contention would be at once manifest, for the reason that the nerves of sense have no other use than to give us clues whereby we are able to know what is specifically true of things. Come to think of it, however, our bodies, in principle, do consist of nothing but the nerves of sense, strange as this may seem. "What then?" you will be ready to ask. "Are not the stomach, heart, and lungs, with their accessories, a part of the body?" Doubtless they are, but they are nothing but an adjunct of the nerves of sense, a device merely to adapt the nerves of sense to a world of time. Everything is in eternal motion. The only way that the nervous system can exist, then, is that it be built up as it is torn down. The stomach, heart, and lungs, together with their accessories, are nothing but a device for dragging the nervous system through time. "What then?" you will be ready to ask. "Are not the bones, muscles, and motors, with their accessories, a part of the body?" Doubtless they are, but then they are nothing but an adjunct of the nerves of sense, a device to adapt the nerves of sense to a world of space. Everything is in a different place than everything else. The only way, then, that the nervous system can exist is through locomotion. The bones, muscles, and motors, with their accessories, are nothing but a device for dragging the nervous system through space. Our bodies consist of nothing but the nerves of sense, with an arrangement on the one hand by which we get from moment to moment, and an arrangement on the other by which we get from place to place. Nothing else was possible, since matter acts under the forms of time and space.

It is, therefore, a great joke, and one showing to the best effect the irony of nature, that whereas the clown consciously or unconsciously despises knowledge, disallowing alike both science and classics, his bodily constitution should nevertheless demonstrate that but to get knowledge he would never have been born.

"But is it not," you will probably ask, "the chief end of man to glorify God and enjoy him forever?" Doubtless it is, but how to do this, that is the question. Really to get knowledge is just the way to do it. For by knowledge we come to understand the truth of things, the laws of nature. Should it be asked, What, then, if we do? it is possible to say. We have communion with God only through the truth, the truth of things alone expressing what the will of God is. For example, by the diseases and death which poisons produce we know it to be the will of God that we should not take them into our bodies. What is true of poisons in this respect is true of everything else. We come to what the will of God is respecting anything only through the truth. We do his will in fact only as we know what it is. Nay, perfectly knowing what his will is, shall we not surely do it? Presumably, seeing that otherwise we should put the unreasonable for the reasonable. Coming, then, into unison with the will of God through our knowledge of things, we do glorify him and, not only so, we do also enjoy him, and that always, our religious emotions, it is plain, arising out of our view of the truth of things taken as a whole. Rising, then, to the true, the beautiful, and the good through the knowledge which our nerves make possible, we fulfil our mission.

We must, therefore, conclude that everybody who has been born into the world came to take on flesh and blood solely for the purpose of becoming informed about things; for that purpose, indeed, left his former state, whatever it might have been, whether one of existence or of non-existence, of joy or of sorrow, of glory or of shame. We must conclude this in fact, unless we might believe that he could have possessed himself of some clairvoyant power by which it would have been possible for him to have knowledge without nerves. We must conclude that the sorrow which fills our hearts and is expressed in tears when we gaze on the mortal remains of one untimely cut down is the sorrow which we feel that one should have been deprived at least temporarily of his means of knowledge.

The dogma of absorption, as held long since by the Hindoos, is that one should so conduct himself as at last to be absorbed into divinity, a dogma which, taken figuratively, we are bound to accept. For the truth issues from the divine will and expresses what the divine will is, so that to come into unison with this will, be absorbed into it, as it were, we have to know what the truth is. All humanity, past, present, and to come, reduces to mind obtaining knowledge through the nerves, coming thus at the truth, or, as the song has it,

> "We are traveling home to God
> In the way the fathers trod."

CHAPTER II

PERCEPTION

Of all the processes of the mind perception is at once the best and the worst understood. It is nothing but seeing, hearing, and the like. Who does not think that he knows all about it—and yet how soon must he be undeceived?

The chief interest relative to perception lies in this, that what we actually perceive of things is nothing but images in the mind, created by the mind itself, but created on suggestion of sensations.

It must be plain to anybody that we do not directly see with the eyes more than one-fifth of the kinds of properties which things manifest. Indeed, are there not four senses beside sight? We do not directly see with the eyes how things will feel, what sounds they are capable of, or how they will taste or smell—all this we calculate and image.

To take the case of how things will feel, we do not directly see with the eyes that anything is material, has rigidity, will resist touch, is impenetrable. That we do not see this is proved from what is known once to have happened in a Grecian temple. A human face, smiling and scowling, was made to appear over the place from which the smoke of incense arose, in the midst of the smoke itself, yet the attendant would surprise the spectators by passing his sword right through the face, just as if the face were nothing but air, as, indeed, it was. The trick was performed by a series of mirrors before the first of which sat a person out of sight. His likeness was reflected from this mirror to the second, and so on, till it fell at last upon a concave mirror, which had the effect to throw the likeness out over the incense. It was this likeness which the spectators mistook for a person's face, and why should they not so mistake it? For it looked exactly as a human face. Now in every case each of us does just what these spectators did. We do not see how things feel, but we judge from appearances how they feel. If we saw directly with our eyes, as some people suppose we do, how things feel, such a mistake as that which was made in the Grecian temple would be impossible. We should have to see just how things feel.

We do not directly see with our eyes that things will burn or pain us. We merely conclude that they will do so from certain signs, and hence the mistakes in this particular also which we make. We see a man stand barefooted upon what seems to us a red-hot griddle, it being heated to all appearances by the gas-jets below it. Actually, however, it is merely painted red. The gas-jets below it are turned down so far as not to heat it very much. Never, indeed, do we see with our eyes that griddles are hot. We merely guess that they are hot. Whether we are correct or not makes no difference so far as the process of perception is concerned.

We do not in any way whatsoever hear with our eyes, that is to say, we do not with our eyes directly see what sounds a body is capable of making, how a drum will sound, for example. A man comes upon the platform, holding in his hand what we take to be a cage with a canary inside it. We suppose that the bird can sing, birds with the appearance of this one usually being able to do so. We are surprised that, on a sudden, the cage and canary vanish away. What we took for a cage was only a pasteboard frame so arranged that it was easily folded up. What we took to be a canary was only a stuffed one. The frame folding up suddenly, enclosing the stuffed bird, glided unperceived down the performer's coat-sleeve. We no more see with our eyes that any other bird will sing than we saw with our eyes that this stuffed canary would sing. We merely reason out and imagine from what we see that birds can sing.

We do not see with our eyes directly how anything smells. We infer from what we see how it will smell. Seeing a bottle out of which he had once taken a disagreeable dose, a man could not be persuaded to smell of it again, though it now contained nothing but rose-water. The signs were to him that it would smell bad, that was all. He did not see how it would smell, but thought how it would smell.

We do not see with the eyes how things will taste, apples or oranges, for example. We infer this merely. Otherwise we should not be deceived, as we sometimes are, mistaking waxen apples for real ones, orange skins stuffed with cotton for oranges indeed. If a horse had green spectacles on he would doubtless think that shavings must have the taste of grass.

To sum up, then, we do not see with the eyes how a thorn will feel, how a bell will sound, how a rose will smell, how a fig will taste—all this we guess at. We do not, in other words, see how things are related to senses other than sight, but on the strength of past experience we infer how they are related to these senses.

What in any case we see is merely an image which appears to us to be where the object which it represents is situated. There is nothing material or tangible about this image, as must be evident from the fact that we see just such images in the dreams of our sleep. The tree, for example, which we see in our dream does not look in any way different from the tree which we see with our eyes. The fact is that the tree which we see with our eyes when we are awake is nothing but an image in the mind constructed by the mind itself.

This is still more evident if we take into account what are usually called our space perceptions of things, namely, thickness, shape, size, and distance.

Space has three dimensions—length, breadth, and thickness; from the first two we guess at the third, not seeing directly that things are thick, but merely thinking that they are so. Berkeley made a telling statement of this when he declared that we see only the ends of things, the ends toward us, not what is behind them. Had he thought of it, he would probably have said that to see behind the ends of things would be like seeing under the ground; we should as easily do the one thing as the other. As we can at best see but the surfaces of things, what we know of the thickness of things must be reasoned out and imagined. If, as is maintained, we do not directly see with the eyes the distance of things from us, we can, of course, not directly see with the eyes that one part of a thing is farther from us than another part of it, as indeed we should have to do were we directly to see the thickness of things. (We can anticipate a point here, it remaining to be considered whether or not we directly see with the eyes the distance of things.)

Another proof that we do not directly see the thickness of things is taken from the laws of perspective. It is known to everybody that lines can be so drawn on a flat surface that when we look at them they have to us the appearance of a solid object; what, for example, is only a disc, appearing to us as a ball. When, then, we look at an actual ball—such is the argument—what we really see, if anything, is nothing but a disc, we judging it to be globular from the positions of the lines. Pictures for the stereoscope consist of two parts, one representing the object as seen by the right, and the other the object as seen by the left eye. When we look at the picture these two views are combined in imagination to produce the view of the whole. When we see objects without the stereoscope—such is the argument—we really, then, also combine in imagination the two views, the one of the right and the other of the left eye. When the real colors of objects are shown in pictures, as, for example, in a picture of the pyramids, a view of them in the stereoscope differs hardly at all from a view of the objects. We cannot persuade ourselves that we are not looking on things having extent in the third dimension, though what we actually see is nothing more than lines and shades on a flat surface.

We do not directly see the shape of things with the eyes; this also we have to reason out and imagine. In the first place, we have to combine in imagination the several lines of direction which an object presents in order to form any idea of its shape, not seeing the combination directly, but only mediately. Seeing a ring of points marked on a black-board, for example, we are able to make out the ring only by combining in imagination those separate points. In the second place, as we do not see with the eyes the direction of lines as they are, but only as we think them to be, it is plain also from this that we see only such shapes as we ourselves conjure up and set before the imagination, shapes being made out by the directions of lines. This is proved by a notable example, namely, that if from the ground we look at statues which are on the top of a high building we see them as if they stand perpendicular. Going to the top of the building, however, we are surprised to find that these same statues actually lean backward. The statues had, in other words, to be placed slanting in order that they might appear erect. If we go to Paris and view the statue of Bonaparte which stands on the high Vendôme column, we shall notice that Bonaparte appears to lean a little backward, forward, or sideways, according to the position we are in; the statue, inasmuch as it must be seen from all sides, had to be placed perpendicular on the pedestal. The Parthenon, the temple at Athens on the Acropolis, was perfectly symmetrical in form, every line in it appearing to the eye to be exactly straight, though in fact there was not a straight line in it. If the lines had been made perfectly straight they would not have appeared so, we not seeing directions of lines as they are, but only as we think them to be.

There is, however, still another way in which we may convince ourselves that we do not directly see the shape of things. Take a card-board with two pin-holes in it, one for each eye. Through these look at a coin which you hold a few feet off. You will be surprised that the coin does not appear to be round, but oval. You, therefore, do not see the shape of the coin as it is, but only as you imagine it to be. It is, moreover, known that a stick, part of which is immersed in water, although it be straight, yet appears bent, the water refracting the rays of light at an angle differing from that at which the air refracts them. Wherefore, as the conditions under which a thing is seen modify the shape which we give it, it is plain that the shape of a thing is a matter of judgment, rather than a matter of direct sight. We have to conjure up out of the given conditions what the shape shall be.

We may, if we choose, see certain things directly opposite in shape to what they are. Looking at the outside of an actor's mask, for example, we can, if we wish, see it as the form of a face, not right side, but wrong side out. On the same principle, an image of a face in relief, say that of Benjamin Franklin, may, if we wish, appear to us the concave mould in which the image of the face might have been cast.

The size of objects is inferred and imagined by us, not directly seen with the eyes. We have, in truth, to infer and imagine the size of an object either from the distance we think it from us or from comparison of the object with other objects the size of which we think we know. We have, in short, two principal ways of estimating the size of things. An example of the first is this: It is known that statues on the top of a very high building have to be larger than natural in order to appear of proper size, the reason being that we underestimate the height of such a building. We think the statues smaller because we think them nearer us than they are. What is the same thing, making a mistake as to the distance of the objects from us, we also make a mistake as to their size.

Statues which are set up on heights are made very large, by means of which they make the greater impression on us, this having the effect to make us imagine them larger than we should otherwise take them to be. Indeed, the amount of impression which a thing produces on us might have been put down as one of the means by which we make out its size.

Of estimating the size of an object by comparison of it with objects of which we think we know the size, we have a good example from Abercrombie. Seeing men and women entering the door of St. Paul's Cathedral, he supposed that they were children. For he compared them with the door, thinking it an ordinary one, when in reality it is very large. Entering New York harbor, as one comes from a voyage at sea, he is surprised that the Statue of Liberty looks so small, the reason probably being that it bears no proper proportion to the neighboring hills. The great pyramid, it is said, looks larger than usual if a huge camel be standing at its base.

That the size of things is merely reasoned out and imagined by us, and not directly seen with the eyes, is also established by the different sizes which people attribute to the moon. The moon looks larger when near the ground than when up in the sky, the reason being that when the moon is near the ground, intervening objects, such as trees and the like, make its distance from us appear greater than when it is over us. We imagine the size of the moon, in short, from the distance we imagine it to be from us. When seen behind the mass of leaves and twigs which a tree holds the moon looks larger than usual, because we compare it with this mass, the size of which we pretty accurately know. Le Conte mentions that when the sun sets at San Francisco it appears to be broader than a certain island behind which it goes down. When the moon is up in the sky, to one person it appears no larger than a saucer, to another as large as a plate, to a third the size of a wash-tub. The explanation is that when the moon is over our heads there are no intervening objects to lengthen out the distance nor any with which we may compare the moon. Everybody has to suit himself, imagining what he will.

We do not directly see the distance of things from us, but estimate it either by means of the size we suppose things to have, or by the atmosphere, or by the intervening objects. Small distances we estimate by the amount of effort we make either to converge or to focus the eyes.

We have this incident given to illustrate estimating distance by means of the supposed size of objects. A woman, seeing on a plain a small boy playing with a little wagon, took them to be a good distance from her because she supposed that the boy was a man and that the wagon was an ordinary one—in other words, being wrong about the size, she was wrong about the distance. A better example is that of a man looking out of his window, and, seeing the spire of a dove-cote not far off, which, however, he placed at a good distance, supposing it to be a church spire, the which, if it had really been, it must have been a long distance off to look so small.

Owing to the kind of impression which objects make on us in a clear atmosphere we take them to be nearer us than they are. This is the reason why strangers arriving in Denver undertake to walk out to Pike's Peak, thinking it close at hand, when it is about seventy-five miles away. The air of Italy is likewise clear. Looking from Frascati, says Schopenhauer, Tivoli, though far off, looks to be close by. A foggy atmosphere, on the other hand, makes things look more distant than they are. Two trains approaching each other on the same track during a fog, the men who jumped from them to save their lives were surprised that the collision took place so soon after they first caught sight of the danger, the trains having been nearer together than they supposed.

It is well known that intervening objects increase to the mind the length of anything. A field through which cocks of hay extend looks longer than it does without them. A stretch of water in which ships are anchored one after another looks longer than it does when the ships have sailed away.

How we estimate a short distance by the amount of effort we make to converge the eyes is illustrated by many well-known examples. If we shut one eye and try as quickly as we can to put the stopper in the ink-stand, we shall probably make some ludicrous blunder, because we cannot converge the eyes quickly, and by the amount of effort to do so estimate the distance from the stopper to the ink-stand. For the same reason we find difficulty if, shutting one eye, we attempt quickly to thread a needle or to snuff a candle. The estimation of short distances by the amount of effort we make to focus the eyes is exemplified by holding a book at arm's length and then bringing it suddenly toward the face. We shall be made sensible of the amount of effort we make for each particular distance as the book approaches. By the amount of effort made each time we judge the distance for that time.

It is thus made out, therefore, that we do not directly see with our eyes the thickness, shape, size, and distance of things, but calculate and imagine them merely.

The time relations of things are fabricated in the mind somewhat as are the space relations. We do not, for instance, see with the eyes the passage of time, but calculate it. One who is suffering from rheumatism wonders how other persons are able to lie abed so late in the morning, the time between the first break of dawn and the rising of the household seeming intolerably long to him. To those, however, who are lying comfortably in bed this same time seems very short.

Several considerations prove that we imagine and infer the motion of things rather than directly see it with the eyes. In the first place, things may appear to move when in reality they are standing still, or may appear to stand still when in reality they are moving. This we observe when we are traveling in railroad coaches. Our own coach seems to be moving when it is the train beside ours that is in motion. The objects along the road seem to be gliding past us, when it is ourselves who are speeding away. In the second place, certain things can be made to appear to move either this way or that, just as we choose. Looking at an old-fashioned wind-mill with its sails, if we give attention to the upper part of the sails they appear to turn in one direction, if we give attention to the lower part of the sails they appear to turn in the opposite direction. In the third place, things may seem to us to move even in impossible ways. Water may appear to run uphill if the ground along the stream is descending when we think it to be level.

We do not, then, see directly with the eyes the qualities of things or their space or their time relations. We reason out and imagine what these are.

Persons born blind and brought to sight by operations for cataract have at first great difficulty in seeing things as we do, because they have had no previous experience in using reason and imagination for such a purpose. The oldest case on record is that of a boy, thirteen years of age, on whose eyes Cheselden operated. The boy was either born blind or had lost his sight so early in life as to have no recollection of having seen anything. He therefore lacked skill in applying his reason and imagination to things. First one eye was operated upon, and then, after the lapse of about a year, the other eye. On receiving the sight of the first eye it was found that he could not properly make out the qualities of things. He was surprised that pictures did not feel like the things which they represented to sight. He asked which sense it was that was lying to him, whether it were sight or whether it were touch. No doubt he would have been surprised that the countenance of a good singer might not be beautiful, as, we are told, he thought it strange that those he most loved were not prepossessing in looks. He would also have been surprised that the sweetly smelling orris-root is somewhat scraggy in appearance. He was actually surprised that things which tasted agreeable to him were not always pleasant to look upon.

Certainly we have it proved in this that we do not directly see with our eyes the rigidities of things, their sounds, their odors, and their flavors, but have to infer and imagine these qualities—otherwise the boy on coming to his sight would have been able to see them as we think we do.

As regards the thickness of things, their shape, their size, and their distance, it is interesting to know what was the experience of the boy.

He did not at first, the surgeon says, see things as having depth in space at all. Had he seen a pitcher or bowl on the table, either of them would have been to him merely a flat surface. He was unable to comprehend how pictures on flat surfaces could represent objects that to touch show thickness. He could not make out the shape of things. He could not so much as distinguish the cat from the dog. Looking at the cat, and then having felt it over with the hand, he said he thought he might know it next time. He was unable to see things of proper size. They appeared to him larger than is natural. When the second eye was brought to sight things appeared larger to it than to the eye first opened. To both eyes, used at the same time, things appeared about twice as large as when he used only the first eye made to see. He was, moreover, unable to form correct ideas of size in general. He could not conceive how the house could be larger than a room of it. He was also unable to conceive how his father's picture could be contained in a locket. He was not able properly to estimate the distance of things from him. Indeed, at first, he did not see things at a distance at all. Everything seemed to be touching his eye. When he had learned to distinguish the distance of objects on Epsom Downs he called it a new kind of seeing.

We seem, then, to have it demonstrated from the case of this boy, unfortunate though he was, but destined to everlasting mention, that the seeing of things consists merely in applying reason and imagination to the sensations given us by the nerves of the eyes; that we do not directly see with the eyes the qualities of things, their space relations, and the like.

The case of Caspar Hausar has a bearing on this subject. For although not born blind, he had been confined in a dungeon from infancy. He was found wandering on the streets of Nuremberg, having in his possession a letter that gave an account of his previous confinement and stated that the time had now arrived when it had been found practicable to set him at liberty. He declared that when he first left the dungeon all he could see was a window-shutter in front of his eyes on which various colors were flitting about. Nothing as a single distinct object could he see. The shutter which he saw was of course an image of the one on which he had gazed so long in the prison. With sufficient practice he learned, indeed, to see things as we do; but why the need of this practice? Evidently because he had to learn to exercise his reason and imagination on the sensations of sight, the act of seeing being an intellectual and not merely a physical affair.

Haslam gives an account of a boy who, though his eyes were good enough, could not see things as we do, since from feebleness of mind he did not sufficiently use his reason and imagination to interpret the sensations which his eyes gave him. He could not estimate the distance of objects with any approach to accuracy, for which reason he was known even to clutch at the moon with his hand. He, no doubt, thought it a cheese or something of the sort a few feet from his head! There is an account of a feeble-minded woman brought to sight by an operation for cataract which is much to the same purport. She was, as a general thing, not interested in anything, but there was one exception—nuts and apples. These she could easily see and would eagerly grasp after. She could, in other words, see only those things with regard to which she could be induced to exercise her reason and imagination.

We have, then, to adopt as a theory of sight this—that what we seem to see as if they be objects are really nothing but images in the mind which the mind itself creates. How, indeed, do we think this can be otherwise, when it is made out that we do not directly see with the eyes the qualities of things or their space or time relations?

Berkeley, who was the first to set forth this theory with anything like an approach to thoroughness, relied mainly for his proof of it on two points, his main argument being that from the nature of the case we can know only what is in the mind, not what is outside it, consequently that whatever we seem to see of a thing is only an idea. Notwithstanding the desperate efforts made to show the insufficiency of this contention, the argument still maintains its force. For what we see of things is manifestly only our knowledge of them. His special plea was that the world of sight is different from the world of touch, nobody ever seeing what he touches nor touching what he sees. We have learned to merge these two worlds into one on theory merely, he claims. He showed that we do not directly see with the eyes the distance, size, or situation of things, but have to infer the same. He had learned from Alhazen, an Arab, who lived in the Middle Ages, that the moon is seen to be of different sizes at different times, and even at the same time, by different persons, owing to the fact that its size has to be calculated from various circumstances, and is not directly given. He was also familiar with what had become known as Molyneux's query, Whether or not a man born blind would, on first receiving his sight, be able to distinguish a ball from a cube, both ball and cube being nearly the same in size. Berkeley, following up the clues which these examples suggested, worked out the great theory that what we see as if they be things are really only the ghosts of things.

Schopenhauer maintains the theory on four grounds: First, though the image of an object on the eye is upside down, we yet see the object right side up. Secondly, though the image of an object is on the eye, we yet see the object not on the eye, but at a distance from us. Thirdly, though there is on each of our eyes an image of the object, we yet see not two objects, but only one. Fourthly, though the image of an object on the eye is perfectly flat, we yet see the object as having thickness. These facts plainly prove, Schopenhauer contends, that what we see as an object is merely an image which the mind creates on suggestions of sense. We see objects right side up because the mind has learned how to construct the right kind of an image to represent an object. For the same reason we see objects at a distance, do not see them double, and see them as extended in the third dimension. Why it is that seeing but the ghosts of things, we yet see them how and where the things are, Schopenhauer explains on the ground that we feel things with the rays of light. When we look at the sun, for example, it is the same as if we are poking the sun with sticks ninety-two million miles long to find out what sort of thing the sun is!

Berkeley held that dreams appear the same to us as realities for the reason that realities are really dreams. Nobody pretends, says he, that we see anything in our dreams but images; why, then, should we pretend that we see anything in our experiences but images? As nobody pretends there was any cow present when he saw one in his dream, why pretend that there is any present when he sees one in reality? Why pretend to the seeing of stars millions of miles from his head? Manifestly, says Berkeley, we see nothing in life but dreams. A man who lodged at a tavern, rising early in the morning, saw in the hall as he entered it a man coming to meet him, was in fact about to accost the man, when, greatly to his surprise, he discovered that it was himself. As a matter of fact, he had only been looking into a very good and almost perfect mirror. Somewhat after this manner, says Berkeley, we take for things what are only images in the mind. We do not see things, but only dreams.

What we ordinarily call a dream, however, differs from our every-day experience in that it may in certain respects be inconsistent. Fosgate relates that, having once dreamed of falling into a chasm, he dreamed again the same night the very same dream, thinking he was now awake. A boy who had heard it said that it was a bad sign to dream of anything white, dreaming once of a white horse, quickly bethought himself, "I must be careful not to dream of this to-night." A man, dreaming that he was attending the funeral of a friend, dreamed at the same time that he was conversing with that friend, the same alive and well. We give, more-over, no heed to the length of time in dreams. A soldier, for example, was twice called, the intervals between the calls being short, yet in that brief time, as he afterward related, he dreamed of events which would naturally occupy days. Tennent, on the contrary, who lay seven days in a trance, said on his recovery that the whole time seemed but a moment.

On the contrary, consistency is characteristic of our every-day experience. For example, a wagon of which we have knowledge through the perceptions of the senses wears out only gradually and in a way that every change in it is distinctly marked and accounted for. The wood which wears away or rots is by no means lost, but is merely separated into parts, the oil which evaporates from it is preserved, the particles of iron which are rubbed off last still and always. Indeed, that wagon never is nor ever can be lost to human experience. Like the brook of Tennyson it goes on forever. In some form or other it will extend to the most distant future. It also goes back to the remotest past. The wood was once in trees, the oil in flax, the iron in mines. The trees out of which the wood came were formed of such things as earth, water, and air—constituents which existed in the world when the world was as yet without form and void. The like may be said of whatever else is in the wagon. Indeed, if we look the matter up, we shall find that the wagon in some form or other was existing when the morning stars sang together. All the modifications of its materials which have been or will be made were or will be consistent not only with themselves, but with all human experiences, past, present, and to come.

This we may say of a wagon of which we have experience through the senses—every stage of its history is definitely fixed with reference to each stage preceding it and to each stage following it, everything that has occurred with reference to it is in itself capable of being traced up; but this we cannot say of a wagon which exists merely as a dream.

Nevertheless, so far as the mere appearances of things are concerned, it is evident that they are just the same in dreaming as in reality.

The ideal realism of Lotze depends on the principle that seeing with the eyes is merely a consistent dreaming. Matter, he contends, is composed of minds, startling as this may seem, every atom of a stick or of a stone, for example, being, as he supposes, a mind having similarity with our own. The world, as he teaches, exists both within and without us, and hence the name, ideal realism. The world exists within us, seeing it is but the dream occasioned in us by the joint action of the minds making up the universe. The world exists without us, seeing it is the same for everybody.

There are four kinds of perception in addition to sight, namely, hearing, tasting, smelling, and handling, each of which resembles sight in being an imagery within the mind, so that we may say generally that perception is a process of forming images in the mind on suggestions of sense.

With the ear we directly experience but little, nothing in fact but the quivering of the waves of air; but though we directly experience so little with the ear, we yet from what we experience infer a great deal. Should we hear a machine in the darkness imitating exactly the human voice, we should no doubt think we were hearing a man talking, the reason being that we have learned from experience that tones and words such as the machine might make are peculiar to humanity. We do not, then, in reality hear that a man talks, we merely conclude that a man talks, conclude that he talks from the signs we have. Were this not so it would be impossible that we should mistake the sound of a machine for the voice.

Experts in tasting teas are able to tell the qualities of the teas, as, for example, that a certain tea has been dried on copper. It would be inaccurate, however, to say that they taste the drying of the tea. For they do not taste this, but infer it, there being cerain peculiarities in the taste of the tea giving clues to reason. Men, moreover, do not taste that a liquor is ten years old or that there was a nail in the keg. This or that they reason out and imagine on the ground of certain sensations.

Testing things by taste, as it is called, is in truth, for the most part, testing them by smell; but this is irrelevant to the matter in question.

Knowing nothing but the smell of an object, we imagine its qualities. For example, a man smelling apples in a dark cellar may in consequence know the characteristics of them. For from their smell, perhaps, he knows what kind of apples they are—pippins, for instance. Knowing that the pippins usually sold in the market are of a certain size, he is able from having smelled them to say how large they are. It would not be correct, however, to say that he smells that certain apples are pippins or that the diameters of the apples are three inches.

Julia Brace, blind, deaf, and dumb, was able by the sense of smell alone to distribute a whole washing as it came from the laundry, telling infallibly every piece, to whom it belonged.

Next to sight, however, touch best exemplifies perception, how it is a process of forming images in the mind. We can test this for ourselves by touching something at random in the dark. For instance, rising in the night and going into a room, where we touch a table, we know immediately what it is. When the hand no more than comes in contact with it we have an image of it in the mind; we do not have to wait to feel the table all over. The mind is able at once to infer and imagine what the object is we have touched.

Persons who are born blind exemplify the same thing. For by the use of reason and imagination a blind man can learn to do almost anything that anybody else can do—learn to sew, to spin, and to weave, to make baskets, to bottom chairs, and to play the violin. Sanderson, although blind, was yet able to distinguish genuine from counterfeit medals, succeeding even where experts had failed, relying merely on touch. Kleinhaus, another blind man, chiseled out a very good statue of the Emperor of Austria, as did Genabasius, still another blind man, a statue of one of the popes. Bayle tells of a blind man who distinguished by touch every card in the pack, and played the game so dexterously that he was hard to beat. A blind man passing his hand over the back of a horse knows what the color of the horse is. Manifestly, however, it would be improper to say that he feels what color the horse is—brown, bay, chestnut, or what not. What he feels is certain impressions merely. From these he reasons out and imagines what the color of the horse is.

What it is possible for the mind to reason out and imagine from mere sensations of touch is still better illustrated by those who are not only blind, but deaf also, and perhaps dumb. Laura Bridgeman, who could not see or hear or speak, learned to sew, to knit, and to write. She was able to read by passing her fingers over raised letters, and was able to converse with people by means of signs. She knew everybody perfectly well, and would put out her hand at the right time to shake another's.

Those whose limbs have been amputated also furnish examples how reason and imagination are applied to the impressions of sense. Certain persons who have lost their limbs yet feel pain in them, the effect, no doubt, of past experience on the mind, reason and imagination continuing to do their wonted work, notwithstanding the fact that the impressions of things on the nerves have ceased to exist. An apparatus having been applied to the stump of a man's leg twelve years after the leg had been taken off, the man declared that he felt the lost member as if it were asleep. Another man, under somewhat similar circumstances, said that he felt pain in the toes of his foot, although the foot had long since been amputated. By the force of reason and imagination he felt pain in toes which he did not have. A man whose arm had been off for thirteen years or more declared that he still felt the hand as if it were in a bent and cramped position. A man who had lost his arm in battle, said, twenty years subsequently, that he felt rheumatism in it whenever the weather was damp. Persons whose legs have been removed are in the night so sure that they possess them that they can convince themselves to the contrary only by feeling for them with their hands.

Something similar happens to persons after having had their teeth filled by a dentist. When they have retired at night they feel the working of the tools on their teeth, although no tools are there. The nerves giving the same sensations that they gave when the tools were applied to the teeth, reason and imagination construct the same perception as they constructed when the tools were actually applied.

This must teach us that perception by touch, like all other perception, is mostly a process of inference and imagery, perception, in fact, being the process of forming images in the mind on intimation of the nerves, so that what we really perceive is, so to say, the ghosts of things, these ghosts, however, truly representing the things, how and where they are.

CHAPTER III

PHANTASY

We are, doubtless, all acquainted with the process of dreaming, the faculty appropriate to which is called phantasy, but we may not be so well acquainted with its importance, to say nothing about understanding the complexity of the process.

The subject of dreams is embraced under three heads—what they are, what produces them, what they themselves occasion—these divisions corresponding to the questions, what? whence? whither?

Dreams, considered as to what they are in themselves, are either perceptive or cognitive, either sleeping or waking, either individual or communal.

Perceptive dreams are dreams of seeing things, of hearing them, of touching them, or even of tasting or of smelling them; dreams of sight, however, called visions, being by far the most important. One may, indeed, dream of hearing sounds. For example, a man dreamed that he witnessed a sea-fight and that he could plainly hear the booming of guns. One may dream of touching something. For example, a man who dreamed that he was wearing a velvet coat, dreamed at the same time that he felt it with his hand and found it smooth. Occasionally, also, one dreams of tasting or of smelling something. Whenever we dream of perceiving anything, in short, the dream is perceptive—there is a representation to the mind just as there is when we directly perceive anything.

Cognitive dreams, on the other hand, are dreams of memory or thought, such dreams consisting not in what we seem to see, to hear, to touch, and the like, but merely in what we assume to be true, we dreaming that something has taken place, whether it has or not; that something is so, without regard to the truth of it. For example, it is related by a man that he frequently dreams that he once had a very good dinner in a certain restaurant. He never had any such dinner there, however—the restaurant does not even exist. His dream is merely a representation of memory or thought.

This distinction between perceptive and cognitive dreams is of the greatest importance. For by it we are made aware, right at the beginning, that the dreaming process is much more complex than we might have suspected it to be.

We are not to understand, however, that one of these kinds of dreams necessarily takes place apart from the other. As a matter of fact, they are usually blended with each other.

The second distinction to be made in dreams is the distinction between those which occur in our sleep and those which occur in our waking. The former being well understood, it is necessary only to speak of the latter.

We have an example of a perceptive dream in waking hours given in the experience of Nicolai, a certain German writer. For he distinctly saw by day, as he says, men and women who followed him about whithersoever he went, conversing with him and with one another, although no men and women were present, as he was able to prove by experiments which he made. If it be held that persons in this condition are really asleep, or, perhaps, as it would be preferable to say, are under the power of hypnosis—this, if true, little alters the case—we speak only after the popular fashion. The dreamer really acts just as people do when they are awake—he walks around, performs various actions, engages in conversation—he is not asleep in the sense in which one is asleep in bed. If he is technically asleep, this, as was said, little alters the case.

An example of a cognitive dream occurring when one is awake is furnished by the experience of a boy who was oppressed with a fever. He verily believed that just outside the bedroom door was the highway and that there to a gate he had a horse tied. He thought he had been ploughing in the field. The fact, however, was that he had never used a horse in his whole life. He was merely dreaming when he was awake—at least, when he and others supposed that he was awake.

We have in the fact of persons' dreaming, when seemingly awake, one of the explanations made of their seeing ghosts, as the same are called, what they see being, on this theory, only their dream. It is related, for example, of a certain boy that, having gone to bed in a dimly lighted bedroom, he saw standing against the wall, or moving about, gayly dressed men and women, the appearance being to him of an evening party. Noticing that his mother, who was putting him to bed, did not see them, he supposed himself to be possessed of some power of mind superior to hers. She, on the contrary, when he called her attention to the presence of men and women in the room, thought him light-headed or at best trifling.

A woman, sitting in the twilight of her parlor one evening, saw for a few moments, and for a few moments only, what in every respect resembled her deceased sister. She particularly noticed the long golden hair which her sister had worn when living. She was dreaming, as we suppose.

What has often happened is this: a man, having gone to bed, is visited by a deceased relative, who stands at the foot of the bed and converses with him. He, indeed, thinks he is conversing with a deceased relative, the truth being, however, that he is merely dreaming that he is doing so, dreaming that he is doing so when he is awake, or, at least, when he thinks he is awake.

If it be objected that not all cases of seeing ghosts are to be accounted for on the principle appealed to, this is nothing to the purpose. The point is that some cases of seeing ghosts are thus to be accounted for.

The third distinction in dreams, and, as it seems, the last which needs to be taken account of, is the distinction between dreams which are individual and those which are communal, it being here necessary, however, to refer only to the latter.

Two or more persons may dream the same thing, either when asleep or when awake.

A family aroused, as they supposed, from their slumbers in the dead of night, found the house lighted up and strange-looking creatures moving about, all of which resembled in appearance the traditional form of the devil. These beings compelled the whole family to get out of bed, and continued for a long time to terrify them, even passing their hands over the face of each. Finally, however, they put the whole family to bed again and extinguished the lights. Nobody dared to stir till it was broad daylight, when, getting up one by one and looking around, they could discover no clue to what had happened in the night, except that they smelled sulphur. Sulphur had accidentally gotten upon the stove. It was the smell of this which had set the whole family to dreaming the same thing at the same time. As a matter of fact, they had not been out of their beds the whole night.

An example of more than one person dreaming the same thing when awake may also be given. During the night a lady, perceiving that there was a woman in white rocking the cradle in which her child was sleeping, frantically shook her maid to get her up, whereupon her maid merely said, "Don't I see it, too," the woman in white that instant passing out of the window, notwithstanding the fact also that it was closed. The theory is that the lady and her maid dreamed the same thing at the same time, and when awake, or at least when they supposed they were awake.

On the basis of such occurrences as these it has been sought to account for haunted houses, for the miracles which the Hindoos perform, and even for the appearances in seances.

The principle on which haunted houses are explained, supposing that the appearances there are nothing but the dreams which one or more persons have, is that a person having in that house some time or other been subjected to great mental strain, a knowledge of which he wished others to possess, his experience was thereby impressed on the mind of everybody in the universe. People in general, to be sure, know nothing about this, but when any one of them comes to stay in the house, or possibly merely to visit it, certain circumstances connected with the house call out the original impression which the man dying there made on the subconscious mind, causing one to dream the very same thing, and it may be when he is awake, which the person in that house so long ago experienced.

It is no objection to this theory to say that it is absurd that people should have stored away in the memory what they know nothing of, since it is easily proved that they do have such things stored away in memory; things which they have not thought of for a generation, indeed, may suddenly rise into their consciousness—persons who had entirely forgotten a language, for example, have been known to speak it in the delirium of death; persons have even spoken in an unknown tongue that which was unconsciously contained in the memory.

The miracles of the Hindoos, moreover, could be accounted for if we might suppose that they are nothing but the dream which several persons at the same time have, there, in fact, being no miracle at all, only what appears to be such. It is reported, for example, that a certain Hindoo, having gathered a crowd of people around him, made them an address, after which, taking a rope in his hand, he threw it into the air, the rope, strangely enough, standing straight up and down, the one end in the clouds, the other just above his head. Seizing the rope, he climbed it, pulling it up after him, till he was actually lost to view, having, as the bystanders believed, made his ascent to heaven. Those who witnessed the performance declared that, at least, it appeared just as if all this took place, however difficult it might be to believe that such was actually the case.

That what people see the Hindoos perform cannot possibly be real is manifest from this, that performers often proceed even to dismember a man, apparently sever his head from his body and the like, yet shortly afterward produce the man alive and well.

As was said also, one explanation of the appearances of spirits, as the same are called, at seances, is that they are nothing but the dreams which the several persons gathered together there have in common. For example, a man who attended a seance for the first time saw there, as he verily believed, his deceased brother, the same wearing the long beard which was peculiar to him in life. This, in truth, is what he saw, but how could he say that he was not dreaming, since if he were dreaming everything must have seemed to him just as if it were real, the same in fact as things appear to us in the dreams of our sleep? We do not doubt their reality. Something like this at any rate is the argument used, and of course should be taken for what it is worth.

Three main theories, it may be said, obtain in reference to spiritualism, the first of which is that the phenomena are altogether due to sleight-of-hand, the medium always deceiving the people, the objection to which is that it makes too great drafts upon our credulity, we being obliged to suppose wilful deception on the part of so many apparently candid persons. Moreover, it is strongly objected to this theory that there are occurrences at seances not capable of explanation merely on the hypothesis of sleight-of-hand. The second theory, that the phenomena are due to departed spirits, has the objection that not sufficient intelligence is manifest in the doings and sayings of the would-be spirits, an objection, of course, possibly admitting of explanation so as greatly to diminish its force. The third theory is that the phenomena are to be explained out of dreams, either that they are nothing but dreams or that they are dreams which are in some sort materialized and embodied. According to this latter theory the mediums are deceived, not deceiving, either taking as objective what is merely subjective or as assigning to the phenomena the wrong cause.

The fact that ghosts of the living as well as ghosts of the dead have been seen is adduced in support that the spirits at seances may not be real ones, the ghost of a living person being, we should suppose, only our mental representation of it. Pythagoras, we are informed, was seen at the same time in two different towns, one of these appearances of him manifestly being nothing but his ghost—not his departed spirit, inasmuch as he had not yet departed this life. At any rate, it would seem to follow that the seeing of a ghost does not necessarily prove that the same is in fact a spirit.

Dreams in themselves considered, then, are either perceptive or cognitive, either sleeping or waking, and either individual or communal.

Moreover, to dreams of all kinds two characteristics attach which give them great importance, the first that they have significance and the second that they are taken as realities.

The ordinary and the extraordinary meaning of dreams have to be noticed, the ordinary meaning of dreams not usually receiving the attention due it.

To understand what is meant by the ordinary meaning of dreams we have need to take a hint from figurative language. For example, we read without surprise that Joseph was a fruitful bough, although it is plain that Joseph being a tribe of men could not have been the limb of a tree. We understand, moreover, what is meant when we read that the Pharisees were a generation of vipers, although plainly being men they could not be snakes. Now the ordinary meaning of dreams is figurative, the same as this language. This, then, is the usual significance of dreams—they indicate to the mind bodily states or states of what is somehow connected with the body. Suffering from a fever, a man perhaps dreams that somebody is pouring hot water on him; suffering from indigestion, he dreams perhaps that a mountain is upon his stomach.

The extraordinary meaning of dreams is that which is more commonly made account of, though it would, doubtless, be better to consider it merely as an adjunct of the main meaning of dreams.

The extraordinary meaning of dreams is of three kinds—that pertaining to things, that pertaining to space, and that pertaining to time.

To take the first case, it is true that some special insight into things is occasionally gained by means of dreams. Coleridge, for example, having taken an anodyne, dreamed out that poem of his known as Kubla Khan. Franklin declared that he gained much political insight from dreams. His example, indeed, makes us wish that politicians nowadays might give more heed to dreams. Tartini, the musician, dreamed that the devil appeared to him, and in exchange for his soul composed him a piece of music which is known to this day by the appropriate title of the Devil's Sonata, Tartini having remembered it and written it out.

To take the second case, the significance of dreams as regards space—it has reference to knowing things at a distance. Thus, on the day of the battle of Pharsalia, a man by the name of Cornelius, at Padua, more than a hundred miles from the scene of action—such is the account—described the battle correctly in every detail as it proceeded, seeing the whole thing in a dream, when at the time he was awake or seemingly so. Swedenborg, relying on a waking dream, correctly described a fire which was raging at Stockholm, although he was at Gothenburg, far away. Major André's sister, residing in England, saw in a dream the court-martial which condemned her brother, clearly distinguishing in it Washington and Knox, though she had never seen these men, she afterward learning from pictures that her vision was correct.

To take the third case, the significance of dreams as regards time, it has reference in the first place to what is past and gone. For example, Zschokke, the Swiss writer, tells us that whenever he saw anybody he saw also at the same time and as it were in a dream and by signs seeming to surround the mouth everything which that person had ever done. Sangster recounts that a deceased woman appeared to him looking the same and dressed exactly as she was represented in a picture which was about the house. The tinker of Swaffham, we are told, dreamed that if he would go to London

Bridge and stand at a certain place upon it, somebody there would tell him something of great importance to him. Following out this dream, he was actually told by a man at that place upon the bridge that he had dreamed himself that there was a chest of money buried under an old apple-tree well known to the tinker in his native town, but that he had no faith in dreams himself, being a man of common-sense. The tinker, however, going home—such is the story—dug in the spot and found the money.

The significance of dreams as regards time has, in the second place, reference to the future. We read, for example, that Joseph, having been warned of God in a dream, fled into Egypt, thus saving the young Saviour's life. Schopenhauer's servant dreamed of cleaning up ink from the floor the night before she was called upon to do it. Goethe in a waking dream beheld himself in a certain attire riding horseback along the road to Strasburg, his dream being literally realized eight years afterward.

Much more talked about, however, are premonitions of approaching death. Families, as we know, have their own sign to indicate to them the impending decease of a relative, the white woman, for example, being such in the case of the Hohenzollerns. Voss relates how a servant of one of his friends always knew when anybody was going to die by seeming to see, as if in a dream, certain shadowy creatures following him about everywhere, as if with intent to destroy him. A case even is on record in which the death of a person and all the circumstances of the funeral were correctly foretold.

The second general characteristic attaching to dreams, to give them great importance, is the fact that we usually take them as realities.

If our dream be a vision, we just as much believe that we see what we suppose we see as if in reality we saw it—not always so, of course, but usually. One dreams, for example, that he is out walking of a summer's day—the sun is shining brightly, the trees are loaded with leaves, the grass is green, horses, sheep, and cattle are feeding on the meadow. Now what he supposes all the time is that he actually sees all these things. The horses, for example, he thinks are real horses. He is not convinced of the contrary, indeed, till he awakes.

If the dream be one of thinking merely, and no vision at all, what he thinks in his dream he verily supposes to be fact, as, for instance, that he is fallen heir to a large fortune.

Now, from the circumstance that dreams have significance, it follows that they must be connected with certain causes, and from the fact that they are taken as realities it follows that they may control our actions. We have, therefore, still to consider what produces dreams, and what they themselves occasion, thus completing our survey of them.

The production of dreams is occasioned either by physical or by mental causes, the latter, moreover, being another's will or our own.

Among physical means of producing dreams are drugs, disease, fasting, heat, and light—these, although there are many more.

Preparations of a certain kind of hemp, when taken into the system, have the effect to make one dream of diversified landscapes; he really thinks that he is looking on meadows, hills, and vales, the same covered with grass, flowers, and weeds, with here and there rocks and streams interspersed. A man, having taken a good dose of valerian, saw on retiring to rest, and while he was still awake, a lake before him in which were fifty or more boys bathing, distinctly distinguishing the features of each. Opium has a similar effect, as most everybody knows from the case of De Quincey. Having used this drug, he saw stairs towering into the heavens and others descending into the earth, saw palaces the corners of which rested on mountains and the vast doors of which were festooned with clouds. Moreover, he seemed to spend infinite ages with crocodiles and other loathsome animals.

Delirium tremens is a disease which, when one has it, causes him to see snakes and insects just as if they are real, although no snakes nor insects are at hand. A small boy overcome by a fever said that he saw on a rose-bush, just outside the window, a little white dog, the fact being, however, that no such dog was anywhere about the place. A man who suffered from a fever said that to him the walls of his room appeared to be covered with drifting sand, over which were passing all kinds of animals of diminutive size.

Mahomet, having fasted much, saw things when awake just as we see them when asleep. He saw, for example, something like a shadow enter his room, although his wife, who was with him, could not perceive any such thing. St. Anthony, from habitual fasting, came to see strange visions. Creatures of every description seemed to him to enter his room—lions, panthers, bears, and wolves. What he took to be the devil approached him, handing him a silver dish which, as he took it in his hand, vanished into smoke. He was dreaming when he was awake, we suppose, nothing more. Luther, in the Wartburg, from a similar cause, saw, as he believed, the devil, and threw at him his ink-bottle, bespattering the wall in the place, which is still shown to tourists.

How a heated room will make one dream everybody must have observed; even too much covering on the bed will do the same thing.

Light reflected from smooth surfaces is a physical means to make us dream. We have the case of crystal-gazers, as they are called, who put themselves to dreaming by looking into water-bottles or other glassware. Their dream is directed by the reflections of color and form upon the interior surface of the glass. It is recorded that in a certain Grecian temple there was a well in the bottom of which was a mirror. The priestess looking into this well saw in the glass an image of the absent sick person, a cure for whom was being sought. Gazing on the glass, we may suppose, had the effect to make her dream. It was the image in her vision which she saw. We have all heard the queer story regarding Abraham Lincoln, that standing before his looking-glass after his first nomination, which was made at Chicago, he saw two images of himself, the front one bright, the one behind it pale, and that subsequently in his life he saw the same thing again, perhaps several times; that he believed the bright image to represent his past career, the pale one to represent his future. He believed he would not live to see the end of his term of office. This experience of his is explained on the ground that gazing on the glass caused him to dream, though he was awake, or at least seemingly awake. He saw two conditions of himself in that baseless fabric of a vision. It is said that in Egypt there is a society which has existed for forty centuries, the successive members of which have produced in themselves dreaming by gazing on porcelain. They have triangles drawn on a porcelain plate and certain words inscribed upon it, and to make the plate more shiny they oil it.

We come now to the mental means of putting one to dreaming, the actions of others or of one's self.

The means by which one person puts another to dreaming are either objective or subjective, the objective means being what he says or does.

For example, the operator says to the person who is to be hypnotized, "Think of nothing but that you are going to sleep; your eyelids are now closing, your eyes are getting tired, you feel weary all over; you are now sound asleep." The patient comes thus to be in the dream state, and when in that state his dream can be directed by the operator, that is to say, he will dream anything the operator suggests to him to dream.

A hypnotized patient told that there is a bird on the table where there is none, not only sees a bird on the table, but also the image of the bird in the looking-glass on that table. Told that the picture of a certain person is on a piece of blank paper, he sees the picture on that piece of paper, but only on the side of it on which he was told that the picture was. If the paper is taken away and then brought back, the other side up, he sees no picture on it at all.

Persons hypnotized also have their dream directed by putting them in certain attitudes, as, for example, putting them in the attitude of drinking may make them drink, and the like.

The subjective means by which one puts another to dreaming is the mere use of his own thought and will, without any apparently outward signs. Some of us in our childhood were made to wonder much at what was related of a crazy man, that, though he was kept in a separate room of the house confined or under watch, he would yet repeat what persons in other rooms said in a very low tone, and even what they merely thought and did not utter at all. We have the explanation in this that the thoughts of others were transferred to his mind, thus suggesting ideas which, as it were, directed his dreaming.

We have also the case of controlling hypnotized patients in that the company all think of the same thing for a time, when it is found that the patient dreams it. For example, in the presence of a hypnotized woman, the company by agreement kept in their minds the thought that the woman would see her hat the color of red, although it was really of some other color. She did actually see it red, we are told, and could not believe it was hers.

Certain persons have power to put themselves to dreaming, at least on certain subjects. Painters make use of this gift. For example, Doré saw, as it were in a dream, the pictures which he wished to paint. Was, for instance, a man to be represented in the act of leaping, Doré in his self-induced dream saw the man in that attitude. We are to understand that what he saw was not the scheme of a picture, such as any of us may have before the mind, but that what he saw in his waking dream looked exactly like the object which we behold with our eyes when we perceive a man in the attitude of leaping. It was related by a certain painter that, wishing to portray an ideal woman, he dreamed one sitting before him in a chair, then, watching his dream closely, he took a brush in his hand and depicted the woman on the canvas. French schools make it a part of the instruction in painting to teach pupils how to dream. The voluntary production of the ghosts of persons is not so rare an occurrence as we might suppose it to be, but it may seem strange that a man should have the power to make his own ghost appear before him, as Brosius, a physician of Bendorf, a town of Germany, is said to have done. Such a man could paint his own picture without the aid of a sketch and without looking into a mirror. Beethoven, even after he was deaf, it is said, could yet dream how any music would sound, doing so when he was awake. Ole Bull was accustomed to say that the music of his violin existed in his mind before he played it. When Poe was writing his Raven, a poem esteemed the best which has been produced in the New World, he made himself dream, we are told, the scenes represented in it. Sitting under a lamp-post in New York, he told a friend of his that at that very instant he could see a raven and could even hear it croak. Flaubert, the French novelist, relates that he dreamed his characters so vividly that they had to him all the semblance of reality. We are told of a negro preacher who so perfectly portrayed an inferno as to come to believe in its reality himself—for, pausing in the midst of his discourse, he wailed long and loud over the state of the lost. Men have played chess by dreaming, the player sitting with his back to the board, perhaps also with his hand over his eyes. The moves on the real chess-board are made by an assistant as the player directs him. The player looks merely on the board which he has in his dream—upon this board, indeed, it is that he plays the game. We are told of a man who could in this fashion play twenty games of chess, all at the same time, every stage of each of these games standing before his mind, not as a scheme, but as if it were real, just as we behold something similar in the dreams of our sleep.

We observe somewhat the same thing in the case of psychometrical demonstrations, as they are sometimes called. Taking articles in his hands, the medium tells to what sort of persons they belong, what scenes have been associated with them, and the like. Taking a watch and chain, for example, not knowing whence it came, after looking at it a little while and feeling it carefully, he proceeds to tell the appearance and character of the person to whom it belonged and to trace out the history of the same. Much the same thing is often done without the use of the articles. The medium tells, for example, that such a person, whom he points out in the assemblage, has lost such and such relatives by death, that they were such and such like persons, perhaps even gives some minute details which could not have been known to him personally.

He, indeed, claims to have this knowledge from departed spirits—and this is one theory of the case—though it seems possible that he gets his knowledge telepathically by seeing into the minds of others.

So far the cases given of dreams induced by one's self have been those in which the person is aware that he is dreaming, but there are other cases in which he is not aware of it. Certain persons are able to put themselves into a trance, in which state they dream and give an account of what they dream, but when they come out of the trance they do not remember what they have dreamed any more than we remember much of what we have dreamed in our sleep. For example, a woman, being in a trance, a piece of marble from the ruins of Pompeii was placed upon her head, when, it is said, she described the house of which this piece of marble had, about two thousand years ago, formed a part, the inmates, who they were, what their customs and manners were, even their dress.

Persons in this condition take the dreams which they have produced for realities; any object which they seem to see they take to be a veritable one. They may, therefore, even act in accordance with what they seem to see.

This indeed brings us to the third and last grand division of our subject—for the direction of our voluntary actions by our dreams means that we act in accordance with them, just as we act in accordance with the perceptions of sense. We have it illustrated in somnambulism, in hypnosis, and in insanity.

As regards somnambulism, the case of persons getting up in their sleep and going out on the roof of a house is the best known example. Such persons are guided by their dream, the same as a carpenter going out on the roof of a house is guided by his perception. At least in part the somnambulist is actuated by his dream. We have the case of a young woman who was trying to win a prize in painting, and consequently had her mind greatly exercised over it. She discovered that somebody was adding touches to her picture in the night. A watch being set, it was found that it was she herself who did the work. She would get up in her sleep, paint a while, then go back to bed, and know nothing about it in the morning. We have also the case of a young preacher who worked at his sermons this way. It was found that if a pasteboard was placed between his eyes and the page he could read just as well as before, presumably because he was reading out of his own mind, and not off the page at all. What is still stranger, we have the case of a man who would get up in the night and rob his own hen-roost, knowing nothing about it in the morning.

We are to understand that these are all cases of dreams getting into action—the dream is not only taken as a reality, but is actually put into practice. The beginning of something of this nature can be traced in us all, especially when we have been hard at work on a task. We in our sleep constantly think of it and seem to ourselves to be still working at it. A boy who, in the hot sun, loaded sheaves of oats all day, on going to sleep at night dreamed all the while of still loading sheaves of oats. Had his dream been even more intense the probability is that he would have gotten up and gone into the field and would actually have handled the sheaves. Indeed, a case is known of a man who did this very thing.

Hypnosis somewhat resembles somnambulism, the great difference being that it is artificially induced, or at least often so. When hypnotized patients are told that mosquitos are biting them, they go through the motions of brushing off mosquitos, plainly showing that they are acting out a dream, no mosquitos really being about them. Told that they are in the midst of a flower-garden, they get down on the floor and go through the motions of picking flowers, calling them pinks, lilies, or what not, just as suggested. Told that it is cold, they shiver; told that it is raining, they get under cover.

It is possible that witchcraft is merely a case of a person hypnotized and set to doing and believing absurd things. An example, doubtless familiar to all, may be cited. Against the express wish of his wife, a man, we are told, persisted in going with some associates on a hunt. They were surprised that a fine-looking deer which circled around them could not be hit by any of the party. The man, at last, cut from his coat a silver button, which he put into his gun and fired at the deer. The result was that the deer was wounded by it and fled away. Reaching home at night he found his wife in bed wounded exactly as the deer had been wounded, the theory being that the woman, having transformed herself into a deer to be shot out of spite, had then retransformed herself into a woman, exercising the powers of a witch. This, considered as a matter of fact, we are sure could never have happened, but considered as a waking dream which several persons had in common, and in accordance with which they performed certain actions, it may well enough have taken place. If we suppose the woman, as well as the men, to have been hypnotized by a witch, the whole transaction, although a dream, may yet have had the appearance of a reality. For witches may have been able to make several persons dream the same thing at the same time, and not only so, but also to make them regulate their actions by it, so that they should think that things happened to them in common which did not.

Nineteen persons, under the persecution of Cotton Mather, were hanged for witchcraft on Gallows Hill, Salem, Mass., a thing which is often made subject of lament. The traveler standing at the grave of Mather on Copp's Hill, Boston, to-day, muses on what he deems that man's misguided action. For all we know to the contrary, however, many, if not even all, of those who were hanged may have been veritable witches, persons who, out of malice, hypnotized others to make them trouble. The witchcraft of Salem, for all that anybody can show to the contrary, may have been a matter of fact. When the nature of hypnotism was not understood, it was easy for people to suppose that the power which certain persons exercised over others was due to their league with the devil.

To maintain the reality of witchcraft it would, doubtless, be necessary to assume that one person may under certain circumstances hypnotize others at a distance, even at a long distance; it would, in other words, be necessary to assume what is called telepathy, a thing which has before been alluded to.

Insanity is a sort of continuous somnambulism, a sort of natural hypnosis, though it is admitted that these expressions do not fully describe it. The insane man, though wide-awake, or at least apparently so, acts under the delusion of a dream, his dream being largely cognitive, though also often perceptive; that is to say, he thinks false things mostly perhaps, yet often sees and experiences what is not at hand.

We are more familiar, doubtless, with the insanity of some individual rather than with that of a community, though both kinds of insanity exist, the individual and the communal.

A man who was becoming insane, to take the case of an individual, tied his cow behind his carriage and drove rapidly to the neighboring town, giving as his reason for so doing that his cow, although she had now reached an advanced age, had yet never seen that place. He was, we may suppose, but acting out a dream which possessed him. The dream, too, was a dream of thought merely—he thought things to be as they are not.

Taine gives an account of a man who attempted to get away from robbers, complained, indeed, that they pounded him almost to death, although, as a matter of fact, nobody was near him nor was doing him any harm. He had but been dreaming when he was awake, and so vividly, moreover, as to take his dream for a reality. What was more, he had proceeded to act in accordance with what he dreamed.

We have also the ludicrous example of a man who pounded himself continually, thinking it was somebody else. He could not endure, he said, the insults which that man offered him.

Crazy persons, as was said, may not only be under a delusion of thought, but also under a delusion of perception, see things which are not present, hear sounds—indeed, exist in a world altogether different from that in which we conduct our affairs. Cases enough are on record in which a person is visited by the dead, who tell him what to do—commit murder and the like—all of which he takes in sober earnest, though it be nothing but a dream. We are thus able to account for the horrible things which certain insane persons perform and to understand why it is necessary to keep them in close confinement.

What is called communal insanity also exists, or at least has existed, an insanity in which several persons participate.

For example, during the Middle Ages people had a mania for dancing in concert. They would gather in public places for this purpose; screaming and foaming, they would dance till they fell in utter exhaustion, when they would groan as if they were dying. While they were in these acts they were insensible to all other impressions than those connected with what they were doing. They thought of nothing but the dream which they had in common and which in common they acted out.

There were in the Middle Ages, also, what we call were-wolves. Men and women dreamed—and when awake—that they were wolves—dreamed it in common and in common acted it out. They took to the woods in bands, walked on all-fours, howled and hunted. They killed and devoured not only animals, but also children. It was in some cases found necessary to destroy them, as if, indeed, they had been wolves.

What is observed in a speaker's influencing an audience is, perhaps, a mild form of the communal acting out of a dream. Punshon, the great preacher, for example, so roused the people before whom he spoke at a conference that they all rose to their feet, shouted, and waved their handkerchiefs. He is said to have magnetized them, which probably means no more than that he caused them in a measure to dream, and what they dreamed to act in accordance with. They were led to attach an exaggerated importance to something, and in accordance with their false assumptions to act. No one reading by himself what Punshon said would have conducted himself in such a manner.

So far account has been taken only of the influence of dreams on what are usually called our voluntary actions, but it seems that they may also have influence on what are called our involuntary actions, on the organic functions of the body.

A patient whose limb was amputated felt no pain during the operation from the fact that, previous to it, he had been hypnotized and then told that he would feel no pain. Here a delusion in the mind had the effect to suspend the ordinary results from the action of the nerves. What, indeed, could better illustrate the power of a dream?

The cure of many diseases, it is claimed, can be effected by means of hypnosis, this meaning that the patient is put to dreaming and that his dreams have an effect on the body for the better. Persons suffering from a mania for intoxicating drinks have been cured by being hypnotized, and when in that state told to abstain from liquor. Those subject to maniacal attacks have been cured by a similar process. For example, a girl in such a condition that it required five nurses to control her was hypnotized after several hours of effort, her eyelids being held open so that she was compelled to gaze at a magnesium light. Once got to dreaming, she was kept in the state nearly all the while for weeks, being taken out of the hypnosis only a half-hour daily.

She was cured by this process. The operator had power to cast out devils, had them dreamed out, we might say, really used dreams to modify the organic structure of the brain.

It is said that even laziness has been cured by a like means. A boy who stood at the foot of his class because he could not apply himself to his tasks, having been hypnotized, was commanded to learn his lessons. Brought out of the hypnosis, he made such diligent application of his powers that he very soon reached a high grade.

Allusion has been made by Rosenkranz to the hopelessness of trying to educate idiots, but it seems that even they yield to hypnosis. An idiot, it is said, who could not learn to write was able after hypnotic treatment to make the entire alphabet, having gotten power over his muscles by the aid of his dreams.

If dreams can modify the human body, the question arises whether they can also have an effect on matter outside of the body, as, indeed, some have claimed. It is asserted, for example, that persons by the mind have been able to move the needle of a compass. It is claimed that a man in India can by his mind write a letter on a sheet of paper which is in another man's desk in America, such being called a precipitated letter.

It remains to be asked whether the materializations of spirits, as they are called, are anything but the patient's dream made to embody itself. Are, indeed, levitation, table-tipping, and the like explainable on these grounds?

CHAPTER IV

MEMORY

It being admitted that memory depends on conditions, the question arises what are those conditions? Not only so, but what are all of those conditions? Primarily the conditions of memory are (1) the person himself, (2) his circumstances, (3) and things in general. The person himself includes two conditions of memory, health and aptitude; but what conditions of memory, we may ask, are included in things themselves? The aspects of things in general are quality, quantity, and relation, but we have here to consider quality only quantitatively, what its intensity is, so that the aspects of things in general reduce for us to quantity and to relation. Three kinds of quantity exist, that of intensity, that of space, and that of time. All the conditions of memory, therefore, are health, aptitude, intensity, space, time, and relation.

We might reduce the statement to this: the conditions of memory in their entirety are, first, the person himself; secondly, his circumstances; thirdly, the intensity of things; fourthly, space and time; and, fifthly, the relations of things.

This classification, no doubt, is exhaustive, seeing that, beside the person and his circumstances, all there is anyhow to influence the memory is things, these, moreover, having intensity of quality, being in space and time, and standing in relation to one another.

It is plain that the person consists of body and of mind. The main question with regard to the body is health, with regard to the mind is aptitude. The first thing to consider, then, so far as the person is concerned, is the state of his health. This condition of memory seems to depend on the connection which things to be remembered have with the brain. Traces of sensations, it is supposed, are always or usually left in the brain, these traces being the means by which we call up events. One trace is connected with another, consequently, getting intimation of one thing, we thereby get intimation of others—this is the theory.

According to this view much is stored away in the brain, possibly everything of which we have ever had any impression, many examples, indeed, being adduced to show this. A boy whose skull was opened by a surgeon was wholly unconscious at the time of the operation, but remembered all about it four years afterward when in a delirium of fever. He even told who were, two years before, present at the operation and how each of them was dressed. An even more remarkable case is this: a clergyman being in the habit of reading aloud every day Latin, Greek, and Hebrew, was overheard by a woman who was at work about his house. She understood nothing of what he read, not knowing the languages. Many years afterward, however, when seized of a fever and wholly unconscious, she repeated, greatly to the surprise of those who heard her, the very same passages that the clergyman had so long before read in her hearing. A man who was leisurely resting his fingers over the muzzle of his gun, when it was discharged in consequence of a dog's running against the lock, said that in the brief time elapsing between the dog's striking the gun and the discharge of it all his past conduct stood before him, the Lamb's Book of Life, as it were.

We have not, perhaps, sufficiently taken into account what a remarkable thing memory is. A man sitting by his fireside of a winter's evening relates how, fifty years ago, his sister drew him upon a little wagon along a certain well-known road. He describes the little wagon in all of its details—the wheels sawed out of a board, holes through them for the axle, the narrow box, the tongue with its cross-piece. Nobody but himself pretends to know anything about that little wagon, not even the sister who he says drew him upon it. No part or vestige of that little wagon can now be found. Notwithstanding all this, he still insists on the truth of what he says.

This is as wonderful as the claim of St. John to have been relating things which must shortly come to pass. For it is nowise stranger that one should know the future than it is that he should know the past, seeing that we are always but in the present time.

The brain, as was said, is a machine of the mind, possibly somewhat on the principle of a graphophone, having in itself traces of whatsoever has happened in the experience of the person. How it is, then, that the state of the health should have an influence on the memory is comprehensible.

The second thing to consider, so far as the person is concerned, is what aptitude he was born with. Great memories are, no doubt, in part to be explained on this principle, as, for example, extraordinary memories of faces, of places, of details, of accounts, of words, of discourse, and of music. While most of us find it difficult to recall forty or fifty faces, Cyrus, the elder, we are informed, knew every soldier in his army, and Themistocles knew twenty thousand citizens of Athens. We have an account of a man by the name of Thompson who could draw from memory a correct map of a whole parish, showing the position of everything in it, streets, alleys, barns, and houses. A man, known as Ravenna, having played a game of chess, could afterward describe all the moves which had been made and in the order in which they had taken place. Hortensius, the great Roman orator, was able after an auction to give from memory a statement of all the sales in their order, just as they appeared on the book of the clerk, with the amount each person bought. It has often been a matter of great wonder how Drew, the financier, could transact his immense business without keeping any books. The thing, however, is easily enough understood if we suppose him to have had a memory such as that of Hortensius. A certain Corsican, we are told, could repeat thirty-six thousand words backward or forward, putting each in its proper place. Another man, named Lyon, could commit to memory a whole newspaper, advertisements and all, in one day. Scaliger learned the entire Odyssey and Iliad by heart in three weeks. According to Eusebius, the manuscripts of the Old Testament being destroyed by Nebuchadnezzar at the time he destroyed Solomon's temple, five hundred and eighty-six years before the birth of Christ, we should have had no Old

Testament but for the memory of Ezra, from which it was restored. The Miserere, which was sung but three times a year in the Sistine Chapel of Rome, and the manuscript of which was kept secret, was listened to so intently by Mozart, when he was but fourteen years of age, that after having heard it twice he wrote it out and was able to sing it himself, and with an effect almost to rival that produced by the choir, although the effect of the piece when sung in the service of the chapel is said to exceed that of any other known one.

Such memories, then, we may suppose, are partly to be accounted for by the aptitudes with which certain persons are born, the want of such aptitudes also accounting for the very poor memory which certain persons from the first manifest for certain subjects. It is related, for instance, of George Combe, the well-known writer, that he never could in his whole life learn the multiplication table, what many a boy has learned in one night.

It may be remarked here that attention is set down by many as a condition of memory pertaining to the person, but perhaps not with sufficient accuracy. For attention itself being dependent on other conditions of memory, its separate force, no doubt, has been much exaggerated. Usually, indeed, we give attention to things on account of something else than attention.

We are now arrived at the second division of our subject, the circumstances of one's life.

Early impressions, it is noticed, have to do with the scope and direction of our memory, and probably because they pertain to the circumstances of our life.

Arkwright, being the youngest of thirteen children and in a family the circumstances of which were straitened, from early childhood had strongly impressed upon his mind the dependence of one thing on another financially, so much so that he afterward invented spinning-machines; he accomplished his invention from the constant presence in his memory of the necessity of organizing details to a paying result. Bonaparte, early impressed with warlike scenes, came to have what we may call a military memory.

Any sudden change of one's circumstances is likely to transform one's memory, as numerous instances show.

When scarcely six years old, John Wesley was one night aroused from his slumbers to escape from the flames of his father's house. So much impressed was he with the event that ever afterward the thought of the uncertainty of life clung to his memory; but for that fire he could never have preached the sermons for which he is now famous; that fire, indeed, was the happiest pedagogical device which could have been contrived to make him a great preacher. A certain man, who throughout his former life had been of a serious, if not of a melancholy, turn of mind, was during his last illness wholly given up to jocularity. Whereas his recollections were once of the austere, they were now of the comic. What is called a loss of memory is often nothing but a change of memory, new matters being made prominent and old matters obscured; whoever has changed from one business to another, or from any one condition to another, must have been made sensible of this.

Even cases of rotation in memory have been noticed, the person being subject to two different states, in the one of which he has one memory and in the other of which he has another memory, being veritably part of the time Jekyll and part of the time Hyde.

For example, a drunkard when sober could not remember at what house he had left a certain parcel, but when he was drunk again he remembered very well where it was—he had one memory as drunk and another as sober. A man while in the somnambulistic state had resolved on suicide, but forgot all about it when he was brought out of that state. The next time, however, he was in the somnambulistic condition, he unfortunately made way with himself. We are told of a woman who changed from one memory to the other every time she fell into a deep and protracted slumber to which she was subject. When she had one memory she wrote one hand, when the other memory another hand; when she had one memory she knew certain persons only, when the other memory certain other persons. She had to be introduced to a person if she had only known him when she had the other memory. Thus she changed from one memory to the other every time she fell into one of her deep and protracted slumbers.

Mediumship, as it is called, possibly is to be explained on this principle, the theory being that when the person acts as a medium he is merely in a second condition of memory.

At a religious meeting, where testimonies of experience were given, a young woman suddenly arose and spoke energetically, claiming especial authority for her utterances. She was, for the time being, it is believed, in another state of memory than was usual with her, nothing more.

Sometimes the medium even poses as one who has long since departed this life, thinks he is really such, the truth perhaps being, however, that he is merely speaking from his secondary memory, his primary memory being for the time submerged. What is called being possessed of a spirit, good or bad, is also explained on the same ground.

Instead of rotation in memories, however, the two memories may exist at one and the same time, it seeming to one in this state as if inside his own mind is the mind of another. Sidney Dean had a work of twenty-four chapters produced by what seemed to him to be a mind within his own moving his hand.

Such writing as this is called automatic, and is sometimes even signed by the name of a person deceased, but, as was said, is believed by many to be due to nothing but secondary memory.

Some persons only, and not all, being subject to such a state, the cause of it is plainly to be ascribed to certain circumstances which have influenced the brain. Circumstances of life, accordingly, have to be included among the conditions of memory.

Beside the person and the circumstances of his life, it is plain that things themselves are alone what remains anyhow to influence memory. Four conditions of memory are therefore yet to be treated of—intensity, space, time, and relation.

The intensity of things as it affects memory is usually considered under three heads—that of interest, that of perspicuity, and that of vividness. The first two of these, however, are but cases of the third, what is to our interest more vividly impressing the mind than what is not to our interest, what is clear more vividly impressing the mind than what is obscure.

Vividness as a condition of memory is exemplified in what is specific and objective.

Realistic descriptions, for example, are easily kept in mind because they vividly impress us. How easily we remember all about the Russian expedition of Napoleon, so vivid are the scenes of it. Let us contrast with this, however, the items of the losses of the Federals at Bull Run—four hundred and sixty killed, one thousand one hundred and twenty-four wounded, and one thousand three hundred and twelve missing—total loss, two thousand eight hundred and ninety-six. The reason we can remember the scenes of the Napoleonic expedition better than the items of the Federal losses at Bull Run is because the one is intuitive and objective and the other analytic and abstract. For the same reason it is easy to remember that Simeon Stylites, out of devotion to his Saviour, went up on top of a post, where he continued to live for thirty years, supported by almsgivers, never once descending all that time; but hard it is to remember that in a particular instance the exceptions to gender are *arctus, alvus, colus, carbasus, vannus,* and *humus.* It was stated by a certain man that he had forgotten all of the history which he learned at school when a boy, except that in a certain battle a horse's tail was shot off—that fact, said he, I can never forget.

The reason why stories are easily remembered, and therefore powerfully affect the mind, is because they are detailed and specific—they vividly impress us for that reason. We have all heard the fable to the effect that a kid, standing on the roof of a house, made sport of a wolf passing by. We are impressed with what is meant, the scene coming so vividly before us. Very different, however, it is if one say, by way of maxim, that many are brave, for no other reason than that they are out of harm's way. We have explained why the Hindoos teach morals almost exclusively from fables. Bunyan, by his account of the men's falling into the hands of Giant Despair, makes a vivid picture easily remembered by us. If, however, he had merely said that hesitation to do one's duty brings one into evil plight, how weak would have been the impression! Our Saviour makes a strong representation when he says that the characters of men, as related to the truth, are as so many kinds of ground on which the same kind of seed falls, some of it outside the field, some of it on stony, some of it on thorny, and some of it on good ground. It would have been very different, however, if he had merely said that the truth is the same for everybody, what one gets out of it depending on his character. There would have been nothing to impress us.

Object lessons, it is plain, involve the same principle. They make things easy to recall, because they vividly affect the mind. We have a grotesque example from the Spartans and another from the Burgundians. The Spartans caused drunken men to be exhibited in public, so that their own children might be strongly impressed with the evils of intoxication. The Burgundians took their children to the limits of the country, where they had them thoroughly flogged, the reason assigned for the strange practice being that the children might never forget where the boundaries of the country were.

We have just the same thing, and nothing more, in the use of maps, charts, models, specimens, dissections, experiments; what these effect is to make matters vivid.

It must follow, also, that whatever can be connected with things vivid will be easily remembered; this is a second main point to be taken into account. We remember the shape of Italy, for example, from the shape of a boot, the shape of Florida from the shape of a pistol, the shape of Cuba from the shape of a banana.

Herndon proposed a curious plan for remembering numbers on this principle. He would let objects stand for them—say a candle for 1, a goose for 2, a tripod for 3, a table for 4, a hand for 5, a pipe for 6, a razor for 7, a pair of spectacles for 8, a gourd for 9, a melon for 0. Then any number could be symbolized by something vivid and easy to recollect, for example, a candle, a table, a gourd, and a goose thought of as in a row represent to the mind the date 1492, a goose with a candle in front of it the 21st, the day of October on which Columbus discovered America.

It is the same principle of which Grey made use to remember numbers, having words to stand for them, the theory being that we remember words easier than we remember numbers. For each of the ten numerical characters Grey let both a vowel and a consonant stand, either of which could be used at pleasure, so that a word easily pronounced could always be manufactured to represent any given number—for instance, afne, for 1492.

Lately a system something like that of Grey has come into extensive use as a means of ordering goods, each article having a made-up word to signify it.

The plan adopted by Grey was to let a or b stand for 1, e or d for 2, i or t for 3, o or f for 4, u or l for 5, au or s for 6, oi or p for 7, ei or k for 8, ou or n for 9, and z or y for 0.

Very easy to remember would be another plan of symbolization—let a, e, i, o, u, long and short, stand for the ten numerical characters, also let stand for them consonants derived from the names of the same, n for 1, t for 2, th for 3, r for 4, v for 5, x for 6, s for 7, g for 8, m for 9 (as if it were nn written together), and z for 0.

If by this arrangement we wish to remember the number of the house in which Frances E. Willard lived on Chicago Avenue, Evanston, Ill., we should only have to keep in mind the word nēti, 1728.

Feinaigle, a German, used all the consonants for the ten figures, having allotted certain ones to each digit, no regard being paid to vowels, so that it was usually possible to find several real words in the language to represent any number. According to Pliny Miles's scheme, founded on this device, the word *tribune* stands for 1492.

The next division of our subject is space, how it affects the memory.

Things are beside one another in space; they have, therefore, position and multiplicity—we can say where each is with reference to the rest and how many things are there together. What, then, position and what, then, multiplicity have to do with our remembering things, these are the questions to be taken up.

Respecting position, the principle is that, having in mind an object, we naturally remember things in proximity to it. This explains a seemingly otherwise inexplicable thing, namely, that one who has resided for a few years in a city comes to remember millions of things in it. He remembers them from their positions.

It follows that it will assist us in remembering any branch of knowledge if we can represent to ourselves the parts of it as being beside one another in space. Studying history, for example, we may make what is called a map of time, a space being assigned to each age of the world, and the characteristics of that age written in the space. Studying optics, we may draw squares, assigning to one of them velocity, to one of them intensity, to one of them refraction, to one of them reflection, and to one of them color, writing in each square peculiarities of the topic. Studying geology, we may draw concentric rings to represent the different ages of the earth's crust, the first and innermost one the Silurian age, the next the Devonian, and so on.

On this principle we have explained the method which in antiquity was ascribed to Simonides. Simonides, we are told, being called out during the progress of a banquet, the roof of the house suddenly fell in, crushing to death all those who had remained at the table. When the stones were cleared away, though the bodies were mangled beyond the possibility of recognition, yet was Simonides able to identify every one of them. For he had remembered what position each of them occupied at the table. To remember anything, then, said he, we are to have in mind certain fixed places, and therein to imagine the things which we wish to recollect.

This device is highly commended by Cicero and by Quintilian. Cicero tells us how we can associate what we wish to remember with things which we imagine to be in the rooms of an imaginary house. On this plan, if we were going to make a speech, we might imagine in the hall things which would suggest to us the ideas of our introduction, in the next room things which would suggest to us the ideas of our statement of the case, in the next room things which would suggest to us the ideas of the division of our subject, and so on, the things which would suggest to us the ideas of the conclusion being, perhaps, in the kitchen. Quintilian convinces us, once for all, of the great efficacy of such a method by the observation that, when we return to places in which we formerly were, we remember what once occurred in those places, and even the thoughts which we once had in them.

If we imagine a house with ten rooms, the four walls and floors of which are divided into two equal parts, it is plain that we should have a hundred different places in such a house wherein to imagine things by which to remember others, and that imagining ten such houses we should have a thousand places. If in each of these thousand places we imagine four or five objects to recall so many words, we shall have deposited in it things enough to recall a good vocabulary.

The principle of multiplicity as applied to memory is illustrated in this, that we find it comparatively easy to remember a few objects, say articles of furniture in a room, but extremely difficult to remember a great number of them.

It is proverbial that to learn anything one must confine his attention to a very few things. He must guard against a diversity of objects and a diversity of changes. He should, says Watts, not study where he has a good view from the window, nor should he indulge in recreations immediately after having attended on instruction. Pericles, during all the time of his administration, says Plutarch, never accepted invitations to dine out, nor was he ever seen in any other street than that which led from his house to the assembly.

Hyde, the great adept in life insurance, it is said, was not recognized by anybody outside of his business in going from his house to the office or in returning from the same. He had nothing to do with society as such. All he thought of was how to get somebody to insure his life and how to invest the premiums.

We contravene the principle of multiplicity by using one thing for many, effecting in this way a generalization, so to say.

Having, for example, learned twenty-six letters, we are able by this means to recall any number of ideas whatsoever. Having learned the ten numerical symbols, we can by this means recall any number, however large. Letters and figures, therefore, beside their other uses, are a device by which we get over the condition that increasing the number of things increases the difficulty of recollecting them. Rules are a similar contrivance, as, for example, that for spelling words which double a final consonant—we do not have to remember how to spell each word individually, but only how to spell the words in general. So, also, we conjugate Latin verbs easily if we merely remember that the stems are for the most part unchanged, the personal endings nearly always the same, the tense signs recurring. Mnemonic letters and rhymes involve the same principle, as, for example, the well-known *vibgyor* and the lines for remembering the exact number of days in each month.

We also contravene the principle of multiplicity by using a part for the whole. The advantage of catechisms and teaching by question and answer is that a part of a subject can be considered and exhausted at a time without special reference to the rest. Of all merely human teachers Plato, it is said, is the most beloved. For he taught his doctrines in dialogues still extant, the learner considering one particular point at a time together with its various bearings. Abstracts or compendiums serve a like purpose in that they condense the matter of larger treatises into narrow limits. If, moreover, when we read a book, we mark such passages as seem important, adding here and there a note, we by this very means make a compendium of it, and with little trouble.

There is no greater pedagogical mistake of the present day than the failure to take into account the principle of multiplicity. This we observe particularly in the study of languages, very small results being obtained in comparison with the time and labor spent upon them. The learner, to do anything in a language, has to know the various meanings of several thousands of words. It is not enough to know the meaning of several hundreds of them. As soon, however, as he tries to master these thousands of words he finds himself in the iron grasp of the principle of multiplicity. It is so hard to remember a great number of things together. As somebody has well remarked, the reason why a student cannot read at sight a page of Latin or Greek is a very simple one—he does not know what the words mean.

It is plain that from the beginning to the end of the study of a language the vocabulary should be an object of attention. The use of translations, interlinear or other, and the limiting of grammatical work to the elements, will enable the pupil to secure the requisite time.

As to the mastering of a vocabulary, the plan of short lessons and continuity is probably the best. If we try to accomplish too much, like the boy who put his hand into the jar of filberts and grasped so many that he could not get it out, we accomplish nothing. It is known that if one learn but five words a day he will in two years learn three thousand. The excuse, therefore, for spending such an amount of time, to have at the end of it a knowledge of only a few hundred words, and this knowledge imperfect, is not as good as it was once supposed to be. Learning a vocabulary is like going over a mountain—step by step we approach the other side, but we cannot jump over the mountain.

Another thing which the principle of multiplicity requires is small classes, and, therefore, the adoption of something equivalent to the so-called Lancastrian system, whereby students do some of the teaching. No other way does it seem possible to accommodate ourselves to that condition of memory according to which it is harder for us to remember many things than a few.

We reach that division of our subject in which is to be stated what influence time has on memory.

Succession, simultaneity, and perpetuity are the three characteristics which have to do with time—we find, accordingly, that memory is concerned with each. In the first place, we are likely to remember one thing from another if in their occurrence one came right after the other, the assassination of Lincoln, for example, from the surrender of Lee. In the second place, we are likely to remember one thing from another if they both occurred at the same time, as the surrender of Vicksburg from the withdrawal of Lee from Gettysburg. In the third place, however, we remember a thing if it is constantly in time, that is to say, is repeated to the mind, a case of more importance than the other two, as examples will show.

Houdon made a practice of rushing by toy and other shops, observing the wares as intently as he could. When past the shop he made an effort to recall as many of the things he had seen as it was possible for him to do. He found by this repetition that he gained power to recollect things. Herndon would let his mind drift for a few moments and then endeavor to recall as many as he could of the thoughts which had passed in his mind. By practice with cards persons learn to remember every one which they may throw down. They begin by laying down one and recalling what it is, then two, then three, and so on. They must be careful not to increase the number too fast, must thoroughly master two cards before proceeding to three, and so on. The same way men learn to add long columns of figures at sight. They practise first with two or three small numbers, hurriedly writing them, erasing them, and recalling their sum. They proceed to more numbers and larger ones, and so on. On this principle, too, some learn to take into the mind a page of writing or printing at a glance, are thus able to speak from manuscript as readily as from memory. They begin with a sentence or two, glancing at the page, then away from it, and trying to repeat what they had fixed their eyes upon. When they get so that they can master a sentence or two, they add a third, and so on, till, as was said, they can take in a whole page at a glance. Demosthenes, that he might impress on his mind the phraseology of the speeches of Thucydides, copied them not merely once, but eight times over. It is related of a German that having learned by heart the speech of Demosthenes "On the Crown," and having recited it a great many times, he finally came to believe that he was Demosthenes himself before the Athenian assembly. We are told that a man who found it difficult to remember that the word "surely" occurs twice instead of once in the well-known line of "The Raven," having said this line over twenty or thirty times to himself as fast as he could, ever afterward remembered it well enough. Elihu Burritt, having open before him a page, as he blew the fire or pounded the iron, was able in this way to learn eighteen different languages at the blacksmith's forge.

At least three thousand words have to be known before we can do anything in a language. The only way to learn them is to go over them continually. If we are not willing to do this, it might as well be understood that we can never master the language.

It was one of the advantages of the old-fashioned school, whatever else might have been its defects, that the pupil, when studying arithmetic, proceeded directly to the examples, working them by the thousand. He came to proficiency through sheer force of repetition.

A teacher, whose success was marked, made it a rule to review every day all that had previously been gone over, possibly having in mind that Cato never made a speech on any subject in the Roman senate without somehow dragging in the thought that Carthage ought to be destroyed.

Examples of the lack of repetition are also good to illustrate this condition of memory. A pupil recites well to-day how it is proved that in every triangle, no matter what, where, or when, the sum of the angles was, is, and will be the equal of two right angles. The teacher rejoices in the mastery of the subject evinced by the pupil. Ten days from that time, however, the pupil could not go through that demonstration if his life depended on his doing it. A man relates that once he knew as well as could be all the words in the first book of the Anabasis, so that he could read it in a day, taking into his mind an account of all the circumstances which led up to that battle at Cunaxa which must forever be famous, but for years he had not done anything in the language. What was he to expect? One day, chancing to take up that same first book, he could not make out so much as that of Darius and Parysatis were born two sons. It is well known that one will even forget his native tongue if he is placed under circumstances in which he does not use it. For example, an Englishman who had resided in France for five years, on his return home could not tell where he had been, except in some such unintelligible expressions as "Got back—France—five years." An old lawyer, who had not practised for some time, on going to try a case, found himself at disadvantage in that a young lawyer quoted against him an appropriate passage in a law-book. "Alas, young man," said the old lawyer, "I have forgotten more law than you ever knew."

In the last division of our subject it remains to speak of the relation of things, how this affects the memory.

We remember more easily whatever is similar to anything else which we may have in mind. One hearing an anecdote told, for instance, remarks that it reminds him of a story, which, accordingly, he proceeds to tell. We remember anything more easily, also, which is in contrast to anything else which we may have in mind, as, for instance, the vanity of human life from the jests of the grave-diggers in Hamlet. In general, whenever anything depends on another, we remember the first from the second, and vice versa.

The association of one thing with another causes it to be recalled, as is illustrated by examples easy to find.

Washburne relates in his memoirs that, when he was minister to France, he had on a certain occasion to introduce many Americans to the Emperor Louis Napoleon, who having expressed his surprise how Washburne could remember names so easily, Washburne told him that the feat was not so great after all, seeing that he had always made it a practice when he met anybody to observe some peculiarity about him. This peculiarity would, by association, call up the name of the person.

How hard it is to recollect a list of disconnected words—exceptions to gender, for example—is well known, the reason being that there is nothing by which one word suggests another. For example, Foote, the comedian, it is said, wrote ten lines of nonsense and challenged anybody to commit it to memory in ten minutes, a thing which no one was able to do.

A list of words, no matter how long it may be, can nevertheless easily be committed to memory if it is arranged so that each preceding furnishes a clue to the next. Such a list of words, for example, is this: *street, pavement, quarry, workman, pickaxe, handle, wood, tree*

—each suggests the following by its relation to it. Again, suppose it were required to remember the word *chemistry* from the word *Hottentot,* it would be possible to do so by inserting the intermediate series, *black, charcoal, carbon,* for *Hottentot* suggests *black, black charcoal, charcoal carbon, carbon chemistry,* so that, indirectly, *Hottentot* suggests *chemistry.* Such are the tricks of mnemonics made possible by the fact that one thing suggests another through the relations which it sustains to it.

Classification helps us to remember things because of the principle of relation.

It is illustrated by an apothecary shop, where the bottles, boxes, drawers, and cases are arranged in some way according to kinds, to the end that each article can the more readily be found. It is still better illustrated by a catalogue of a library, where subjects are arranged under heads, subheads, and particulars.

In pursuing any branch of knowledge, says Watts, we should begin with a view of the subject as a whole, arranged under its proper divisions. We should begin with what is commonly called a primer. For, if we plunge at once into large works, we shall be like the mariner on the great ocean without a compass. If we confine ourselves to pamphlets treating only of particular aspects of the subject, we shall be like the poor fisherman who only knows his own bay.

Regarding the subject of classification, the question arises whether, in the case of geometry, the divisions usually made might not be much improved, especially for beginners. Suppose, for instance, that the first division were triangles—the treatment of angles being made subordinate to that of triangles. Then suppose that the second division were figures composed of triangles, all surfaces being regarded as subject to triangulation. Next, suppose that the third division were pyramids, the sides of these being triangles. Lastly, suppose that the fourth division were bodies composed of pyramids, all bodies being considered as so composed. Further, suppose that not all the details were gone into, but only things of prime importance. Would not such a classification have great advantages for beginners?

Even an artificial classification may be of great use to the memory, as we see in the case of the alphabet, a classification which enables us readily to find anything not only in a dictionary or encyclopædia, but even in a library.

Some have performed mnemonic tricks by having fixed in the mind the representation of an animal for each letter of the alphabet, as, for example, ape for a, bat for b, cat for c, etc., then associating the things which they wished to remember with these animals in their order. We have also heard of persons who, having a poem by heart, associated with the phrases thereof, taking them in their order from the first, things that they wished to recall, disconnected words, for example.

The general principle in these artificial systems is that we have a framework in the mind on which we hang things, so to say.

The condition of memory founded on the relations of things explains also the use of cross-references, a subject well illustrated in a method of teaching.

For example, if the study were the geography of Palestine, the learner would consider not merely what is ordinarily known as the geography of that country. He would, indeed, learn all about the physical features of the land and its political divisions, but, in addition to this, he would learn everything else about the country. He would learn what representatives the vegetable kingdom has in Palestine—the sycamore, the olive, and the fig-tree, the flowers which bloom on the plain of Sharon, commonly called roses, the lilies which skirt the Mount of Beatitudes. He would learn that the Egyptians made coffins out of the wood of fig-trees obtained from Palestine. He would learn what representatives the animal kingdom has there—wild boars, porcupines, and curious squirrels. He would compare the wild swine of that country with our own, noticing the great transformation which environment has effected. He would learn what are the mineral resources of the country, though, except salt, they are few. He would learn what are the commercial products of the country—oil, fruits, and grains—how each of these is obtained and how prepared for the market. He would learn what are the customs and manners of the people. He would learn what are the incidents and antiquities connected with the various places—the graves of Abraham, Sarah, Isaac, Rebecca, Jacob, and Leah are at Machpelah; at Bethel, Jacob dreamed of the golden ladder; at Shechem, Joseph was cast into the pit. He would learn what were the careers of the great men who once inhabited the country. He would learn what literature the country has had—Psalms, prophesies, chronicles. He would consider particularly the Book of Job, the greatest literary production of the Hebrew mind, among the first in the order of time of great literary productions in general.

The object of learning all these matters in connection one with another is not merely that the learner shall possess such a rich store of knowledge, but also that from the connections which all these matters have with one another it would be impossible that much of it should ever slip away from the mind, one thing always bringing up another, and the parts the whole.

The mastery of one subject after this manner has also the effect to improve the mind generally, making it capable of absorbing and retaining knowledge on any subject.

The chief advantage which a genius has over others lies in the fact that he perceives innumerable relations between one thing and everything else, his mind being, consequently, always interested, engaged, and invigorated, making the acquisition of knowledge easy for him.

The object of teaching a pupil on the principle of cross-references is to make of him in some sort a genius.

CHAPTER V

IMAGINATION

IMAGINATION, using the word in the broadest sense, is characteristic of every faculty of the mind, every process of the mind being, in fact, one of forming images. In the restricted sense of the word, however, imagination may be defined as the power which the mind has to represent impossibility.

The greater part of fiction is the work of conception rather than of imagination, if we speak of imagination in the narrower sense. The characters and circumstances represented in fiction are such as really exist—the Achilles of Homer, for example, is what many a man is, the siege of Troy is that which often takes place. The most of fiction, therefore, is only history—general history, we might say—an account not of particular individuals, but rather of classes of society; such fiction, accordingly, being as much the truth as any matter of history whatsoever.

The process of mind employed in creating novels and the like is invention, compound conception.

But coming to imagination in the stricter sense, it is plain that there are as many ways of representing impossibility as there are ways of representing possibility itself. Herein, then, we have a clue of great importance in compassing the scope of imagination, taking imagination in the narrower sense.

Possibility, it is agreed, cannot be otherwise considered than under some one of three heads—quality, quantity, and relation. What is more, for the purposes in hand, the head, quality, is embraced in that of quantity, any particular quality being determined by its quantitative degree. We say, for example, that the air is so hot (as indicated by the thermometer), thus designating its quality. We have, therefore, the two heads, quantity and relation, to which, for the undertaking on which we are entered, we can reduce all possibility.

As, then, there are only three kinds of quantity—degree, time, and size—and only three kinds of relation—inclusion, exclusion, and these two taken together—it may be reasoned that imagination can violate reality in but six ways.

This result, in fact, comes to the same thing as that arrived at by Kant. Every truth, says he, can be expressed in a proposition—every proposition, moreover, not only expressing a relation of things, but also a quality and a quantity, the quality and quantity of propositions being, as we know, a subject often treated of. Thus Kant reached the conclusion that all reality ultimately falls under the three heads—quality, quantity, and relation—and, as quality has a quantitative limitation, he was enabled to reduce these heads, for certain purposes, to two, namely, quantity and relation.

Quantity, according to Kant, is intensive, protensive, and extensive, that is to say, quantity of the degree of quality, quantity of the length of duration, and quantity of the amount of space, this, in fact, agreeing with our measures, these all being of intensity, of duration, or of extension.

Kant ascertained also that there are but three kinds of relations of things—that of objects and their properties, that of causes and their effects, and that of wholes and their parts.

The first of these relations we may call inclusion, a property being included in its object; the second we may call exclusion, a cause excluding all but the one sole effect; the third we may call inclusion and exclusion taken together, the parts of a thing being included in the whole, but excluding one another. This last relation we may also speak of as composition, composition exemplifying the relation of whole and part.

There is still another way in which we may look at the matter. Things may be regarded as qualities with their quantities—the quantities as degrees, durations, and sizes; the qualities as properties, causes, and constituents—whence the six ways in which imagination may misrepresent things.

From a certain point of view, then, we have mythology explained as the representation of impossibility, this impossibility being either in degree, or in time, or in size, or in property, or in consequence, or in composition.

First, things are represented as of impossible degree, many examples illustrating it.

The capabilities of the members and organs of the body, for example, imagination exaggerates. The eyes of Jupiter were so good that, although he was in Greece, he could yet see what was taking place in Italy. Heimdall, the watchman of the gods, had such good ears that he could even hear the wool growing on the backs of sheep. Mars had such good lungs that his voice resounded over the field like the blast of a brazen trumpet.

The hands of Minerva were so deft no one else could weave as she. The feet of Camilla were so nimble that she could run over the water without wetting them, over the standing grain without bending it. The dog Lelaps could not be overtaken by any other animal in flight. Hugi could run so fast that he got to the end of the race and back again before his competitor could even get started. Thor had such a good stomach that he could eat for supper eight fishes and could drink eight barrels of mead, this notwithstanding he was not a man of great proportions.

Homer represents that, at the siege of Troy, Diomed declared in the assembly of the Greeks that they might all go home if they desired—he and his man, Sthenelos, would remain and take Troy alone. Cæsar records how the Germans told him of the Suevi, a certain tribe of men, that the gods themselves were not to be compared with them, this although the gods are represented as possessed of unnatural powers. The heads of Guido Reni, perhaps, surpass anything that nature can produce. The landscapes of Claude Lorraine, it is said, have no existence—they excel in beauty any representation of real landscapes. The throne of Satan, as described by Milton, far outshone the wealth of Ormus and of Ind. In all these cases, then, we have the exemplification of exaggerated degree, the assignment to things of a degree of quality impossible to them.

Secondly, time is violated whenever imagination represents things as taking place either sooner than is natural or more slowly.

Of things coming about too quickly we have the example of Aladdin's palace, that, though more gorgeous than any previously existing, is built in one night. The apartments are numerous and magnificent. The hall alone has four-and-twenty windows, enriched with diamonds, rubies, and emeralds, large and perfect. One of the windows is, by design, left uncompleted. The Sultan's artisans attempting to complete it, after working six weeks give up in despair. Aladdin has it finished in an instant.

The contrast between this and the real building of a structure is wonderful. Solomon's temple, which was built about nine hundred years or more before the birth of Christ, required seven years for completion, notwithstanding the fact that the number of men employed on it was great.

Of things coming about too slowly we have the example of the Struldbrugs of Swift, men and women who, though they became older and older each day and ever more and more decrepit, yet did not die, their day of death being unnaturally put off. We have the Hindoo representation of Brahma as a being, one night and one day of whom is between eight and nine billions of our years.

To represent the weariness of time in the infernal realm Ingersoll imagined that a bird carries away the material of a whole world such as ours is, a grain of it at a time, flying with each grain over millions of miles, indeed, keeps on his journeys till none of the world is left—and yet it is not even breakfast time in the infernal realm.

Thirdly, of size misrepresented by imagination we have also two cases, first, what is too small, and, secondly, what is too large.

Of the first, Swift's Lilliputians are the best known example. Gulliver, a man of ordinary size, resembling in appearance, therefore, one of us, waking up one morning on a far-off shore where he had been cast in the night-time, finds himself tied down and guarded. Cords had been stretched over his body and fastened to stakes driven into the ground, these cords being in size about the same as our ordinary twine. On his body, as he lay there, a soldier, about six inches in height, was pacing up and down, his weapons in his hands. All the men in the country were somewhat similar in height, though an exception was made in case of the emperor, he being taller than any other Lilliputian by as much as the thickness of one of our thumb-nails. The soldiers were armed with bows and arrows, and when Gulliver tried to move, a regiment or two of them discharged a volley, the effect of which Gulliver could feel on his hand, as if needles were pricking it a little. A platform a foot and a half high having been erected, an officer of high standing delivered therefrom an address, not one word of which Gulliver understood, though it concerned him much, being a statement of the regulations to which he would be subject while sojourning in the realm. Gulliver making sign that he wanted something to eat, the little folk put up ladders against his side as he lay there. Up these they carried baskets of hams, quarters of beef, and joints of mutton. Putting up inclines also, they rolled up to his mouth hogsheads of wine. Gulliver took several baskets of meat at a mouthful and drank at one draught a hogshead of their wine—indeed, the little folk did not have wine enough for him.

We are to remember that everything in the country corresponded in size with the men. Oxen were hardly more than four inches high, sheep but an inch and a half, geese were the size of our sparrows, larks the size of our flies. Dogs with which the people could hunt game would probably be about the height of their sheep, but otherwise not so large. The tallest trees were not more than seven feet in height. A sword was less than three inches long, a bucket the size of one of our thimbles. It took six hundred of their beds to make one for Gulliver. Their thread and needles were so small as to be invisible to him. Their fields were forty feet square. A city capable of containing five hundred thousand inhabitants was five hundred feet square, the walls two and one-half feet high and eleven inches thick. The gates in the wall perhaps were thirty inches long, and a little more than half as high. There were some buildings in the city, however, that were as much as five feet in height. The whole empire was about twelve miles in circuit.

Gulliver ate from a table which he himself improvised, it being like one of ours for height. Upon this table, that he had to keep in one of the public parks, he, at meal-time, often placed the emperor himself, together with some of his ministers, they sitting in chairs of state on the table to visit with Gulliver while he dined.

It was calculated by the Lilliputian mathematicians that it would take one thousand seven hundred and twenty-four times as much food to make Gulliver a meal as it took for one of them. Their loaves of bread were the size of our bullets. Not more than three bites were necessary in eating the largest of their sirloin steaks by one of our species. A dish of anything was usually not more than a mouthful for Gulliver. He could take twenty or thirty of their fowl on the end of his knife. A goose or turkey made a small mouthful for him. It took three hundred of their cooks to supply his wants.

To transport Gulliver to the capital of the country the Lilliputians made a vehicle which for them was great in size. The wheels were six inches or more in diameter, and of these wheels there were twenty-two. The frame of the vehicle, something like a hay tackling, was seven feet long and four feet wide. Five hundred workmen were employed to construct it. Upon this vehicle they loaded Gulliver, using, to do so, eighty poles one foot in length, and fastening to these poles ropes the size of our twine. It took nine hundred of their men three weary hours to accomplish the task. Fifteen hundred of the largest horses that could be found in the empire were required to draw this vehicle, none of which horses was more than four and a half inches in height.

Gulliver easily drew across a channel a whole fleet of vessels, the entire navy of the Lilliputians, having hooked to the ship with wires which he had fastened to strings. He waded the water, hauling after him the fleet.

To form to ourselves some idea of the astonishment which must have overcome the Lilliputians on seeing Gulliver among them let us for a moment imagine that we ourselves are in a position similar to theirs. Suppose, for example, that a man should be discovered some night in the vicinity of Chicago on the shore of the great lake, a man whose size should be as much greater than ours as Gulliver's was greater than that of the Lilliputians. If we take the average height of human beings as sixty or seventy inches, they are ten or twelve times as tall as the little folk are represented to have been. The giant we have supposed to be discovered would, therefore, be sixty or seventy feet high. If it would take a string three feet long to reach around the body of an ordinary man, a string which would reach around the body of the giant would have to be thirty or more feet long. If the average weight of men is one hundred and forty or one hundred and fifty pounds, the giant would weigh fifteen hundred pounds or more. Suppose, then, such a giant were discovered on the shore of the lake in the night, we can well think what a stir there would be among the people. While he is asleep, ropes are carefully stretched over his body and fastened on either side to stakes driven into the ground. Though these are our ordinary ropes, he has strength enough to break any of them when he awakes. A platform is erected fifteen or twenty feet high, from which the mayor perhaps delivers an address, telling what conditions the giant will be subject to, though the giant understands nothing of what the mayor says. Let us imagine, also, the scene of giving the giant his breakfast as he lies there, his side on the ground. To get up on him ladders have to be fifteen or twenty feet long. A hundred men ascend these ladders with baskets of hams, baskets of bread, baskets of apples, and the like, such as are found in our markets. Long timbers having been placed to form an incline, men roll up kegs of beer and wine. A keg of beer to him is no more than a glass to one of our species. A cubic foot of any kind of food, say of ice-cream, would be no more to him than a cubic inch of the same kind of food to us. We may also imagine the scene of taking him on a huge vehicle to the city. He has to be drawn by one thousand five hundred of our best horses. The vehicle would have twenty-two wheels, six or seven feet in diameter, and would be seventy or eighty feet long, forty or fifty feet wide. The giant would be loaded on this vehicle by nine hundred men, having poles twelve feet or more in length and ropes attached to them, it taking three hours to complete the work. If the giant walked through the streets of Chicago he would have to be careful not to brush away projections with his coat-tail. He must look out, too, not to tread on people who are going in or out the eating-houses. If the giant made himself a table on which to take his meals in one of the parks he could lift up the mayor and some of the aldermen, perhaps, and let them sit in chairs on the table while he conversed with them and at the same time ate his dinner. If a large boat were at anchor in the river he could hook to it and haul it after him, much as a tug now does the same thing.

The representation of size impossibly large is exemplified in the Brobdingnags of Swift, these looking as tall as church steeples, being men sixty or seventy feet in height. They stepped thirty feet at a stride. Their stile and stair-steps were six feet high, their beds twenty-four, their tables thirty. A page of their books was eighteen or twenty feet long—one of their dictionaries may have been about forty feet square and fully twelve or fifteen feet thick. Their razors were the length of two of our scythes, a case-knife twice as long. Their platters were seventy-five feet around. Indeed, such whales as abound in our waters were, as Swift represents, often roasted and brought on the table whole, the occasion doubtless being Thanksgiving. Cats were as large as three of our oxen, dogs as three of our elephants, rats as one of our dogs, larks as nine of our turkeys, some flies as large as our pigeons. Apples were as large as our barrels, hazel-nuts as our pumpkins. The straw of wheat in the fields stood forty feet high. A man of our size lying in the stubble would be concealed from view, much as a rat is in our stubble. These giants put Gulliver, a man of our kind, on exhibition, taking him around the country in a box, as we take around mice for the same purpose. A mischievous dwarf among the giants, thirty feet in height, however, nearly drowned Gulliver by dropping him into a pitcher half-full of cream. He also once wedged him into the end of a beef-bone, the marrow having been extracted, causing Gulliver much annoyance.

Voltaire's Micromégas illustrates the same thing. For this giant was many miles in height—the length of his nose was alone more than a mile. He could walk entirely around the earth in thirty-six hours, could easily wade the oceans. The diamonds of his necklace, strung on a string like beads, weighed from fifty to a hundred pounds each. The insects which he dissected, when he was a student at the university, were a hundred feet in diameter. Having taken up one of our largest ships out of the sea in his hand, he was examining it, with a view to scientific information, when by chance the ship, happening to slip from his fingers, fell into the pocket of his friend, another giant, though not so large as he. To find the ship in the pocket of his friend required a great search.

If it be maintained that it is not impossible that on some worlds things may be as small as they are represented to have been among the Lilliputians, and on other worlds as large as they are represented to have been among the Brobdingnags, it is to be remembered that we are speaking of things as they are on this earth, where there are neither pygmies nor giants from which descendants may arise. That, however, some conditions of size are impossible, under any conditions, must be manifest, as, for example, we observe in the case mentioned by Sterne. Providence, it was said, might make an ordinary man's nose of any size whatsoever. Not so, it was replied. For if a man's nose were as large as a church steeple it would not be the man who had the nose, but the nose which had the man.

Fourthly, things may be represented as existing with properties that it is impossible they should possess.

Swift's Laputa is an example, an island that is represented as floating in the air, and raised and lowered at the will of the inhabitants, they having merely to move a lever to accomplish this result. The lever turned a horizontal shaft which was in the middle of the island, and fastened to which shaft was a magnet, one side attracted, the other side repelled by the earth, whence it is easy to understand how the position of the lever and consequently the position of the magnet determined the ascent or descent of the island. The island is represented as containing just ten thousand acres and almost exactly seventy-eight hundred and thirty-seven yards in diameter, its under layer being of adamant, two hundred feet thick, on the upper side of which were the metals, and lastly the soil itself, all the streams flowing to the centre of the island and into one or the other of four ponds, these about two hundred feet from the centre of the island. As, however, the island is represented as being raised or lowered at the will of the inhabitants, the thought is that they could avoid dew or rain by going above the clouds.

This artificial land, conjured up by the imagination of Swift, recalls to our minds a late theory of things, according to which we are living on the inside of the crust of the earth, the oceans and continents being on the inside of this crust, the sun, moon, and stars in the interior of the earth.

But not alone to the mineral kingdom do we have the assignment of impossible properties, we have them also assigned to the vegetable kingdom. Certain trees, it is said, would grow till their tops could be seen from the ruins of Troy, then wither and die down, doing this again and again and forevermore, out of sorrow for the downfall of the city. We are persuaded, however, that no such trees ever existed, and that imagination in giving them such attributes has transcended reality. The fruit of trees is imagined as having impossible properties, Iduna's apples, for example. According to the myth of the Norsemen, if anybody ate one of these apples he was at once restored to youth, just as Ponce de Leon hoped to be by bathing in some fountain of Florida. The account which we have of the lotos is likewise imaginary. According to Homer, the ships of Ulysses were borne for ten days over the waves from Malea, when they struck land, supposed to be some part of Africa. The sailors going on shore were given lotos by the inhabitants to eat, whereupon they lost all desire to return to their country. They had to be dragged to the ship by main force and securely tied there to get them away.

We have, moreover, animals set forth by imagination as possessed of impossible traits. The Houyhnhnms of Swift, although they were horses, are yet represented as having the reasoning powers of men. To draw their sleds, ploughs, and the like, the Houyhnhnms had animals exactly resembling men, but destitute of our reason. According to the portrayal of Swift, it was common indeed to see a horse sitting on a sled, driving around the country, drawn by a number of these animals, known as yahoos. Swift represents that these horses built their own houses, or, perhaps we should rather say stables, there being in them mangers. The horses could use tools—for example, held a chisel between the pastern and the hoof. They could cut oats and grass and even make earthenware. They had a republic, in some respects rivalling that of Plato; were active in politics. Their colts were exercised in gymnastics and were otherwise well educated; excellent domestic regulations also obtained.

According to Homer, when Patroclus was slain in battle at Troy, the horses of Achilles, which he had driven, bowing their heads to the earth wept bitterly, their tears falling thick and fast.

The attributing of such traits to animals, it is plain, is the work of imagination merely, animals being incapable of them.

Men also are assigned attributes by imagination which they cannot possibly have. In disregard of truth, we imagine that diminutive, invisible human beings, called elves, inhabit wild and desert places, there playing pranks upon unwary travelers. In disregard of truth, we imagine that farm-houses are the abodes of small, invisible creatures in human shape, called brownies, who thresh the farmer's grain in the night or in the night churn the good housewife's butter. In disregard of truth, we imagine that every spring, brook, hill, dale, meadow, and what not, has its nymph, an invisible woman, who controls the place and somehow resembles it. In disregard of truth, we imagine that there are three women, called the Graces, who have to do with whatever is becoming and proper; three women, called the Fates, who control everything pertaining to one's destiny; three women, called the Furies, who punish crimes; three women, called the Gray Sisters, who are the harbingers of age and want; three women, called the Gorgons, whom, if anyone look upon, he will be turned to stone. In disregard of truth, we imagine that a man called Apollo draws the sun through the heavens every day with a team of horses. In disregard of truth, we imagine that a man called Neptune has control of the waves and tides of the sea. In disregard of truth, we imagine that a man called Jupiter directs the storms, even hurling the lightning in his hands. In all these cases we really attribute to human beings characteristics which are imaginary merely, the results of nature being really produced by mineral, plant, and animal existences in accord with the laws which the Creator has assigned them, and not by anthropomorphic divinities.

Personifications are a similar work of imagination, Virgil's Rumor, for example, he representing it as a woman with a hundred tongues.

Furthermore, things that are made or built are often portrayed as having impossible attributes. The ships of the Phæacians are an example. They are represented by Homer as being without rudders and without pilots, yet of such a nature that they would always of themselves go to the right port. Even if the sea were covered with mist, this made no difference. The ships always went by the shortest route just where they were wanted. Mouse Island, near the spacious harbor of Corfu, is still pointed out as the remains of one of these ships, that which bore Ulysses from Corfu to Ithaca. At the mouth of the brook which now bears the name Cresside, on the same island, is a lake, and, on the south side of it, a spot is still shown where, according to tradition, Nausica first met Ulysses, she apprising the Phæacians of his coming, so that they afterward furnished him with the ship.

Fifthly, the relation of cause and effect is violated by imagination.

Things are assigned as causes that are totally inadequate to produce the results given them, as we discover from myths. Loki, we are told, is compelled to sit where a serpent drops down from above poison, which his wife, however, catches in a cup, but, when she must for a moment empty this cup, a little poison falls upon him, causing him to squirm and to howl so violently that the whole earth is shaken—this, as mythology has it, being the cause of earthquakes.

Mythology, moreover, often represents one thing as instantaneously changing into another without any adequate cause, which is also at variance with the law of consequences. For example, when the waters of the flood had subsided, Deucalion and his wife having thrown behind them stones, those stones became men and women—the hard parts of them bone, the seams blood-vessels, and the slime flesh, so that, as Greek mythology has it, the world was repeopled. Men are also represented as instantaneously changed into flowers, trees, or stars. Ajax, having slain himself out of grief because the armor of Achilles was awarded to Ulysses, the larkspur sprang up from his blood. This flower has on it, to be sure, certain marks which a good imagination construes into the first two letters of his name, these, moreover, forming the Greek word equivalent to our interjection, Woe! The sisters of Phaeton, mourning for their brother, were transformed into poplar-trees on the bank of a river, their tears becoming amber as they fell into the water, this latter incident seeming to refer to the yellow leaves of the poplar which fall in autumn. On a hill in Phrygia the traveler is still shown a low wall, enclosing two trees, one a basswood and the other an oak. These, he is informed, were, according to tradition, Baucis and Philemon, an aged woman and her husband, once residents of the place, but turned into trees simultaneously on account of their expressed wish that neither of them should outlive the other. Most of the constellations of the heavens are imagined as having once been men or animals. The Great Bear, according to mythology, was once Calisto, a woman; the Little Bear, Arcas, her son; they having been changed into these stars out of the compassion which Jupiter had for them, an agreement being made between Jupiter and Neptune that they should never dip themselves in the ocean, the consequence of which is that these constellations always continue to circle around the pole-star.

This myth was known to the old Chaldeans, and it is a strange fact that the Iroquois of America used the name of bear for the constellation which the Chaldeans designated by the same name.

Transformations are, indeed, a common thing in mythology. Proteus could change himself into anything, becoming at pleasure beast, fire, or flood.

Sometimes the violation of the causal connection extends only to the conditions under which the results are feigned, the causes themselves being otherwise adequate. Munchausen, for example, imagines that having at sea a dog which made sign that game was nigh, he did not doubt the instinct of the animal, as well he might not. For soon the sailors, having caught a shark, found in its stomach several live partridges, some of them sitting on eggs. Here, manifestly, the only absurdity consists in the circumstances under which the fowls lived and were scented.. Another example from Munchausen better illustrates the same point: his ship having been swallowed by a whale, as he avers, he escaped from its stomach by placing a beam upright between its jaws, this keeping the mouth of the whale open while his ship sailed safely out.

On account of causality things always pass away into others, but imagination may represent them as continuing long or always in the same state. Endymion, for example, always continued young, notwithstanding the passage of time. Diana took care of his flocks, so that, although he slept on age after age in his youthful beauty, everything was done just as well as if he were awake. Rip Van Winkle kept in the same condition for twenty years, notwithstanding the great advance which the world in that time made. Greuselbach believed that the Egyptians knew how to have themselves embalmed so as to be unconscious for thousands of years and without change, when they were awakened to new life by a chemical process. It has also been represented that a woman, a few years ago, was living in Africa, who was still as young as she was when the pyramids were building. It is imagined, moreover, that a good Genius takes unfortunate children to a plain upon the clouds, where they romp and sport forever, their childhood never ending. Swift imagines that a magician, merely by waving a wand, could exhibit Alexander still alive and well, at the head of his army, just as he and they all appeared before the battle of Arbela, more than two thousand two hundred years ago. Hannibal with his army crossing the Alps was made to appear, Julius Cæsar also, in his last triumph, ascending the Capitol. Cæsar, in fact, still had on the very same clothes which he wore that day, his clothing not having waxed old with the ages. Homer and Aristotle appeared on a stage at the head of their commentators, a motley throng, whom Homer and Aristotle knew not. Swift, as he informs us, was good enough to introduce Homer and Aristotle to some of them. We have all heard, likewise, of the evening party, men and women eating and drinking and making merry, when, on a sudden and without warning, everyone stopped just in what position he or she was, and in the scene was there no change till a thousand years were flown, when the spell was broken and the eating and drinking and merry-making continued until the party dispersed.

Philosophers, indeed, have pointed out that if we might suppose the entire universe to cease for a trillion years, and then to proceed exactly where it left off, nobody would know any difference and everything would be accounted for just as it now is.

What is more, causality requires that things take place in a fixed order down the stream of time, but imagination may regard things as taking place backward. In the case of moving pictures, for example, if the crank be turned the other way the scene takes place in reverse order. One starts, say, with a harvest-field, the sheaves of grain in shock. As he turns the crank backward the sheaves become scattered over the field, and then unbound, the grain becomes standing and uncut again, grows green, is younger and younger, till, finally, it is just springing from the ground, and lastly the sower appears scattering the seeds. Flammarion has pointed out that everything that occurs, if it were observed at a great distance by a person moving in the right direction and at the right rate of speed, would all appear to him to take place in reverse order. Persons on their death-beds, for instance, would appear to recover and to become younger, eventually getting to be little children again, even elemental.

The Phœnix of mythology is in some respects a case of the same thing. A bird, living to be five hundred years old, built itself a nest of sweet-smelling things, in which it died, to grow up again, whence our expression, "The Phœnix rising from her ashes."

Sixthly, imagination represents an unnatural composition of things, impossible combinations.

We have an example from Virgil in that he speaks of shrubs the sap of which was human blood, the impossibility consisting merely in the assumed combination of shrub and blood, not in the existence of either of these things in itself.

The monsters of mythology, also, are good examples of this use of the imagination. Sheep, swine, cattle, and horses are set forth as made up in impossible ways. As a matter of fact, no sheep ever had a fleece of gold, yet the ram of Phrixus is represented as having had such a one. Diana had a boar whose bristles were those of a porcupine, its tusks long like those of an elephant, and its eyes balls of fire. The king of Colchis had cattle the hoofs of which were brass. Neptune's horses not only had brazen hoofs, but also golden manes. No horses exist with wings, yet imagination so portrays them, so portrays Pegasus, for example. The Griffin, which was a creature of imagination, had the neck and wings like those of an eagle, but the rest of its body resembling a lion's. It built a nest of gold and laid in it an egg of agate. The Chimera was partly lion, partly goat, and partly dragon, had three heads, breathed out fire and smoke, and ravaged the country. The Basilisk, also, was a serpent which burned up the herbage with its breath. The Hydra was a serpent with nine heads—if anybody cut off either of these, two more heads grew out to take its place.

Certain men were imagined by the poets as monstrously composed. Briareus, as the poets made him, was a man similar to others, although he had a hundred hands. He could have driven a team of horses, lines and whip in hand, ate his dinner, and performed several kinds of work, all at the same time—he might even have done the entire work of a small factory. The Centaurs are represented as being men to the waist, the rest of them horse. Such a man, in fact, did not have to keep a horse, since he was both man and horse at the same time. The Satyrs were men the legs and feet of whom were those of goats. The Gorgons were women, each particular hair of whose heads was a good-sized snake, their teeth were those of swine, and their nails were brass. They would have been employed in our time to husk maize or to pick cotton. The Harpies were women with the bodies of birds. The Sphinx was a woman with the body of a lion and the wings of an eagle. Argus, as fabricated by the poets, had a hundred eyes, never sleeping with more than two of them at a time. On the contrary, the Cyclops and the Arimaspians had but one eye each—the Cyclops, who were very large and tall, having the eye in the forehead. The three Gorgons, moreover, had but one eye between them all.

Of things the like of which human hands have fashioned, those most commonly made the subjects of imaginary composition are palaces, for example, that of Eblis, which was wrought out by the imagination of William Beckford.

The visitor ascending the side of a mountain by a staircase reaches at length a level terrace extending along the mountain's side. The terrace is paved with polished marble, so that it really resembles in appearance an expanse of water. Moreover, on this terrace extends, as far as the eye can reach, a row of towers. Looking upward, the visitor sees that the tops of these towers—and they seem almost to touch the sky—are the abodes of birds and built in an architecture so strange as to be indescribable. Descrying in front of these towers the broken walls of an immense palace, he is filled with terror as he beholds upon them four colossal figures, images of strange creatures, as they are, part leopard and part Griffin. He is filled with greater terror as he beholds upon them inscriptions which ever and anon change themselves into others as he watches them in the moonlight.

Suddenly the mountain shakes, and, the side of it yawning, there is disclosed to the visitor a stairway, broad and ample, descending into the depths of the earth. On the right side of each step is a torch, and on the left side of each step is a torch, and above each torch a cloud of camphor-smoke, so that between these two rows of torches the visitor descends, reaching at last the bottom, only because he goes so fast. He sees before him three huge doors of ebony, the locks of which are enamelled. Applying then his keys to these doors, they fly open, and with a noise as if it were a clap of thunder.

He enters a hall, the floor of which is so extensive as to be mistaken for a prairie, the roof of which is so high as to be nearly out of sight. The floor is strewn with gold-dust and with saffron, from which there exhales a fragrance almost overpowering, this being increased also by the smoke of ambergris and aloes wood everywhere burning. The display of things to eat and drink is profuse beyond description. Rows of tables extend for miles between the columns of the hall, heaped with viands, fruits, and dainties. Vases of crystal interspersed sparkle with all kinds of wines. Strange-looking men and women, seemingly of a spiritual race, are everywhere moving to the sound of music which comes from below. Multitudes of other men and women, more nearly resembling ourselves, each deathly pale, however, and each holding the right hand to the heart, are moving hither and thither, disregardful of the sights.

In fact, the hearts of these are on fire because of the evil which they have done.

Going down a passage which glimmers with light coming from afar the visitor passes some curtains, which are brocaded with crimson and gold, into a vast room carpeted with the skins of leopards.

Eblis, the king of the palace, sits on a ball of fire on the top of a mound in the very midst of this room.

The visitor passes out by an aisle into another room, where even greater wonders meet his gaze. There are in it fifty windows with frames of brass, through any one of which he sees several cataracts.

On bedsteads of cedar are reposing living skeletons, prehistoric kings of the earth that lived before Abraham, Isaac, and Jacob, inscriptions at their feet recounting whatsoever they have done, and from a mound in the midst of this room a similar skeleton exhorts to righteousness everybody who enters.

Huge vases, each with a lid on it, extend in a circle around the mound, being filled, as the visitor finds, with talismans, which, according to the strange usage of the place, he is obliged to present as tickets of admission to the remaining halls and chambers of the palace, these halls and chambers extending without end and without number into the depths of the earth, and containing all things whatsoever curious and rare.

Those whose hearts are on fire wander through these halls and chambers forevermore seeking rest, but finding none, ever dissatisfied with what they have seen, ever hunting for something else.

CHAPTER VI

CONCEPTION

We come to a process of the mind the importance of which it would be difficult to exaggerate. This process is often spoken of as simple apprehension, being such a generalizing as a simple inspection of things is able to afford us. It is the process whereby the mind forms images of the unchangeable aspects of things on the things merely being taken cognizance of, what is general in things being that which is abiding in them, what is general in things being that which is in all the things.

We form in this way primitive classes. The power of mind to perform this process is known as conception, a name which is also extended to the process itself.

It is, of course, to be understood that this is *simple* as opposed to *compound* conception. We here merely generalize what exists. We do not change anything. We do not create something. Simple apprehension is not invention.

Things are inorganic, or organic, or mental. The inorganic world consists, for the ordinary observer, of the sky, the ground, and the surroundings, so that his notions of the unchangeable aspects of the inorganic are confined to these. There is a world above him, below him, and around him.

Of things above us are the canopy, the sun, moon, and stars, and the clouds, together with things connected with the clouds. These in general are all the things over our heads, and what they now are they have, time out of mind, been; what the image of any one of them was in the minds of men thousands of years ago, thanks to our power of conception, it is in our minds to-day—certainly a very remarkable thing.

To every generation the sky has been a canopy, slightly colored. What little difference there may be between one view of the sky and another we manage to neglect, doing which we call making abstraction; what in every view of the sky is the same we keep in mind, doing which we call generalization.

What is the same in all our views of the sky we make in the mind an image of, this image being called a notion, sometimes even a general notion.

To a notion which we have in the mind we give a name which stands for it, every common noun, in fact, being such a name. Certain nouns—indeed, the greater part of them—are called common, not because, as the boy thought, they are an inferior kind of noun, but because they denote what is common to things, what is general in them, what in them is unchangeable.

The sun looked the same to Joshua some ages ago as it looks to us to-day, he having in mind the same notion of it that we have.

The moon is mentioned by Thucydides in his history. He informs us that the Athenians having observed it to be eclipsed when they were about to abandon the siege of Syracuse, the four hundred and thirteenth year prior to our era, were on that account unwilling to leave, the consequence being that, when they did abandon the place, they were all either killed or captured. It is manifest that the image of the moon was the same in their minds as it is in ours, a silvery disc broken into shadowy forms.

As regards the stars the case is similar. For example, a child happens for the first time in his life to be taken out-of-doors before daybreak to go on a journey. Observing the shining lights of the heavens, he unhesitatingly calls them stars, though plainly he has never before seen those particular stars, having never before been outdoors so early in the morning. He calls them stars because he has an image in his mind how stars look.

The clouds, says Solomon, return after the rain, the word which he uses to denote clouds having to him the very same meaning that the word we use to denote the same thing has to us, although between him and us have lived and died eighty-five or more generations of men.

The clouds, we notice, are moved by the winds, and of the winds we also have a notion, carrying it in our heads as we journey down the stream of time.

Horace, who lived more than nineteen hundred years ago, tells us of the thunder which he heard, of the lightning which he saw, yet all the thunder that has been heard, all the lightning that has been seen since that day when his mortal remains were borne to their last resting-place on the Esquiline have been of like character—the thunder as he heard it, the lightning as he saw it. On many parts of the globe does the lightning play, in many parts is the thunder heard, yet who is there that ever fails to know either of them by the notion which he has of it in his mind?

The rains which swelled the Euphrates when the Jews hung up their harps upon the willows growing beside it differed not perceptibly from the rains which swelled the Tennessee when the hosts of Grant contended with those of Johnston on its bank. People in Babylonia and people in Tennessee, though separated by thousands of years, had yet the very same notion of rain.

The snows of Valley Forge which chilled the air to Washington were the same as those of Moscow which chilled the air to Bonaparte; the notion that the one had of snow was the same as that which the other had of it.

The hail which beat upon the heads of the Amorites was like that which is still observed; in fact, we have in our heads the very same notion of hail that the Amorites had in their heads, though our heads be not beaten with the hail.

The sleet that prehistoric men saw glittering on trees and shrubs as so many gems was like what we often behold, the notion which they had of it, that which we have.

David, lamenting the death of Jonathan, says: "Let there be no more dew upon the mountains of Gilboa;" we know what he means, because we have the notion of dew that he had, notwithstanding the mutations of time which fill in the gap between him and us.

Siberia shows us the ruins of cities underground and inscriptions that we cannot read, people known as Scythians having long ago lived there; people who must have been acquainted with frost, must have possessed the very same notion of it that we possess.

Of everything above our heads, then, we have a notion in the mind, of everything connected with everything above our heads. This notion of the sky, indeed, connects all men and all ages into one, yet manifestly could not do so but for that process of the mind known as conception, simple apprehension.

We have next to consider what is under our feet—loam, clay, sand, gravel, and rock, connected with which are burrows, pits, caves, mines, quarries, and with these metals and gems.

The soil of Egypt is mentioned by Herodotus, who declares that, in his opinion, the whole land of Egypt was once a bay, that it was filled up with the mud of the Nile. He ventures the hypothesis, indeed, that if the Nile were turned into the Red Sea, it would in ten thousand years convert that sea into arable land. It is loam which the Nile deposits, giving to Egypt its fertility. The Egyptians, then, though they lived long before us, long before Moses even, had in their heads the same notion of loam that we have.

The case is the same with regard to clay, bricks made of which by the Babylonians exist in great numbers, the Babylonians having thought of it as we do.

Of sand old accounts exist, one of which may be mentioned. Archimedes wrote a work—still existing, strange as this may seem—in which he makes computation how many grains of sand it would take to fill in all the space around the earth out as far as the farthest fixed star, the sands together forming a great globe, the number, according to him, being what we should express by sixty-four with twenty-one ciphers attached. It is evident, therefore, that he entertained the same idea of sand that we entertain of it, had the same image of it in his mind.

Vitruvius speaks of gravel in his work on architecture, having had the notion of gravel that we possess.

Agrigentum stood partly on what was popularly known as the rock of Athens, the which the traveler beholds to-day. Empedocles, who lived there, must have had the same notion of rock that we keep in mind.

The gospels speak of the holes of foxes. We know what is meant because we have in mind what the writers had each in his mind.

We read that Joseph's brethren threw him into a pit in the vicinity of Shechem, where now his tomb is. The pit we understand was an opening in the ground much the same as those which we observe to-day. We have, in short, the very same notion of a pit that Joseph had of one.

The Phœnicians, we are informed, had tin-mines worked in England where to-day the same mines are still worked; in fact, the notion of a mine was the same to the Phœnicians that it is to the Englishmen.

The traveler coming into that part of Sicily where once Syracuse stood sees the quarries, now overgrown with weeds, where the Athenians pined away more than four hundred years before Christ. The notion which they had of a quarry was that which we have.

Tubal Cain, we read, was a worker of metals. We understand by this that even prehistoric men had the same notion of metals that we have.

It is stated that of every age there remain gems. If we had them arranged in a row they would stand for all the generations of men. The gem of Thotmes, on which it is said that the eyes of Moses may have gazed, is seen by us in the museum, it meaning no more to us than it meant to Thotmes.

We have, then, a notion of the ground as a whole, this notion made up of subordinate notions, both the whole and its parts being the same for us as for those who lived before us.

There is a third something involved in the inorganic world, our surroundings, these being of water or of land, the diversities of which are, on the one hand, marshes, springs, brooks, rivers, ponds, lakes, and seas; on the other hand, plains, hills, mountains, vales, islands, peninsulas, and capes.

We are told of the Pontine marshes which men, representing successive generations, have undertaken to drain—Appius, Cæsar, the emperors, the popes, and our engineers. To each of these the notion of a marsh has been but that which it is to us—ground partly covered with water.

The fountain of Arethusa, to which Virgil alludes, is still pointed out near the place where Syracuse once stood. This fountain has persisted through time, but not more so than the notion of a fountain.

The brook Cyane, which successive generations have looked upon, has to each of them been the same.

Firdusi bids us not to worry. For, says he, the Tigris will continue to go down to the sea long after the heads of the Mahometan church have passed away. It appears that at least two hundred generations of men have looked upon the Tigris, but it has been to all of them what a river is to us—a stream of water, somewhat large, confined between banks and flowing to an outlet.

Exodus contains mention of ponds. When we read the account we are as certain what is meant as was the writer himself.

Thrasymenus, the lake near which Hannibal overcame the Romans, is still beheld by the traveler. It is, in fact, by Hannibal's notion of it that the traveler recognizes it.

The Athenians sailed over the sea to Sicily, the sea meaning the same to them that it does to us.

The plain of Shinar, read of on tablets dug up in Mesopotamia, is similar to any other plain with which we are acquainted—a level portion of country.

People to-day go to Athens and stand on the hill where the Areopagus met, but the hill is the same to them that it was to the Areopagites.

Hiram, we are told, sent out men to the mountains of Lebanon to get timber, he having had in mind a notion of what mountains are, not different from what we have.

Jews nowadays speak of the valley of Hinnon, having the same notion of a valley that their forefathers had of one.

Writers tell of islands, meaning what we do by the same name—a body of land surrounded by water.

Anaxagoras spoke of the Peloponnesus, a peninsula, having had a notion of what the same is. He knew no better what a peninsula is than any of us know what it is; indeed, wherever there is a pond or a stream we may notice something of the kind on a small scale.

Similarly we speak of what is called a cape, a point of ground extending into the water.

Our notion of the sky, of the ground, and of our surroundings make up our notion of the inorganic, that is to say, our notion of nature as a whole exclusive of the organic and the mental. Everybody, therefore, so to say, has the inorganic world fast in the net of his notions, having a sort of universal wisdom, or metaphysic, of the inorganic, a system of notions to which the inorganic shall always conform. This must be evident. For science is a knowledge of the invariable way in which things conduct themselves, the particular way in which they exist.

The Egyptians, in knowing that the inorganic world consists of things the nature of which is always the same —the canopy, the sun, moon, and stars, the clouds, the ground, the diversities of land and the diversities of water—truly possessed a science of inorganic nature. They were able to say beforehand how things must be. They were able to get all this without any effort, it having been ordained by the Creator that we should have the process of mind known as conception, simple apprehension, primeval generalization.

Precisely similar as we have a notion of the inorganic, we have a notion of the organic.

We have a notion of the vegetable kingdom, which, indeed, for the ordinary observer, is composed of trees, shrubs, vines, grasses, grains, herbs, roots, gourds, flowers, weeds, and moss.

The olive-trees in the Garden of Gethsemane are believed to have been standing when our Saviour spent there that last sorrowful night. He had the notion which we have of them; not only so, but he had the notion of trees in general that we have.

We read in Xenophon of the shrubs which the Greeks saw when they were marching toward Babylon, more than two thousand years ago. Not one of those shrubs probably is now in existence, they have passed into eternity with the writer, yet the notion of shrubs has survived to our day.

The spies brought back to the Israelitish camp some grapes from the vale of Eschol. We can easily conceive how the vines on which those grapes grew looked to the spies, not different, indeed, than vines look to us now. Numerous are the kinds and variety of vines, and yet none of us ever fails to recognize any of them the moment he sees one, having in his mind the notion of vines in general, the unchangeable aspect of them.

Homer tells us of the grass on which the horses of his heroes fed, conveying to our minds what his notion of grass was—one, in truth, not different from the one which everybody since his day has possessed.

Herodotus speaks of the grain which he saw growing in the vicinity of Babylon, twenty-three hundred years ago, assigning to it a yield which must seem fabulous, namely, that if one sowed a bushel of it he might hope to reap two hundred. How long the heads of the grain were he refuses to divulge for fear nobody will believe him. We understand perfectly well what he means by grain—the very same thing that we mean by it; we do not gather at all that he was speaking of trees, shrubs, vines, or even of grass.

On the great pyramid of Egypt, it is said, is an inscription in hieroglyphics stating that upward of two million dollars were paid out by Cheops in supplying the builders with radishes, onions, and the like. The Israelites, moreover, in the wilderness, we read, longed for the leeks of Egypt. Those peoples, who so long ago departed this life, had no different notion of the vegetables which grow in our gardens—such as herbs, roots, and gourds, together with their representatives and imitations in the wild state—than has any child of the present day who may chance to live on a farm and, perhaps, may help to gather into the cellar the vegetables for use.

The same thing is true in regard to flowers. Our Saviour, in the well-known sermon on the Mount, alludes to the lilies, doubtless having pointed to those flowers themselves. To this day, at any rate, lilies are seen growing on the slopes of the Mount, descended, we must suppose, from the very ones at which he pointed his finger more than nineteen hundred years ago. One notion, however, connects the lilies which our Saviour saw with those which travelers now behold there.

The tares spoken of in the gospels were weeds, the like of which still exist. We know what is meant, because we have the notion which the writer had.

The man of eighty years knows a burdock the moment he sees one, for it has the same look that the burdocks had which grew in his father's door-yard when he was a boy. He remembers to have built a play-house out of them when they were taller than his head. Throughout the joys and sorrows of a long life that notion of a burdock has kept its place in his head.

Rocks covered with moss are spoken of in one of the odes of Horace. Those who sang this ode in the days of Augustus must have had the same notion of moss that we ourselves possess. That notion, indeed, has survived the Roman Empire.

The notion of the vegetable kingdom, therefore, as made up of trees, shrubs, vines, grasses, grains, herbs, roots, gourds, flowers, weeds, and moss, is common to the human mind as such; by means of it, in fact, it is that everybody views the vegetable kingdom as a system of unchangeable aspects, and owing to the mental process of conception this is possible and without effort.

We have a notion of the animal kingdom as made up of the notion of beasts, the notion of birds, the notion of fishes, the notion of shells, the notion of amphibians, the notion of lizards, the notion of serpents, the notion of insects, and the notion of worms.

Do we ever wonder what an ancient author means when he speaks of beasts? Do we not entertain the very same notion of them that he held in his mind?

We are all familiar, moreover, with the story of the Roman who, when told that the sacred chickens would not eat, said: "Let them drink, then," thereupon throwing them overboard to drown. He had the notion of a bird that any of us has.

Juvenal tells of a huge fish, which, brought into the room where the banquet was held, seemed to look down on the company from the shoulder of the waiter. Juvenal no doubt expected all posterity to understand what he meant, but how were this possible unless they should have precisely the same notion he had of fishes?

Oyster-shells are found even in the refuse heaps of primeval men, showing that even they had a notion of such animals.

Moreover, turtles and lobsters, as well as mollusks, are known to the ordinary observer as shells.

Virgil tells of toads having their habitation in hollows and of frogs that uttered their complaints, meaning, doubtless, such animals as we still see or hear. It matters not that no animal that was living in his day now survives, the notion that he had of amphibians still clings to us.

Horace speaks of lizards, intending to designate the kind of small animals to which we give that name, though, in a more extended sense, crocodiles, alligators, and even some other animals may be classed under the same head.

Serpents are spoken of by various old writers, none of whom we fail to understand.

Virgil gives up a whole book to the consideration of bees, the average life of one being only a few weeks; whence the number of generations of bees that have come and gone since his day! Having had the notion of a bee, it is plain he had the notion of an insect, which includes in itself the notion of bees, of ants, of spiders, and of others.

Through this notion all the countless hosts of insects which have been on earth since Virgil's time have passed, through it all the countless hosts of insects that are to come must pass.

The fossils of worms are found in the stones which were used in building the pyramids; all the worms which existed prior to the building of these piles conformed to the notion expressed in those fossils, all the worms which ever shall exist will conform to that notion. We have the very same notion of worms that primeval men had—perhaps the very same notion that the worms themselves had.

The ordinary observer, then, however untutored, has a notion of the animal world, knowing it as a system of unchangeable aspects, beasts, birds, fishes, shells, amphibians, lizards, serpents, insects, worms.

We have, in fact, a notion of the whole organic world, just as we have one of the whole inorganic world, these worlds being to each of us a system of unchangeable aspects.

Some sort of biology, accordingly, existed from very early times, men having a knowledge of the invariable ways in which living organisms appear on the earth. That plants appear under certain constant classes gave them a botany, and that animals appear under constant classes gave them a zoölogy.

As we come through simple apprehension to have in mind notions of the unchangeable aspects of the inorganic and of the organic, so do we come through simple apprehension to have notions of the unchangeable aspects of the mental.

It will be sufficient to confine ourselves to two divisions of it, namely, primitive notions of utilities and primitive notions of religion.

A vast number of utilities, it will be found, depend on a very few simple notions, namely, that of the lever, that of the incline, that of the bow, that of the thread, that of the bodkin, that of the knife, that of the vessel, and that of the vehicle.

An example of the lever is present to the savage whenever he makes use of a stick. When, moreover, he throws a stone or uses one for pounding or crushing anything, he has an object-lesson of the lever; in fact, whenever he makes use of a stone in this way he has a hammer, although when he fastens a stone to a stick he has what is more commonly called such. He makes use of the lever in either case, in the first his arm being the lever. He acquires this notion with little or no effort. The principle, however, is a very important one, since the wheel and axle and pulley are cases of it.

It has been held to be marvelous how the Egyptians could have placed those stones of such enormous weight where we now find them. Some have even gone to the extreme of claiming for the Egyptians miraculous powers, but by a very simple calculation it may be shown that with levers of the requisite length and with men enough to use them the placing of those stones in their present positions was comparatively easy. The wisdom of the Egyptians consisted in conception merely, in simple apprehension. Our difficulty in comprehending the Egyptians has arisen from our failure to realize the importance of this process. Could anything, then, better exemplify the importance there is in understanding the processes of the mind than this application of a principle involving one of these processes to explain what has been deemed inexplicable? When we have once grasped the idea of simple apprehension we have no further need to ascribe the origin of Egypt to Atlantis.

Of the incline the savage has an example every time he ascends a hill, he observes how he gets to the height with an ease not the case when the ascent is perpendicular.

The Egyptians are said to have made use of inclines to raise stones, a very simple means indeed, though, as was said, one very easily discovered.

The wedge and the screw are but forms of the incline, so that the lever and incline taken together are the principles of machinery in general.

Simple apprehension, therefore, from the first furnished mankind with mechanical wisdom.

The notion of the bow or spring is another easily obtained from simple apprehension. The savage, hurrying through the thicket, bending back in his course branches which when let loose returned to their former positions, had it exemplified for him, the bow, in fact, being but a device by which power stored up is suddenly released into action. The tendons of animals furnish savages with strings ready-made, taking one of which and tying the ends of it, each to the end of a stick, and drawing the string tightly, they had a bow.

We can understand, then, how it came to pass that peoples widely separated from one another were yet able to invent the bow—they could get the notion from simple apprehension independently of one another.

The notion of thread is that of fibres twisted together to form a strand, a notion not hard to acquire, yet of great value. Threads twisted together make strings, strings twisted together make ropes, ropes twisted together make cables. Threads woven together make cloth. How much, in truth, depends on a simple notion, namely, that of thread!

That people in different parts of the world might, independent of one another, have learned to make cloth need in nowise surprise us.

The notion of a bodkin is not a difficult one to obtain, it being merely that of a rod in which there is an opening. Examples of the bodkin might doubtless have been found in nature, some little stick, some small bone, or some slender stone being found with a hole through it; or, what would not have been much different, a savage might have made an aperture through some of these materials out of mere freak—many savages might have repeatedly done it.

The use of the bodkin is to draw strings through hides to sew hides together for clothes, holes having previously been made in the hides.

The notion of a knife is that of some material brought to an edge, the advantage being that it now encounters resistance in but a narrow line, that is to say, it now encounters the fewest possible obstacles to penetration. The knife was observed in the case of shells, of bones, and even of stones, nobody, indeed, being able to be destitute of it.

We have first the ordinary knife, a piece of stone, bone, or metal ground down to an edge. A dart is a double-edged knife pointed at the end, spear-heads, arrow-heads, and the like, being examples. A saw is really nothing but a row of small darts, the advantage gained being that resistance to it is only at the points, and that a multiplicity of points can be worked at the same time. A rasp contains the same principle, except that there are many rows of points side by side. The awl is a modified form of the dart, the material being narrow and sharpened at the end all around. The needle is a combination of the bodkin and the awl, the eye being carried to the end.

The sewing-machine needle is set down as a great invention, but really all the inventor had to do was to sharpen a bodkin.

The axe is a combination of the hammer and the knife, the lever here being made use of to give force to the cutting.

Stone axes are found all over the earth, in places, indeed, as widely separated from one another as is Virginia from India; they are found under the foundations of Troy; they may well enough be under the pyramids themselves. Did some one person, nobody knows where or when, invent the axe, and are all axes but copies of that one? Not necessarily so, seeing that anybody in any part of the world could come at it independently from the notion of a hammer and an axe combined, a notion he might obtain from simple apprehension.

The notion of a vessel is that of a hollow cylinder or other body open at one end and closed at the other, a device by which any liquid can be moved from one place to another or can be put or kept in any place at pleasure.

Cups, pans, pails, kettles, are examples of the simplest form. A cask is but the case of a vessel closed at both ends; the bottle, of a vessel nearly closed at the top. A boat, as indeed language bears witness, is nothing but a vessel, though in this case the object is to exclude rather than to include liquid. A house is a vessel turned upside down.

The invention of vessels, we may suppose, sprang up spontaneously in different parts of the earth, men having the notion of them from simple apprehension. Pieces of cocoa-nut shell, the shells of animals, and even geodes would furnish examples ready made. What is more, wishing to heat water in a cocoa-nut shell, and at the same time to keep the shell from burning, the savage may have daubed the shell over with moist clay, that is to say, with mud, the fire baking the clay, giving him the idea of earthenware. We observe, in fact, that the invention of such utilities was much less arduous than we might have supposed it to be.

Lastly, the notion of a vehicle is that of something on which something else is or can be borne over the ground, or at least over some fixed material. From this one notion gotten from simple apprehension, it will be found, all the vehicles in the world have been derived.

The rudest form of the vehicle is exhibited in the stone-boat, a board or combination of boards which is dragged upon the ground. In the case of the sled the friction is diminished by reducing the under surface of the boards to two edges called runners. If we fasten these runners at one point only and make them circular, the same edge to return on itself, we still further reduce the friction, having converted the runners into wheels. We now have the cart. A wagon consists of two carts, a railroad coach of two wagons. A velocipede is a cart, so to say, one of whose wheels is directly behind the other, what is gained by this arrangement being that the second wheel follows the track of the first, thus getting rid of some friction which the common cart meets with. A wheelbarrow may be said to be a velocipede with but one wheel. The boxes used in shops to convey money and parcels from one part of the building to another are vehicles the track of which is above instead of below them.

If we might conceive that children could be brought up on an island by deaf and dumb persons in utter ignorance of all our inventions, yet their posterity, we may believe, would in time come to invent vehicles like those which we now possess.

We learn, therefore, how our utilities depend on a very few notions which all men everywhere get without effort through the process of conception, simple apprehension, off-hand generalization.

As regards religion, the second topic proposed to be treated of, we have to explain how, from the simplest observation, men obtain notions on which to found it; we have, in other words, to explain how on principles of conception the heathen attain to piety.

Fundamental notions of religion are monotheism, worship, messiahship, millennialism, sin, retribution, redemption, and perhaps immortality.

As to monotheism, nature being known to simple apprehension as a system of unchangeable aspects, inorganic, organic, and mental, it was certainly not difficult to arrive at the notion of a supreme being. How many gods soever people might be pleased to imagine there be, it is nevertheless just the same as if there is but one God, the forms of nature—mineral, vegetable, animal, and mental—being permanently what they are. Things exist and act in but one way, wherefore, if many gods obtain, it is just the same as if they do nothing. This is a notion with which simple apprehension supplied the heathen.

Hundreds and perhaps thousands of years before Christ the Chinese spoke of Heaven as the supreme One; the Hindoos held that there is but one power in the universe, namely, Brahm. The tombs of Egypt contain the inscription, "One only art thou, creator of things, and alone dost thou make all that is." On the weather-beaten rocks of Mount Behistun is read what Darius caused to be inscribed there twenty-four hundred years ago, the purport of which is that but one God exists. Among the Greeks, Zeus, among the Romans, Jupiter, was supreme. Widely separated from the old world was the new, yet even here the same belief obtained. The Mexicans consecrated the temple of Tezcuco to the cause of causes, designating the cause of causes as enthroned above the nine heavens, the nine heavens possibly standing in their minds for the unchangeable aspects of nature. They built the temple nine stories high, surmounting it with a black dome, this dome, it may be, symbolizing the supreme power. The dome was studded, it is said, with stars of gold, typifying, no doubt, the dependence of the heavens on omnipotence.

The way, then, we account for people, scattered through so many times, places, and conditions, all holding the same belief in a Supreme Being, is that they easily obtained the notion of such an existence, from simple apprehension. They merely observed that nature continues to exhibit certain aspects, is, in short, directed after one form only.

The notion of worship is one just as easily obtained as is that of one God. The forms of nature, inorganic, organic, and mental, are the ways in which supreme existence is manifested. To go against these forms is to bring all our endeavors to naught, to act in accordance with them is to insure success. The heathen, therefore, having respect for the power manifested in these forms of nature, made this power an object of worship. Their thought was probably something of this sort: a man would more readily do the will of the Almighty, as expressed in the aspects of nature, if he should have a constant intent to perform that will, wherefore the good results of the spirit of worship.

The notion of the messiahship also, at least the notion of it in its most elementary form—namely, that entertained by the heathen—is one given in simple apprehension. For there is only one kind of a man which each of us should become, a kind of a man which the heathen had some notion of, having made a generalization from the characteristics observable in men.

Ages, therefore, before the birth of Christ, Hindoos, Egyptians, and Persians were persuaded of his coming, at any rate were persuaded of the coming of some such person. Virgil, writing before the birth of Christ, sets forth the notion of a Messiah in one of his pastorals. Tacitus declares that the notion was then common throughout the world. The Mexicans seem to have had a Saviour in the person of Quetzalcoatl, a man whom they assumed to be a pattern for them to follow. Perhaps every tribe of savages has entertained some such notion, the process of conception having prepared the way for the missionary.

Strange as it may seem, the millennium also is a notion to be gotten by simple apprehension. The word, to be sure, is merely a name for a thousand years, but with us has come to mean a perfected state of society upon this earth. When the character of everybody is in accordance with the perfected pattern of humanity a state of society properly designated as perfect will be ushered in; this, we may believe, was the thought of antiquity.

We are able, therefore, to understand how it was that Zoroaster, a long time before our era, was enabled to prophesy the coming of the millennium, fixing it at three thousand years from his date. If he lived when we suppose he did the time which he set for the perfection of society would very nearly coincide with the Treaty of Westphalia, 1648, that is to say, with the beginning of the modern régime.

Society is not as yet by any means perfect, but has made so much progress toward perfection that what remains to be done seems but little compared with what has already been achieved. For example, if a savage could have been told of the state in which we live to-day it would have been more Utopian to him than is Utopian to us the millennial age.

Men in the early days of the world, noticing that there were some whose characters approximated perfection, observed also that when enough of them did so, something like a perfect state of human life must obtain on the globe.

Some notion of sin, moreover, is open to conception. Mankind in their early history observed that the state of one's mind has to do with his welfare, that, indeed, misfortune is attendant on a bad state of mind. They might have called this ignorance, stupidity, sin, it matters not what, to them it was simply a disadvantageous state of mind. With the discovery of this they discovered sin.

The notion of retribution is immediately joined with that of sin. For only as one conforms to a correct view of things is he free from pain. Suffering is, in fact, the natural result of a wrong state of mind. The heathen, even savages, might as well have the notion of retribution as we ourselves may have it, seeing that it requires little thought to obtain it.

The notion of redemption is, of course, that of a process whereby a disadvantageous state of mind is removed. The means at hand for effecting such a thing might at first have been very inadequate, but the notion of what was to be done was ever clear enough. From time immemorial mankind have understood that they should be transformed into better individuals.

Even the notion of immortality is foreshadowed in simple apprehension, notwithstanding that some afterthought is necessary to complete it. That the forms of everything, material and mental, perpetuate themselves, this had only to be applied to the mind, considering it as an individual existence, to obtain the notion of the mind's survival of bodily changes.

The heathen took it that the individual things which appear in the world are only those which have previously existed, whence the doctrine of the transmigration of souls. They would seem, however, to have been right in attributing permanence to the ultimate constituents of things, such a dogma being little more than that of ours known as the conservation of energy.

We have explained, then, perhaps, why a child, when being told by his elders that he would surely die, he understanding by death extinction altogether, disbelieved what they said, though he had never had any instruction on the subject and had never before even heard of death.

These notions, then, monotheism, worship, messiahship, millennialism, sin, retribution, redemption, and perhaps immortality, it is plain are given men in the process of conception, simple generalization.

How, therefore, similar religious beliefs could have arisen in different parts of the world is apparent.

CHAPTER VII

JUDGMENT

The notions which we at first have of things are but meagre and incomplete, it is by judgment that they are improved. What is related of a boy illustrates the case of us all. He lived between two creeks, which to the north were not far apart, and to the south came together. Trees in profusion skirted their banks. The sky seemed to him to fit down over the ring of woods like an inverted basin. The boy supposed that the little plain upon which he lived, encircled by woods, and only a few miles in extent, was all there was of the universe. His notion of the world was not wrong, so far as he had any notion of it at all, but it was wrong only in what it did not contain.

The boy learned in time that the land extended thousands of miles beyond his native woods, even to oceans beyond which were still other lands. His own locality, indeed, looked just the same to him as previously, his former notion of it not being in itself wrong, but being capable of improvement by the introduction into it of the notion of extent.

This new notion which he had put into the old one was what in technical language is called a predicate, the original notion being called the subject. It comes about, then, that this judgment is expressed in a proposition whereof a predicate is affirmed of a subject. The process of mind employed is also called judgment, the form of which is that an image in the mind is so modified as to include in itself another image.

It is plain that a multitude of details are gone into by everybody after this fashion whereby his notion of the world is made more precise, enlarged, we may say, each of these details consisting in an added predicate. One learns that in certain parts of the earth are ranges of mountains, that, indeed, there are lands above the clouds; he learns that great stretches of land exist, composed of deserts, over which storms of sand drift; he learns that fire in places issues from the ground, particularly from certain mountains, that fire can be produced by rubbing sticks together; he learns that there are mines in the earth which yield the metals and other substances which he uses, including even salt, oil, and coal. Lead he took to be a rigid substance, but now he learns that it can be melted and run into moulds. Gold he at first understood to be nothing but a yellow metal, beautiful to look upon, but now he learns that it can be dissolved in aqua regia, the same as sugar can be dissolved in water. He learns that there are great oceans on the surface of the globe, that, indeed, they surpass in extent the entire area of the lands—more exactly, two and a half to one; he learns that there are rivers thousands of miles in length; he learns that water comes from the clouds, which are made of vapors, the vapors arising from the waters of the earth; he learns that there are regions of the earth in which there are no rains at all, others in which the rainy season comes regularly. He learns that water can be so treated that there arise in place of it two gases, one just double the amount of the other; he learns that the air on the tops of mountains is rare, that in old wells it destroys life; he learns that air in motion is wind, that in certain parts of the earth great winds, called hurricanes, sweep everything before them; he learns that there are in certain parts of the earth prevailing winds, in other parts continuous calms. He learns that while it is night in the place where he lives it is day somewhere else, that the seasons also transmigrate. He learns that to the north of him in summer and to the south of him in winter there is a vast country in which it is perpetual day, the sun not setting, but seeming to move around the country in a circle.

In each of these cases, and in many more, everybody makes a judgment about the inorganic world, improves his notion of it by adding a predicate. How much enlarged, then, does the notion become as compared with that which the boy had when he thought that the entire universe was included between those two creeks!

It is plain that this process of judgment which a boy goes through with respecting the world was once gone through with by the race in general—what is the same thing, that there was once a time when men had not as yet much exercised their judgment. They had to improve their primitive notion of the inorganic world by adding a great number of predicates not previously thought of.

This coming of the race to exercise its judgment must have marked an epoch in human affairs. The race could never again be what it previously was, since its notion of things had been so much improved.

Homer represents that the ocean passes entirely around the land of the world, that in the midst of the land is the Mediterranean, and that into this the river Nile flows from the south, its sources being in mountains, beyond which live certain pygmies, men of small stature. Far away in the western ocean, he held, are the islands of the blessed, as the same were called. He also states that Ulysses, sailing far to the north, found a land where it was continuously day, and another where it was continuously night.

As a matter of fact the ocean does extend all the way around the old world, the Pacific and the Atlantic branching from the Antarctic to meet again at Bering Straits, the Arctic being regarded as the northern end of the Atlantic.

America, North and South, at least those portions of them approaching the equator, might be considered as islands in the western ocean with pleasant climes.

Stanley, in our day, has gone to the sources of the Nile and looked upon the Mountains of the Moon, as they are called, and has actually found the pygmies, descendants, no doubt, of those whom Homer mentions.

That both continuous day and continuous night exist, alternately, toward the pole has also long been known to us. Homer was under the necessity of representing two countries to the north, the one all the while light and the other all the while dark, evidently because he did not understand how contradictory conditions could pertain to the same place. He did not know the astronomical reason which we do for this state of things.

It is plain that this knowledge which was possessed by those of Homer's time relative to the earth could not have been gotten by men in the early ages of the world, for the reason that the distances to be traversed in order to get it were so great. It was by the Phœnicians that this knowledge was given to mankind, they being the first great maritime people of the earth, going great distances in their ships to carry out and bring in merchandise, the traffic in which made them immensely wealthy. It is believed that they penetrated to the Baltic and to the northern seas. Diodorus gives a tradition even that their ships, being driven by a wind, discovered a great country in the western ocean, which we may suppose to have been America. We have to take into account also that, as they opened up lines of trade in all directions from them, much news about other lands would necessarily come to them, even if they did not actually go to those lands.

When mankind had once got this knowledge it is evident that their notion of the earth was much improved in comparison with what it had previously been; what is the same thing, respecting the notion of the earth, a crisis had been reached, a definite progress made which never could be lost.

What is more, contemporary with this advance of judgment about the earth, we find that there was also an advance of judgment about matters in general. It showed an improvement of judgment when the Phœnicians discovered that commerce is a way of getting a living in addition to stock-raising and farming, since they had added a predicate to the notion of human employment. It showed an improvement of judgment when the Phœnicians built factories in many parts of the world where were made new and attractive things, as, for example, the famous dyes which they were enabled to sell at high prices. It showed an improvement of judgment when the Phœnicians simplified the alphabet, reducing it to about twenty characters which were capable of expressing to sight any word whatsoever, and consequently any idea conceivable. Necessarily this became the basis of future alphabets and wrought a great change in the world. It showed an improvement of judgment when the cities of Nineveh and Babylon were built on a grand scale, rivaled in sized only by our modern cities, out of brick instead of out of stone, and in the decoration of which a great use of color was made. Upon a vast platform, elevated many feet above the level of the ground, building was placed on top of building, each smaller than the one below it, till often a seventh or perhaps even an eighth or ninth was added, the walls inside being wainscoted with sculptured slabs of alabaster, and above these, colored tiles placed. The entrances below were guarded by great winged beasts calculated to impress wonder on the beholder. It showed an advance of judgment when a great artificial lake was created by excavations made in a few days, the notion of engineering being somewhat enlarged. It was an improvement of judgment when the Assyrian, the Babylonian, and lastly the Persian empire was organized, reducing to unity so many different communities, and yet allowing them some measure of local self-government. It was an improvement of judgment when in place of the crude literary performances which had before existed, the Iliad and the Odyssey were produced. It was an improvement of judgment when the drama of Job was composed, the Psalms of David, the Reproaches of Isaiah. It was an improvement of judgment when the religion of Israel arose with its abhorrence of idolatrous worship, and its inculcation of the notion of one God, non-anthropomorphic, ubiquitous, and eternal.

The times of which Homer gives an account, it is believed, are those of a thousand years before the Christian era, differing, therefore, not much from the time of the Trojan war and of the building of Solomon's temple. Within the time, then, stretching from the exodus of the Jews to the battle of Marathon, from Rameses to Miltiades, we have a grand epoch in human progress, so marked, indeed, that even as children we have all learned of it and by it been impressed; so marked, indeed, that many persons have fallen into the error of supposing that there was little progress previously and that there has never been any since, forgetting what the Greeks and what the Romans and what Christianity have done for us.

Studying the processes of the human mind we are able to see that this epoch in the affairs of men was produced by the unfolding of the faculty of judgment, the making more specific in the human mind of the notions of things. This is what, in fact, produced this great post-Egyptian civilization, different aspects of which were Nineveh, Babylon, Phœnicia, Judea, Achaia, and Persia.

We have also another very important application of the principle of judgment; we are able to explain by it what is observed in learning to read. It is known that between the primer and literature, properly so-called, there are usually read by the pupil three readers, the second being higher in grade than the first, the third than the second. What seems to be true is this: the work of the primer represents merely the inceptive stage, the pupil learns, for example, that a certain sign stands for his notion of a dog, another for his notion of running, and so on. We have explained, therefore, why pretty rapid progress is made with the primer, the pupil having here only to learn signs for simple notions. In the readers, however, he enters on a process of judgment, he has to improve his notions. It is no longer a question of one simple sign for one simple notion, shades of meaning have to be noticed at every turn. He is going through a process respecting language similar to that which a boy goes through respecting the earth. This part of learning to read is therefore tedious and uncertain.

Judging, it will be observed, consists in making distinctions; for example, when we learn that gold is soluble in aqua regia, we have something by which gold, as we know it, is distinguished from gold as we formerly knew it. What is much the same thing, we have put gold into a particular class of things, those things, namely, which can be dissolved; we have found another limitation, another specification of it.

We are most familiar, indeed, with the word judgment in its application to judicial procedure, yet here even what meaning the word conveys to us is that of distinction. When the judge passes on a matter he puts it into a certain class—the theft, for example, was petit larceny, the murder was of the first degree, and so forth —the judge making distinction of the thing passed on. Our Saviour, in illustrating the nature of the last judgment, instances the case of a shepherd separating the sheep from the goats, a distinguishing of them into classes. The German word for judgment literally means to make distinction, not only so, but to make primitive distinction—means, in fact, to attain a natural specification of a thing.

Judgments have been divided into analytic and synthetic, analytic judgments being those which are implied in the very notion of a thing, as, for example, "Gold is yellow," synthetic judgments being those which are not implied in the very notion of a thing, as, for example, "Gold is soluble"; but for certain purposes this division is not very important, it being ofttimes as much a discovery to draw out what is implied in a notion as to find something in it which was not directly implied.

A process of judgment similar to that which takes place with regard to the inorganic takes place with regard to the organic.

It is plain that a child has at first but a very inadequate notion of plants, little more perhaps than that they are pleasant things to look upon which grow up out of the earth; but as he becomes informed about them he improves his original notion.

Take first the matter of roots. He finds that the roots of plants may in certain cases be mistaken for leaves, the roots in some plants having the appearance of tendrils and being in the air instead of in the ground, as, for example, the tufts which hang from trees in the Dismal Swamp of Virginia. He finds that the roots of plants, when in the ground, absorb water, which, with whatever it contains, ascends the plant as sap, the pressure exerted by which being great, as is shown in the experiment of fixing a tube to the end of a grape-vine, a good weight of mercury in the tube being then lifted by the force of the sap alone.

Take, secondly, the matter of the stems of plants.

He finds that the stems of plants often grow under the ground, being thus liable to be mistaken for roots. Quack grass, for example, is exceedingly hard to destroy for this very reason, the stem branches underground growing to a good length, while from the branches everywhere proceed the secondary ones. It is common, indeed, to call all these branches roots, but they are really the same as the runners in the case of strawberry plants, except that in the case of strawberries the runners are above instead of below the ground. The true name of these branches, as we know, is rhizomes. In the case of potatoes, what one might mistake for the fruit is nothing but enlargements of the stem, called tubers. Even when not running the stem is sometimes under the ground, as is the case with the crocus, this form of stem being called a corm. Cactus exhibits all three of these forms above ground, rhizomes, tubers, and corms, the stem of the cactus often consisting wholly of these.

As, moreover, new branches of the stems of plants grow out of their buds, it is possible from the stems of little trees to obtain a new quantity of trees, at least in certain cases. It is also the custom of nurserymen to cut open the bark of young trees and to insert buds of some favorite variety, so that the branches grown from these buds shall bear the desired fruit. Sometimes, too, the piece of a twig is inserted in the stump of a tree, the twig being sharpened and its bark made to match with the bark of the stump, the object being that the branches growing from the buds of the inserted pieces of twig shall produce the fruit wanted—a process known as grafting.

Take, thirdly, the matter of leaves. They may be mistaken for something else. What appears to be the bark of a cactus, for example, is in reality its leaves. Owing to the droughts to which this plant is subject it is an advantage to it to have as little surface as possible exposed to the air. But the reverse of this is true in the case of plants in general. For a large tree, such as an elm, for instance, although the entire surface of its stem may be comparatively small, obtains by means of its leaves a surface of five or ten acres to expose to the air. What other modifications leaves are capable of is also shown in flowers, flowers being but leaves adapted to a particular purpose. Stamens and pistils are special adaptations.

Moreover, it is not at first known, but is afterward ascertained, that pollenization is one of the means of propagating plants, the pollen being produced in the stamens and falling into the pistils. Strange enough, it is found that in many plants the stamens are on certain individuals and the pistils on others, the pollen having thus to be shifted over from one plant to another. The pollen, indeed, is often blown from one flower to another by the wind, but oftener is transferred by means of insects, these being attracted into the flowers, owing perhaps to the fragrance or the color of the flowers. The insects, going from flower to flower, carry with them the pollen and thus fertilize the flowers, as we say. It has been argued, therefore, that those plants that happen to be attractive by reason of fragrance or color stood a better chance of surviving than others, being more likely to be pollenized by insects and so to bear seeds. One hundred thousand plants, it is said, could not exist but for the bees—the rise of such insects, exhibiting marvelous intelligence, it is thought, we have to thank for our flowers. It is also not at first known, but has to be learned, that the leaves of plants absorb gases from the air, particularly carboniferous gas.

Furthermore, plants for the most part are constituted out of air and water. People, indeed, say that they cannot live on wind, and that beside water they must have something else, the truth being, however, that they are actually living on little else than these very things, the food of animals coming in the last resort from vegetables.

How many other things there are which we have had to learn about the modes of life peculiar to plants! The strange adaptation which a plant has to circumstances, for instance, is one of these. Take the water-nut which grows at the bottom of streams. It has on it certain little balloons which, filling with air in the spring, raise the plant to the surface of the water, where it blossoms and brings forth its fruit. The bearing season over, the balloons fill with water and the plant descends to the bottom of the stream to escape the rigors of winter.

The great importance of plants on account of the properties which they contain is another matter which is learned in detail. For example, we have the case of the discovery of the virtues of the bark of a tree, the same having cured of a fever the wife of one Chinchon, a governor of Peru, the tree henceforth being called Cinchona in honor of the woman—a tree from whose bark is made quinine, the greatest febrifuge and antiperiodic known to therapeutics.

In the case of animal life, also, it is plain that a series of judgments is made by us, one predicate after another being added as we advance in knowledge of the animal kingdom.

We should not at first have had any intimation of the vast diversity possible to animals. As regards size, should we ever have thought that there are animals so small that even millions of them exist in an ounce of sand, animals so small as to be invisible to the naked eye? The inequality in size between a whale and an ant even is what must seem fabulous, yet the ant is as much of an animal as is a whale. As regards length of life, what a difference in animals! The may-fly at the best does not live more than a week—within that time are embraced all its joys and sorrows. On the contrary, an elephant, as Lotze remarks, which eats out of the hand of a child to-day, may have eaten out of that child's great-grandfather's hand when that great-grandfather was himself a child. A crow and a may-fly may come to consciousness on the very same day, but in the ordinary course of things the crow will live five or ten thousand times as long as the May-fly. As regards type, what contrast in animals! Who would have believed but for the testimony of his sense that animals could exist in the form of mollusks? What a contrast between a dog and a clam! Yet one of these is as much an animal as the other. Nay, there are animals in the sea which for all the world resemble melons or cucumbers, except that they have certain long strings attached to them by means of which they lasso crabs. What is more, there are animals in the sea not to be distinguished even from bushes. Variety within the same type of animal is also marked. That, for instance, whales belong to the order of beasts was not to have been believed, we being inclined to consider them fishes. Certain naturalists, indeed, have held that whales and swine have descended from the same ancestors, it being supposed that whales once lived on the land. Quite as strange is the fact that there are beasts which fly in the air, the bats, for example. What is more, duck-moles, although beasts, have yet bills like those of birds; we should have thought that such animals were mythological, truth in this case being as strange as fiction, perhaps even more so.

Not only the variety of animal life is great but also its uniformity. First, every animal has a cellular structure, is, in other words, made up of cells, man as well as the amœbe. Each of these cells is a ball of protoplasm, the same usually covered with what may be called a skin. It would require three thousand of these cells to equal the head of a pin in size. A cell increases in size a certain amount and then divides in two, this being the way in which animals grow. Cells are combined into tissues, tissues into membranes, membranes into organs, those animals which consist of a single cell—and there are such—having no organs of any kind, the animal being stomach and everything else at the same time—a jack-of-all-trades. Secondly, the materials of which all animals are made are the same—air and water, little else. The cells of the body are continually arising, continually wasting away. It is, therefore, as if a gust of wind and a stream of water are all the while the one blowing and the other flowing through the body, the body for the time being consisting of the wind and water in it. Thirdly, a characteristic of all animals is the possession of mind, capacity to feel, usually to know, and to act. A mosquito, for instance, certainly knows something and does something, has therefore a mind, quite as much as Napoleon had one, however superior Napoleon's mind might have been to the mosquito's. A certain animal there is, consisting of a single cell, living inside worms, the same as worms live inside other animals, yet, strange as it may seem, it is possessed of a mind. Legs it has none, hands it has none, head it has none, no organs of any kind does it have, yet it does have a mind. Practically but for a moment does an animal have the same body, that is to say, the same oxygen, hydrogen, nitrogen, and carbon, but forever does it have the same mind.

Now each one of these details about plants or about animals gives us a new notion with regard to the one or the other. For each of them we put a new predicate into our notion of plant or into our notion of animal, as the case may be; that is to say, we form a judgment about the one or the other which we express in a proposition whereof a predicate is affirmed of a subject.

Judgment about plants and animals, it is known, except in some minor particulars, was not arrived at by mankind but gradually, the time taken to get a tolerably good judgment of them having been long, and what was once true of mankind on this subject, it is plain, is still true of individuals on many subjects.

Those of like judgments naturally form a clique, whence it comes about that society is divided into sets, as it were, any one of which disparages the others, a truth which, it is said, Shakespeare meant to set forth in his comedy known as "A Midsummer Night's Dream."

There remains, beside the inorganic and the organic, the mental. Moreover, the mental activities of men are directed, among other things, to practical affairs and to artistic matters.

First, then, it is known that a person of judgment has much better notions relative to practical affairs than a person lacking this judgment. Those who lend money, when inquiring into a farmer's circumstances, let him have the money more readily provided the improvements on his lands be not too good, considering that, if he has put up with more moderate ones, he has better judgment and is, accordingly, more likely to be able to pay what he owes.

People often mistake in their estimates. It was said of a certain man, for example, that he was a good farmer, the opinion prevailing merely because everything was kept picked up on his farm, everything in order, the buildings in repair and well painted. It was not known that a large mortgage was on the farm. The fact is, a farmer may be making a profit, and must therefore be said to be succeeding in his undertaking, although his premises are badly kept.

It was said of a certain man that he was a good financier; all were loud in his praise. He paid his debts promptly, had everything looking well about him. The truth, however, was that his financial ability was small. He had started out with a good property, had not lost it, to be sure, yet during his whole life, if all his accumulations were taken into account, he had not made on the average more than fifty or sixty dollars a year, that is to say, not twenty cents a day.

Persons of poor judgment put great stress on having a house furnished in a particular way, not taking into account that one can sleep just as well on a bedstead which cost five dollars as on one which cost fifty. Carpets and wall-paper and what not are by many deemed essential, whereas in some countries they are rarely met with.

Many persons will not have flour which is not perfectly white, with them the only thing indispensable is its color. To those who have judgment, however, flour not so white is deemed better, that which has in it more of the good qualities of the wheat. Rye bread is despised by a great many on account of its dark color, notwithstanding its nutritious quality. Warm bread, although hurtful to the health, is yet preferred by many, it having been found necessary in Prussia to have a law against people's selling it. Cake in which yellow paint was put once had an extensive sale, notwithstanding the fact that it was so deleterious to health, the reason being that the color of the cake was so brilliant. Of the very same potatoes one man declared that they were the best that he ever saw, another man that they were the worst. The quality of the potatoes for food was excellent, but their skins were rough and they had on them some dirt. The man who considered them the worst that he ever saw evidently bought potatoes merely to look at. Some persons cannot understand how it was possible that the aged Emperor of Germany could have made a meal on rye bread and sausages. Some persons, too, think there cannot be a meal made without a tablecloth and about so many dishes and so many knives, forks, and spoons, whereas Germans often make a meal with hardly any of these things.

Much the same want of judgment is observed respecting clothing. A certain peasant, we are told, could not comprehend how it was that a noted divine could preach, seeing how badly he was dressed. Many persons, it is said, turned away from hearing Barrow, a very eloquent English preacher, on account of the meanness of his attire. They probably went to church not for the purpose of hearing a sermon, but for the purpose of viewing the exhibit of a tailor shop. The Egyptians would not receive Agesilaus as their general, despite his eminent capabilities, seeing that he was poorly clad, was lame, not prepossessing in looks. Once the lackey of a king, having observed Bonaparte, bespattered with mud, helping take care of the wounded on a battle-field, held up his hands in horror, crying out, "Is it possible that this man is Emperor of France!" When the army of Thomas was in danger of starving to death at Chattanooga and Grant and Sherman came to relieve it, the officers of Thomas's army had great misgivings, observing how shabbily Grant and Sherman were dressed.

As to judgment about clothes, many place it altogether on the price, the very same article being with them inferior if it costs less. Merchants, therefore, put the same thing on sale in different parts of the city at different prices, just as the venders of liquors are wont to sell five-cent, ten-cent, and fifteen-cent drinks all out of the same keg.

Judgment about the nature of law is equally remarkable. We should not at first have thought that hearsay evidence is untrustworthy, we should have thought that it is as good as any. We should at first not have thought that the making of an absolutely new law is well nigh impossible, legislation being hampered by principles and precedents.

Political judgment is often wanting, note the prating about the divine right of kings, all the divine right there is being that of properly constituted authority. We might as well talk about the divine right of constables as about the divine right of kings.

One of the most commonly discussed of practical matters is what one shall make the outcome of his life, a theme on which a strange lack of judgment is manifest. We are told, for example, of a certain boy who looked forward to manhood as the time when he might go to California overland, riding in a covered wagon and sleeping in it nights, to do which seemed to him to be the height of all human achievement. Another boy desired that he might be the father of eight sons, so that they with him might constitute a baseball team. Still another boy, urged to get an education, declared that he did not care for it. "Why," said he, "there is so and so," naming a certain clown in the town, "he never went to school but two days in his life, and you can't hardly find a smarter man." It would be incomprehensible to many persons that there are twice a year at Berlin courses of lectures on such subjects as hieroglyphics, dogmatics, and quaternions, attended by thousands.

Respecting artistic matters, how much need there is of judgment is generally admitted.

Many, could they have seen the Parthenon of Athens in all its glory, when as yet it had not been despoiled by the hand of Turk or by the hand of Venetian, would doubtless have been under the necessity of having its good points explained to them.

The statues erected in parks are by some found fault with, by others praised, whence it is plain that one or the other of these must be mistaken.

Wendell Phillips, speaking of the statues of Boston, characterized them to this effect. That of Horace Mann shows him as if he had just gotten out of bed and had brought with him a good share of the bedclothes; that of George Washington shows him as staring up the street, his legs at a painful distance from his horse, and with none of that ease which he was wont to exhibit at Mount Vernon; that of Edward Everett shows him as if he were just rising up out of a barrel; that of Charles Sumner shows him as a burly sailor, pointing his finger at the meat-market; and that of Daniel Webster, placed in the State-house near the stairway, has this advantage only, that persons going up the stairs, as they see it, are compelled to laugh, and are therefore cheered up and rested in making the ascent.

To suppose that Wendell Phillips, though in many respects a gifted man, was totally wrong in his judgment about these statues is indeed permissible, but the main point to be insisted upon is this, that at least *he* or those who differ with him lack in judgment.

Here indeed we have a remarkable instance how necessary it is to take into account the process of judgment if we are to understand the mind, a thing which has usually been neglected.

A great painting has lately obtained celebrity from the report that it was bought for a hundred thousand dollars, people going in great numbers to see it, no doubt paying out in admission fees more than the reputed price of it; but it has since come out that the sale was only nominal, the painter really getting no great sum for it. Except for the belief that it cost so much, few would have admired it.

The operas of Wagner have received very different judgments from different people, showing that some of them are lacking in critical power. For example, the operas are held by certain persons—as indeed they were by Wagner himself—to be the music of the future, the end of all musical attainment, contrasted with whose opinion, however, is that of Tolstoi.

Tolstoi pronounces Wagner's "Niebling's Ring," for instance, to be a model work of counterfeit art. For what do we have, says he, but an actor beating an impossible sword with an impossible hammer, at the same time strangely opening his mouth and uttering something incomprehensible? Then we have him sawing up into pieces the broken sword, which he heats and forges (not this, indeed, but the pretence of doing it), while at the same time he accompanies his action with the unintelligible singing of "Heiho! Heiho! Heiho!"

Wagner has gained a great reputation, says Tolstoi, because he has been able to command *all* the resources of counterfeit art. The audience becomes hypnotized, says he, listening to one of these operas, just as we may suppose it would be hypnotized were it to listen for several hours to the ravings of a maniac delivered with great oratorical power.

As to what is urged by critics, namely, that one must hear the operas much to get their full effect, Tolstoi acknowledges that the point is well taken, but that the same kind of effect can be more readily realized, and with less expense, by getting drunk.

Although the poems of Homer were among the first of literary productions to show judgment, yet Zōilus gave an unfavorable opinion of them. He is, declares Victor Hugo, as certain to be remembered as Homer himself, it being impossible to forget so great a dunce.

Matthew Arnold relates that he was once under the tyranny of Bentham's wisdom, but was delivered from it the moment he read in his writings that Plato talked nonsense. He realized that there were some matters about which even Bentham knew nothing.

Tacitus informs us that persons were found who maintained that the style of Cicero was redundant, turgid, diffuse, inelegant, and egotistic. This, be it remembered, was said of the greatest of all orators, Demosthenes in a few points only excepted, the greatest master of composition that the world has ever known. If he was wrong on so many points, what chance exists that anybody else ever can be right?

Hume asserted that Shakespeare was wholly ignorant of theatrical art and conduct, that we probably overestimate his genius on account of his defects, it being true that things often appear more gigantic on account of being disproportioned and misshapen. Dryden complains of the lameness of the plots of Shakespeare, made up, as he thinks, of ridiculous, incoherent stories, founded often on impossibilities. The only reason, says he, why the Elizabethan age is called the Golden Age of poetry is that people, being then content with acorns, knew not the use of bread. Shaftesbury speaks of Shakespeare's rude, unpolished style, and antiquated form of wit. Chateaubriand makes it an objection against Shakespeare that he did not know the gender, accent, nor exact meaning of words, on account of which he introduces poetic expressions haphazard into the most trivial situations. Pepys has recorded in his diary that he saw Shakespeare's "A Midsummer Night's Dream" played when Shakespeare was still living, and that it was the most insipid, ridiculous play that ever he saw in his whole life. Rymer considered the tragical flights of Shakespeare to be inferior to the neighings of a horse or the growling of a dog. Sardou asserts that Hamlet is an empty wind-bag hero whom Shakespeare has clothed in a dramatic fog and whom the German critics have stuffed with their cloudy notions, with all their uncertain dissertations, with all the smoke of their pipes, and with all the obscurity of their beer-cellars. A Puritan expressed great contempt for the plays of Shakespeare on account of the metaphors which they contain. Somebody has ventured the opinion that the works of Shakespeare cannot live, seeing that they deal with foreign subjects, such as Hamlet, Othello, and Macbeth. An English newspaper observes that places can be found in England where the fame of Shakespeare seems to rest on the belief that he was some sort of a prize-fighter. It having been asked of a Dutchman what character in "Hamlet" he most admired, he replied, "The Ghost."

Booth, we are told, was once playing "The Merchant of Venice" in a backwoods town of Virginia, and wished to take the steamer before he could conclude the whole. He therefore, by previous arrangement, had recourse to a trick. The trial scene coming on, Antonio said to Shylock, "I'll tell you what I'll do, provided you forego the pound of flesh, I'll give you, in addition to what money is coming to you, fifty caddies of tobacco!" "I'd be foolish," replied Shylock, "not to take it," whereupon the play was brought to a close, all who saw it being highly delighted, especially the captain himself, who, on the way down the river, told Booth that he "never knew before that there was so much in that Shakespeare."

Mary Wortley Montagu said of Pope that he is all tune and no meaning; Shenstone, that no poet ever brought so much sense into the same number of lines. Voltaire declares that the "Essay on Man" is the most useful and sublime didactic poem ever written; Black, that it is a tedious and stilted effort. Taine says that we need much self-command not to throw down the "Dunciad" as insipid and even disgusting; Williams, that the "Dunciad" is the greatest feat of the humorous imagination in English poetry. Johnson pronounces the translation of Homer as being the greatest work of its kind; Dennis pronounced it a failure.

Objection was made by a teacher of Greek to the rendering which Pope makes of a certain passage in Homer, and being asked what the passage really meant, he conveyed as good an idea of it as he could, whereupon the questioner exclaimed, "If that is what Homer meant, then Pope is a greater poet than Homer."

It has been objected to Macaulay that certain trees which he mentions as oaks were really elms, that it is doubtful whether what William hunted were not really some other animals than stags. One of the most prominent defects of his history, says Croker, is its style, a point on which he is followed by others. On the contrary, the great writers of the world have expressed their admiration of the thoroughness of the researches of Macaulay and his general accuracy, while as regards his style, they consider it a marvel of perspicuity and effectiveness.

Psychology, indeed, furnishes us a means of understanding much when it acquaints us with the nature of the process of judgment, a process of such a kind that whereas one's opinion on one subject may be good, on another it may be worth nothing at all.

The notion which one entertains on anything can be only general, somewhat vague, perhaps, without he has put into it those predicates which specify it, or, what is the same thing, bring it down to particulars. The startling and absurd statements which one often hears on various topics should, therefore, not in the least surprise him.

CHAPTER VIII

REASON

Reasoning may well enough be defined as knowing by implication—knowing something from knowing something else. To state the matter differently, through reasoning we know a characteristic of a thing by means of a characteristic of that characteristic of it; to say this still another way, through reasoning we know a predicate of a thing by means of a predicate of that predicate. To take an example, a man—half-asleep perhaps—discovers that his house is on fire, not merely because he smells smoke—that might be from his lamp—but because he smells smoke with a woody scent. This woody scent is here the characteristic of the characteristic of the thing, the predicate of the predicate. Reasoning, in short, consists in assigning an attribute to a thing on the ground of some other attribute of it, the attribute of mortality, for instance, to Socrates on the ground of his attribute of humanity.

The expression of a reasoning in the simplest manner was called by Aristotle an enthymeme—for example, "Socrates was mortal, because he was a man;" the more definite expression of it, a syllogism—for example, "All men are mortal; Socrates was a man, therefore Socrates was mortal."

The characteristics of things are represented in the mind by notions, so that the process of reasoning is said to be the forming of one notion out of two others. The notion of woody smell, for instance, merged into that of smoky smell, gives us the notion of smoking wood, that is to say, the notion of wood on fire. Notions, moreover, are images in the mind for which words stand.

Reasoning takes place on theory and from practice. As it takes place more especially on theory, it is quantitative, qualitative, and relational. As it takes place more especially from experience, it is inductive. Reasonings, therefore, naturally divide themselves into four great classes—first, reasoning from equalization; secondly, reasoning from consistency; thirdly, reasoning from dilemma; fourthly, reasoning from example.

Reasoning from equalization consists in recognizing that two quantities are equal because each of them separately is equal to the same third quantity, A equals B, for example, because A as well as B equals C.

We may take as an illustration what is known as the theorem of Pythagoras. We draw a right-angled triangle, and upon each of its sides a square, then draw certain other lines. We now show that the square upon the hypothenuse is just equal to certain spaces which themselves are just equal to the square upon the base added to the square upon the perpendicular, whence things which are equal to the same thing being equal to each other, the square on the hypothenuse of a right-angled triangle is proved to be equal to the sum of the squares on the other two sides.

The solutions of trigonometry, as is well known, depend on this theorem, whence for the results of trigonometry Pythagoras may claim credit. As, then, engineering depends on trigonometry, engineers themselves get their credentials from Pythagoras, he having in effect given them permission to measure inaccessible heights, distances which cannot be traversed. Indeed, Pythagoras gave mankind permission to lay out roads, build bridges, and dig tunnels. As, moreover, the measurement of our lands in the last resort depends on trigonometry, the titles of our lands are actually derived from Pythagoras.

A system of triangles has been laid out by surveyors, which extends from England to Russia, likewise a system of triangles which extends from Maine to California, which two systems are to be pushed into Asia to meet. Particular surveys, as of farms and lots, depend on these general ones.

Let us pause to reflect that the reasoning of Pythagoras, on which trigonometry rests, itself rests on the principle that things which are equal to the same thing are equal to each other. Who would have thought that on a foundation so slight such a mighty superstructure could have been erected? It might have been objected to Pythagoras that it is the merest truism that equal quantities are equal, that no possible good could come from the consideration of a truth so barren; but the spaces which he found to be equal, either of them, to the third space, are very different the one from the other—herein lay his chance of success. That *A* equals *A* may seem a very trite proposition; not so, however, if the one *A* is made up in a manner very different from the other *A*. It might have been objected, also, to Pythagoras that he was but wasting his time considering abstractly the question of squares on a triangle. The way for him to do, it might have been said, was to go out into the fields, measure pieces of land, observe how things are! For how could it be possible that, sitting in his easy-chair, in a room where, perhaps, he could not even see out-doors, he could yet prove what must be true upon the moon?

According to tradition, when Pythagoras had proved that the square upon the hypothenuse of a right-angled triangle is equal to the sum of the squares upon the other two sides, he returned thanks to heaven, making an expensive sacrifice. The vast results which have flowed from his discovery well justify the ardor which he exhibited. For through him mankind has been able to measure the earth and to weigh the mountains.

Pythagoras, moreover, precipitated a crisis in human affairs—humanity could never be what it was before. He had discovered mathematical reasoning, thereby changing the course of history. Euclid afterward worked out that great geometry which is still used in our schools, either by way of translation or by way of adaptation. Following the path opened by Pythagoras, the Greeks discovered reasoning in general, a circumstance which explains all about them. The governments of the Greeks were democratic, governments by discussion, the principle of which is that an appeal is made to reason. The architecture, sculpture, and painting of the Greeks were characterized by perfect symmetry—inconsistencies, that is to say, contradictions, were excluded, reason being the faculty which detects them. Similarly it was that the literature of the Greeks was rational—it had unity and point—the small points, moreover, were subordinated to the great ones. The Romans applied reason to law, carrying back jurisprudence to principles of eternal justice, the same as Euclid had carried back geometry to the principles of space. The Romans likewise employing the principle of reason in the state, arrived at unity of administration, introducing consistency into the management of their affairs. Their notion of the unity of superintendence led to their choice of what are known as the emperors, though these were not emperors in the modern sense. They were merely the managers of the republic, somewhat like our presidents. Pythagoras having, then, set in motion the course of events which finally culminated in the Roman empire, well exemplifies the saying that truth is stranger than fiction.

Pythagoras lived in Crotona, Italy, where he had as disciples six hundred others, who, together with their families, all lived in the same house. They all observed certain rules—rose before the sun, recited verses, listened to music, thought how each might best pass the day; took then solitary walks, meditating the while; next they came together for conversation, took gymnastic exercises, and dined on bread, honey, and water, meat not being eaten; in the afternoon they looked after their affairs, took their baths, and performed religious rites. Before going to bed each took a retrospect of the day, what he had missed, what he had gained. It was enjoined on a new disciple to keep still about the truths communicated to him; moreover, these truths were first given to him in symbols which might mean one thing or another, so that the curiosity of the learner was excited. If he persevered, however, the abstract principles of truth were in time revealed to him. Pythagoras talked to his hearers from behind a curtain, so that no gesticulation, no change of features might impress them, nothing but the truth. When he appeared among his followers he wore a white gown and on his head a gilded circlet. His beard, moreover, was white, long, and flowing.

For the great services which he rendered mankind he received no pay, indeed, did not ask any; like Agassiz after him, he did not have time to make money. Some persons, he said, came into the world to sell goods, others to eat; as for himself, he came into the world to look on. He was an inspector of mankind, with a view to bettering society.

Another illustration of reasoning from equalization may be given. It is proved that a geometric ratio will amount to more than an arithmetic one, a geometric ratio increasing by an increasing amount, an arithmetic by a fixed amount only. For, as a geometric series goes on, the point is reached where its increment equals or surpasses the increment of the arithmetic one; accordingly, this increment, being all the while multiplied, will not only submerge the previous accumulation of the arithmetic series, but its future accumulation as well.

That an arithmetic series cannot equal a geometric one may seem a very trivial matter, yet it is fraught with momentous consequences.

Malthus pointed out that whereas animals have the power continually to double their number, the land has not the power continually to double its crop, animals increasing in geometric ratio, food in arithmetic only. The matter is made still worse by the fact that there are many kinds of animals virtually dependent on the same kind of food. It is, therefore, as if the food of the earth were divided into a certain number of rations, the animals to eat them exceeding that number. As, however, animals cannot live without food, therefore neglecting the matter of insufficient nutrition, the truth arrived at is merely this, that animal life presses on the means of subsistence, whence the struggle among animals to get a living.

Darwin teaches that all the manifold kinds of animals have been formed by this struggle. The discovery of this, with whatever is accessory to it, is to be set down to the credit of the reasoning that a geometric ratio must exceed an arithmetic one.

By means of this reasoning, also, we are enabled to know things regarding the past, present, and future history of mankind which could hardly otherwise have come to light.

The population of the earth was once very small, indeed, did not come to be considerable till people learned how to farm or to keep flocks. We know this because great populations, not being able to subsist without a proportionate supply of food, could not have means whereby they might live previous to farming or to keeping of flocks. Neither the spontaneous productions of nature nor what game could be taken would have been sufficient to supply their wants. Or, perhaps we might better say, not till men learned to till the soil and to do so systematically did there exist enormous populations on the globe, before that time there not having been food enough to support them. For instance, a portion of America where once only forty thousand natives could subsist by hunting and fishing, afterward supported three millions of colonists, these subsisting on agriculture and manufacturing.

We may draw a subsidiary inference here. That part of the world in which agriculture first got a sure footing, presumably Mesopotamia, was the place where civilization originated, great populations and life in great cities being necessary to the birth of civilization, neither of which could obtain without agriculture, agriculture being necessary to great populations, great populations to cities.

We have here something which may account for the fact that so many peoples trace their origin back to regions lying around the Caspian.

We have explained, too, why the population of England is now very large in comparison with what it was in the Elizabethan age; the machinery and other inventions of recent times greatly increase the food-supply of the world, enabling one to do what once it took many to accomplish.

When, moreover, the entire earth shall have been brought to the highest state of cultivation, and when all the means of saving and organizing labor shall have been exhausted, the population of the earth will not increase any more.

Such a state of things, indeed, has already practically been reached in France. There is a farm to about every six persons, usually owned by the proprietor himself. More than half of the entire population of the country is engaged in tilling the soil. This result obtains from the fact that the farms are small, the average containing not much more than twenty acres, half the farms less than six acres, many as little as two and one-half. The farms are used to the very best advantage, and, as the population does not increase, each generation is in a little better circumstances than the one which preceded it.

Thus does the proof that a geometric ratio outruns an arithmetic one furnish us with clues to much of importance.

Reasoning from consistency depends on the principle that the universe is a closed system of causes, each cause producing its effect.

We have this reasoning exemplified in what is known as circumstantial evidence, such as is taken cognizance of in our courts of justice, an instance of which may be given.

Several men broke into a house in the dead of night, presumably to rob the inmates, but being discovered, an affray ensued in which the man of the house was killed. Those who had broken into the house then ran away, leaving behind them a piece of candle. Strangely enough, this was found exactly to match another piece which was in the house of a man supposedly concerned in the crime. The original candle, it seemed, had been cut in two by a knife, showing the wick pressed in the same direction and left in the same position in both pieces. The kind of candles of which these pieces were samples was kept by one dealer only in the village. Of him, it was shown that a member of the man's family in which the second piece of candle was found had purchased a candle a few days before the night in question. No satisfactory explanation could be made why they had bought it or to what use they intended to put it. The man whose family purchased the candle was in bad repute. Remarks previously made by him caused suspicions to rest upon him. It was maintained, moreover, that his voice was recognized in the house where the man was murdered about the time the murder took place.

How could all these circumstances perfectly harmonize with the supposition that he was implicated in the crime unless he was actually implicated in it?

Of course, if it could have been shown that even the most trivial circumstance in the case was at variance with the hypothesis that the man was privy to the murder the proof would have failed. A *reductio ad absurdum* would have been instituted. For this kind of reasoning requires consistency in all things. Could it have been shown, for example, that a great many candles of the kind in question had been sold in the village by different dealers, and repeatedly to the family suspected, the evidence against the man would not, to say the least, have been as good as it was. Could it have been shown that the cutting of a candle in two with an ordinary knife will generally leave the wick and other materials in about the same condition in which they were in this particular case, the evidence would have been somewhat shaken. Could it have been shown that a single thread of wick in one of the pieces of candle had a position not consistent with this piece matching the other, the evidence would certainly have failed. Could it have been shown that the materials in one piece of candle were different from those in the other piece, nothing would have been made out.

When we consider the great number of cases coming before our courts in which the whole matter turns on such reasoning as this, we are made aware of the great importance of it. Famous cases, indeed, might be cited, such as that of Freeman, in which Seward made one of the greatest speeches of all time—of the kind of speech, perhaps, the very greatest.

We have another instance of reasoning from consistency, when by means of such reasoning a lost and dead language is deciphered, as, for example, the Egyptian.

Napoleon's engineers, while engaged in throwing up breastworks in Egypt, discovered by accident what is called the Rossetta Stone, a piece of basalt upon which something was inscribed in Egyptian, together with a translation in Greek. For ages nobody whosoever had been able to read a word of Egyptian. How, then, was this now to be read? How, if not on the principle of consistency? What was inscribed upon the stone must be consistent with itself, every part and circumstance with the whole, every part and circumstance with every other part and circumstance. Indeed, this must be so, or the Egyptians themselves could have made nothing out of it. Everything in the Greek must have something equivalent to it in the Egyptian, or the Greeks themselves could not have gotten from it the same sense which was contained in the Egyptian, the translation would have been absurd. What is more, it was actually stated in thc Greek that it was an equivalent of the Egyptian.

The name of Ptolemy, which occurs in the Greek, would correspond to some word in the Egyptian, this word, moreover, could be found in the Egyptian from its position. And the word being discovered, of course the characters by which it is spelled would be discovered also. On the same principle, indeed, from other proper names in the inscription still other characters could be made out.

The inscription upon the Rossetta Stone is a decree of the priests in honor of Ptolemy Epiphanes, one hundred and ninety-five years prior to the birth of our Saviour.

The same process which was applied by scholars to the Rossetta Stone was applied by them to other stones. The decree of Canopus is an instance. Before the days of Christianity the priests of Egypt held a conference in the town of Canopus, at which they passed a resolution eulogistic of Ptolemy Euergetes, having the same inscribed upon a stone both in Egyptian and in Greek. Twenty-one hundred and four years afterward, almost to a month, that is to say, in our own times, Lepsius, the German savant, discovered this very same stone at Tanis in Egypt.

Pillars of stone were also found upon which Darius, the great organizer of the Persian empire, had put, twenty-four hundred years ago, an inscription, both in Egyptian and in Persian. These inscriptions, as was said, besides their other uses in the decipherment, furnished proper names which could be spelled out in Egyptian.

The meaning of Egyptian words other than proper names could, on principles of consistency, be come at in several ways. The Coptic language, as found in a translation of the Bible, being descended from the Egyptian, has somewhat the same names for things as the Egyptian itself. The Egyptian names for things, moreover, could be gotten from the tombs, where are still pictures of most objects with the names attached. These words must agree with the Coptic, or nearly so.

What was read upon the Rossetta Stone, what was read upon the stone found at Tanis, what was read upon the pillars of Darius, and what was read in the tombs would have to be consistent, the one with the other, as well as with the translations in Greek, Persian, or Coptic.

Following up these clues, scholars have been able to read the lost language of Egypt. They read, for example, on the walls of Karnak the poem of Pentaur which praises the deeds of Rameses the Great. Unwrapping a mummy, moreover, they read the funeral ritual of the Egyptians which was used thousands of years before the birth of Christ. They read also in the tombs around the great pyramid the names of men attached to their portraits, men, indeed, who lived as long before Rameses as Rameses before Christ.

A complete dictionary of the Egyptian language is in process of completion, the meaning of the Egyptian words in their several applications being ascertained, thanks to reasoning from consistency.

On the same principles it was that the Assyrian language was made known to us. The libraries of Nineveh and Babylon, together with those of their suburbs, had been buried for ages. Xenophon makes no mention of Nineveh, although he passed by the site of it long before the Christian era—even then it was covered with earth. The libraries were there in the ground, imperishable because they had been written upon clay, the which had then been burned. Xenophon, however, could not have read the libraries, even if he had known about them—their treasures were apparently locked up for good. It was not till our own times that the language was deciphered, it requiring the labor of many men for many years. Grammars and dictionaries were found in the libraries, and, strangely enough, certain mistakes in them, a result which also well illustrates the wonders of reasoning. Nebuchadnezzar's bricks were found with his name stamped upon them, although he lived so long ago as when the temple of Solomon was still standing.

The principle of consistency is much more used than we should have supposed, a great deal of reasoning resting upon it rather than upon the principle of induction. Astronomy is a case. When we take into account that looking at the planets with a good telescope is like looking at objects with the naked eye twenty-five hundred miles off, it becomes apparent how little we actually see with our eyes. Astronomy rests rather upon consistency of theory than upon observation, we assuming that to be the truth about the heavenly bodies which perfectly harmonizes with itself. The same thing is somewhat true of physiology. It would be difficult to observe all the processes of the body from beginning to end and in connection with one another. Our physiology is in great part merely a theory which is consistent with itself. Geology exemplifies the same thing. Men pretend to say what was the climate of Greenland millions of years before they were born, a climate somewhat resembling that of Florida, such as it might have been pleasant to pass a winter in, had there been anybody on earth to enjoy it. Agassiz made us believe that he knew how the bowlders got where they now are, although no record regarding them has come down to us from the misty past. Physics may likewise be appealed to in this connection. Men undertake to say that throughout the universe no particle of existence is ever lost, though manifestly they have not been watching every particle of existence from all eternity to see just what became of it. Theology, as we know, proceeds much the same way. Men assure us what were the decrees of God in the dateless past, what in future will be the issues of the judgment. Reason, indeed, rivals clairvoyance, even if all that is claimed for clairvoyance be true. Reason, declared Cardinal Newman, reaches to the ends of the universe and to the throne of God beyond them.

We have, in the third place, reasoning from dilemma, disjunctive reasoning, as it is called, a subject naturally falling under two heads, non-mathematical and mathematical.

Of the first kind, the best known instance is that of Demosthenes against Æschines—"Æschines either joined in the public rejoicing or he did not. If he joined in it, he was inconsistent with himself; if he did not join in it, he was unpatriotic. On either horn, one of which must be true, he was at fault."

The second part of the subject, that of mathematical dilemmas, is of especial importance.

It is an example of this kind of reasoning when we prove that two triangles are equal because the one is neither greater nor less than the other, only three alternatives being possible, either that the triangles are equal, or that one is greater than the other, or that one is less than the other.

The method by which Archimedes proved that the ratio of the diameter to the circumference is about 3.1416 is an example of disjunctive reasoning. For the length of the perimeter of the regular inscribed or circumscribed polygon is determined by the length of one of its sides. A side of the polygon, however, is a side of one of the equal triangles into which the polygon can be divided. The side of the polygon, moreover, is determined by the length of half the diameter of the circle. Out of the equal parts, therefore, into which the circumference falls, Archimedes deduced the length of the circumference, the dilemma being that either the whole or all its parts are the same.

Mathematical reasoning from dilemmas has applications to business. Take, for example, the device by which one may pay for a house in installments. If a man pay seven hundred and thirty-six dollars for a house at once or pay one hundred dollars a year for ten years it is the same thing, counting interest at six per cent., whence he may have the privilege of making use of this alternative—dilemma, if we wish to call it so. What is much the same thing, if a man pay eight dollars a month for ten years, he pays seven hundred and thirty-six dollars for his house and six per cent. interest on what debt remains till the whole is paid, this debt all the while decreasing—he pays about this much, indeed, on this plan.

The Prussian Government, after the Napoleonic wars, obliged the great landlords to sell out part of their lands in small pieces to peasants, the landlords receiving from them a small sum each year for a term of years, the sums exactly paying for the lands, together with interest.

What is called an endowment is arranged on the same plan. If one pay two hundred and fifty-six dollars and fifty cents to a trust company every year, this at six per cent. compound interest will amount to ten thousand dollars in twenty years. Anyone, accordingly, by paying in a certain sum each year may at the end of a certain time receive a certain sum.

On the same principle it is shown that a man sixty years old who has, since he was twenty-one, accumulated sixty thousand dollars, has in reality saved no more on the average than one dollar and seventy-five cents a day, money at four per cent. We have the instance also of a man who enjoyed exceptional advantages in business and who, after fifty years of active life, died worth three hundred thousand dollars. It is shown, however, by mathematical calculation that, with all his advantages, he saved on the average no more than one thousand dollars a year, the rate of interest being taken rather high. If at the beginning of the Christian era, one cent had been put out at compound interest, even at a very low rate, the amount of the same would now be enough to buy out everything on earth.

The principle of paying by installments is also extended to what is known as irredeemable bonds. If money be valued at two per cent., it is all one whether a bank receive two per cent. on money for a hundred years, getting at the end of that time the principal back, or receive a trifle more than two per cent. for a hundred years, not getting the principal back at all.

Another case of reasoning from dilemma is exemplified in life insurance. Of any thousand persons of the same age about the same number will die in a given time. We know, therefore, beforehand, as it were, just how long each person will live, since from a business point of view it makes no difference whether one person die or another. On the whole, just so many will die in such a time anyhow. Every time of life, therefore, has its expectancy, as we say. If one is thirty-three years old, he has the probability of living thirty-three years, but if fifty-three years old, the probability of living but nineteen years. On this basis it is that every man pays according to his age to receive a certain sum when he dies. For example, if one is twenty-five years old, he pays about twenty dollars a year; if fifty years old, about forty-five dollars; if sixty-nine years old, about one hundred and nineteen dollars—any one of them to receive at death one thousand dollars. A man who is ninety years old would have to pay about four hundred and eighty-five dollars a year to receive a thousand dollars at death.

Not only is it known how many will die on the average each year, but it is also known how many will die on the average in any specified time, say in twenty years. It is possible, therefore, to insure one for twenty years instead of for life, he receiving at the end of that time the sum for which he was insured, the same as if he had died.

The principle of life insurance, it is plain, can be applied to a great many other subjects besides, it being known as the doctrine of general averages. The best known examples are fire and marine insurance. One by paying so much annually is entitled to receive a certain amount should his house or goods be burned, should his ship or goods be lost at sea. The theory is that just about so much property will on the average be destroyed by fire anyhow in a given number of years, about so much property in a given number of years be lost by shipwreck.

The same principle is applied to the collection of debts. It is known, for example, that in a given business a certain percentage of the debts cannot be collected, say fifty per cent., or one-half. If, therefore, as much again be charged, the matter of bad debts may be neglected. As high charges, however, have the tendency to keep those who will pay from making use of things, it is manifest that the principle more especially applies to a business wherein the loss by bad debts is small, say five per cent.

The principle is also made use of in estimating things, the yield of crops, for example. Suppose that we nail four laths together so as to leave in the middle just one square foot. Taking this frame into the field, we may bring it down wherever we please, so that we enclose in it just one square foot of the oats, wheat, or what other grain grows in the field. Threshing this grain out and weighing or measuring it, we know the yield per square foot, multiplying which by the number of square feet in an acre we know the yield per acre. To be more accurate, we may try the same experiment in several places of the field and take the average result of these experiments.

We have the case of a landlord detecting the theft of his tenant on the principle of general averages. Having computed the number of hills of maize on his land, and from trials in several places determined the yield per hill, he knew beforehand about how much his share of the maize should be, so that although the tenant claimed that his own crib contained no more than his own share, yet the landlord knew better. An investigation, indeed, demonstrated that under one of the cribs the tenant had a cellar which he had filled with the surplus.

It is often stated that in certain kinds of business, there being a great many such, ninety-eight per cent. of all those who engage in them fail. The theory, however, may be ventured that such business, scientifically, though not morally, is of the nature of gambling. Those who engage in it are like a man tossing up a penny. On the average the penny comes down tails about as often as it does heads. The result will be that nobody engaging in such business will make anything. Not only ninety-eight per cent. of those engaging in it fail, but one hundred per cent. The few who seem to succeed in the business really do so on account of cheap living, cheap help, or something of the sort.

Here we have the doctrine of chances, namely, that it is possible from the conditions of an event to express in numbers what is the probability of its happening. La Place, for example, undertook to show that, unless we assume the truth of the nebular hypothesis, the improbability of the planets being as they are is well nigh, if not actually, infinite. The probability that a hungry dog will eat food when the same is placed before him has to be expressed by such a large number as to be practically infinity. We have, indeed, the joke of a German student, who said he would attend a lecture at the university provided his dog did not eat the sausage which he was about to offer him.

Reasoning from example, the inductive process, depends on the principle which we may designate as the sameness of causes—what is observed of a combination of things will always happen upon such combinations, like causes always producing like effects.

This kind of reasoning finds illustration in the knowledge we have obtained of electricity and of chemistry.

Volta observed that two metals connected by wires, tin and copper say, if a moist substance be between them, generate a current of electricity. Galvanic batteries are, as a matter of fact, only an example of this, the metals used being ordinarily zinc and copper, the moist substance between them vitriol water. Such a combination of things actually produces electricity—it will therefore always produce it, like causes being under the necessity of giving rise to like effects. This is a reasoning possible to be made from one observation merely, provided that observation be thorough and exhaustive, the force of the reasoning not depending on the number of examples, but on the identity of causes.

Ampère discovered that a spiral current of electricity has just the same effect as a magnet, what is the same thing, that an electro-magnet is possible, that is to say, a magnet that can be made or unmade at pleasure.

Faraday observed that breaking currents of magnets starts currents in the opposite direction. Magnets revolving so as to pass an armature, or an armature so as to pass magnets, therefore, generate a current of electricity, as we observe in the use of the dynamo.

We have thus three simple reasonings from example which have revolutionized the world about us. The lighting of houses and streets by electricity, the moving of cars and wagons by it, and the sending of messages by it—these all are dependent on one or more of these simple reasonings.

These men, then—Volta, Ampère, and Faraday—may be considered as a triumvirate, exercising government over utilities, it being by their permission that we have our houses lighted, ride on cars, and forward messages.

The reasoning of Volta is practically the fundamental one, since it led to the others, but this reasoning itself was derived from an observation made by Galvani that the flesh of a frog placed between two metals produces a current of electricity.

Galvani made the experiment of hanging skinned frogs on the railing of his balcony, thinking he might elicit some fact relative to animal electricity. The wind swaying the frogs to one side caused them to touch the upright rods. The frogs, being thus between two metals, twitched as if they were alive. This was the original battery, the frog battery, we may call it, the battery from which all others have descended.

Galvani was led to make this experiment, as tradition has it, because his assistant, operating an electric machine, had noticed that a skinned frog which he touched with his knife twitched and jerked its muscles. Madame Galvani, in skinning those frogs for dinner, did better than she knew, furnished her husband with the means of making one of the greatest discoveries on record. In its most primitive form, then, the reasoning on which the battery depends was made by Galvani, and it is in recognition of this service that the battery is called galvanic.

It is among the curiosities of destiny that, though by means of this reasoning of Galvani so many men have been enriched and so many afforded conveniences, he himself was neglected and died in poverty, a proof of the saying, "He saved others, himself he could not save." At this late day, however, a statue to him has been erected in Bologna, where he made his famous reasoning.

Reasoning from example is equally important in the case of chemistry. Priestley observed that a certain form of mercury, known as red oxide, when it is sufficiently heated, gives off oxygen, a gas which he found supports combustion. As like causes produce like effects, it was established that whenever and wherever this kind of mercury is in this way heated oxygen is sure to be given off.

It has been said that Priestley discovered oxygen, men speaking as if what he did was after the manner of his finding a coin in his path. This, however, is not what he actually accomplished. What he did was to make a reasoning, namely, that the heating of red oxide of mercury, as he heated it, will evermore cause it to give off oxygen. Any savage, indeed, might have observed all that Priestley saw without being any wiser. The point is that what Priestley brought to pass was not due to experiment merely. The experiment, for all we know, and probably, was made many times before. The reasoning could not have been made without the experiment, to be sure, yet it was the reasoning from this experiment that was of chief importance.

By observations similar to those of Priestley, though these were often complex, it has been ascertained how each of the so-called chemical elements, more than seventy-five in number, can be obtained. Not only so, but it has been ascertained how by the removal or addition of some elements useful materials can be obtained from certain things. We have thus, through simple reasoning from example, the chemical receipts for the making of commercial products.

So many useful articles are manufactured by the use of these receipts that the knowledge of the chemist may be said to have revolutionized industry.

The knowledge of the chemist over a wide range of subjects is ubiquitous and eternal. The chemist, although he has never been to Africa, will yet tell you in all confidence that a certain combination of materials will there produce water-gas the same as it does here. The particular combination of materials and conditions which are known to produce it now will produce it a thousand years hence. He sees to the ends of the earth and to the remotest ages of the future. He is clairvoyant and prophet.

Were it true that all the reasonings which have established chemistry were actually made by Priestley and derived from him by others, then, it might be said, he gave mankind permission to have the things which, thanks to chemistry, they enjoy; but the principle is not changed because there were many reasonings, one made by one man and one by another. For from these men, taking them collectively, mankind gets permission to have these things. Priestley may, in fact, stand as the representative of them, the chairman of the committee, so to say, for providing people with good things.

Around the grave of Priestley an assemblage of scientists has paid him the respect to which he was entitled for the importance of his discovery, besides, a tablet to his memory has been set up in one of the churches of Philadelphia.

Thus he is somewhat compensated for the fact that when he was a young man he received but one hundred and fifty dollars a year for preaching and that he paid a quack a hundred dollars to cure him of stammering, without avail. He is also somewhat compensated for the fact that, owing to his sympathy with the French revolutionists, a mob burned down both his house and his church, besides also destroying his papers and apparatus, this occurring in England previous to his embarkation for America. He is also somewhat compensated for the fact that he failed, owing to his view of the Trinity, to be appointed to accompany Captain Cook to the South Seas.

It is well known that Priestley was a Calvinist and believed, therefore, that whatsoever comes to pass has been determined to do so beforehand. Reflection on this doubtless led him to the view that like causes produce like effects. Whatever a given combination of materials under the same conditions will produce, they will under those conditions any time produce. This, as was said, was the principle on which he proceeded.

This, in fact, is the same thing as the principle of the identity of things, namely, that every ultimate force of nature always being the same, existing as it does without reference to time, will always produce its one sole effect.

Inductive reasoning, it should be observed, is, like all other reasoning, merely syllogistic, the major premise being here the principle that like causes produce like effects.

CHAPTER IX

SYSTEMATIZATION

THE mind is able not only to discover specific conceptions of the aspects of things, but is also able to discover systems of these conceptions, attaining in this way specific classifications. This process of the mind we may call systematization. It is not creation, the systems being of things as they are.

The principal kinds of systems which the mind thus arrives at, speaking generally, are mathematical, physical, biological, and psychological.

The decimal notation is an instance of the mathematical kind. We number things by a system of the powers of 10. Thus, the first power of 10 is 10, the second power of 10 is 100, the third power of 10 is 1,000, and so on. Moreover, 1 is the zero power of 10, and the reciprocals of the powers of 10 are powers indicated by negative exponents. Then, how many times a power is taken we show by a coefficient. To take an illustration, the number three thousand five hundred sixty-one and seventy-five hundredths is written 3,561.75, as if it were $3a^3 + 5a^2 + 6a + a^0 + 7a^{-1} + 5a^{-2}$ $(a = 10)$. We omit in practice the literal part, understanding it merely. On this plan, it is plain, we can designate in the briefest way imaginable any number whatsoever. The mind reached a great conception, therefore, when it discovered the decimal system, or rather, as we might say, the power system, since the principle can be applied no matter what the base.

The mind also attains to a system of vast importance when it discovers that calculations depend on finding the sum or difference of numbers, and in a simple and easy manner. Numbers in the first place are whole or fractional, and they are like or unlike. The process of finding the sum of unlike numbers is addition, which we perform merely by adding units and carrying tens, not having to have a frame with balls on it, as the Chinese do. The process of finding the sum of like numbers is multiplication, which we perform by multiplying units and carrying tens, writing each result in the proper column. The process of finding the difference between two numbers or what remainder survives when one number is taken from another is subtraction, which we perform by subtracting units and carrying tens. The process of finding how many like numbers can be subtracted from a given number and what the remainder is is division, which we perform by dividing units and carrying tens. The process of multiplication, when the multiplier is the same as the multiplicand, is involution, and the process of division, when the quotient is the same number as the divisor, is evolution. Any case whatsoever of finding the sum or difference of whole numbers is thus brought under one or the other of these six processes, each very simple in itself, a systematization hardly to be overestimated. To perform all these operations, moreover, we have merely to know the tables up to ten. Fractional addition and subtraction are performed by reduction to a common denominator, and then procedure as in the case of whole numbers. Fractional multiplication is performed by multiplying the numerators for a new numerator, the denominators for a new denominator. This process, which includes in itself all cases of multiplying fractions, also includes in itself all cases of the division of fractions, with this proviso only, that the divisor be inverted. If the fractions are expressed decimally, the operations, it is plain, are the same in all respects as in whole numbers.

It is related by a man that when he was a boy and began to attend school, though he was now eleven years old, he was greatly impressed by seeing an older pupil write several fractions on the board and after a simple process write their exact sum in whole numbers and parts thereof, and well he might have been impressed. Indeed, the papers of the Egyptians show us that the labor was great whereby the human mind so systematized conceptions as to be able to accomplish such a feat.

Series, such as the binomial, the arithmetic, the geometric, and the logarithmic, also show systematization.

The binomial series expresses the amount of the sum or difference of any two numbers multiplied or divided by itself or both, any number of times. All this, however, can be put into the form of a binomial multiplied by itself any number of times, since we can use negative and fractional exponents as well as positive and integral ones. We can also reduce the serial part of the expansion to the amount of 1 plus or minus any number, raised to any power. The series will then consist of 1 plus the powers of the number which was added to 1, from zero upward or from zero downward, and with certain coefficients which follow a law. The coefficient of the first power of the number is the exponent divided by 1, the coefficient of the second power is the product of the exponent into a number 1 less than the exponent, this product divided by 1 times 2, the coefficient of the third power is the exponent multiplied by a number 1 less than the exponent and by a number 2 less than the exponent, this product divided by 1 times 2 times 3, and so on. Here, then, we have a great means of making calculation, since in one series, proceeding according to laws, we have grasped all the operations of arithmetic.

An arithmetic series is one in which the terms increase or decrease by a common difference. Five points are involved, the first term, the last term, the common difference, the number of terms, and the sum of all the terms, any three of which being known, the others can be found on principle, whence the advantage of this series.

A geometric series is one in which the terms differ in a constant ratio, the series being increasing if the ratio is integral, decreasing if it is fractional, and involves the five points, any two of which are determined by the other three.

An arithmetic series, moreover, bears a certain relation to a geometric one, for if we take the series 10 + 100 + 1,000 + 10,000, and so on, we observe that it corresponds to the series 1 + 2 + 3 + 4, and so on, since each term in the second series designates to what power 10 must be raised to produce the corresponding term in the first series. Now every number may be considered as the sum of a geometric series, that is to say, as some power of 10 multiplied by 1. There is corresponding to every number, therefore, another called its exponent which shows to what power 10 is to be raised to produce it. Having, then, a table of these exponents, called a logarithmic table, we can multiply numbers without multiplying them, divide them without dividing them, and the like, get at arithmetic results through the exponents. What a triumph of the mind in systematization!

The logarithm of any number depends on a series of the powers of a number 1 less than that number, the first power divided by 1, the second by 2, and so on, the odd terms being plus and the even terms minus. Thus from this logarithmic series and its derivatives we can find the logarithm of any number whatsoever.

Another class of mathematical systematization is that which has to do with surfaces and solids. Properties of the different kinds of polygons and of circles and of the different kinds of polyhedrons and of spheres and of cylinders and of cones are subject to a system of conceptions. Take, for example, that simple case that the area of any triangle is equal to the product of the base into half the altitude. What an importance must attach to it! Take also the case that the surface of a globe is the same as that of a cylinder with the same diameter. Every solid, moreover, has its contents determined by the area of some surface or surfaces, and these surfaces are in the last resort resolvable into triangles. How great, then, must be the importance of the system of conceptions under which triangles exist! It is found, indeed, that if we know one side of a triangle, we can find the other two sides on principle, provided we also know two of the angles, or knowing one angle and two sides we can find the other side and angles. We come thus to have what are called trigonometrical formulæ for finding the dimensions of triangles. What is more, geometrical figures may be algebraically expressed, geometrical truths arrived at analytically.

Physical systematization, as we may call it, is exemplified in what we know of astronomy, geography, and geology.

The sun, moon, and planets have their motions, which have been calculated with great precision. We can say just at what time the sun will rise a thousand years from to-day, what position the moon and the planets will then be in.

Another physical systematization, and one of great importance, is that which is geographical. We know the system of the diversities of lands on the globe, and how each continent, island, peninsula, cape, and isthmus is situated with reference to the rest of the world. In the same way we know the system of the diversities of waters. We know the different countries of the earth, their cities, their inhabitants, and their productions.

We know, moreover, the different strata of the earth and what is characteristic of each, the Silurian, Devonian, and the like.

We descend with our systematization, however, more deeply still into the physical make-up of things.

First, we have a system of the conceptions according to which the movements of bodies take place. For example, a traveler in Saxony, together with his friend, coming to a river which he wished to cross, got into a small boat which was fastened to a wire by a swivel, the wire extending across the river and being fastened at either end. The manager of the boat merely struck the swivel a light blow, when the boat of itself moved to the other side of the river. The man would not have been more surprised if a miracle had taken place, having for the moment forgotten to reflect on the principle according to which forces are compounded. For it was really the current of the river which drove the boat over, as the man's friend explained to him, the principle being that of the parallelogram of forces, that on which a ship sails.

Instances also might be given of the laws of falling bodies, of the laws of pendulums, and of the laws of machines.

Secondly, we have a system of conceptions according to which water acts, hydrostatic systematization, we may call it, and a system of conceptions according to which air acts.

Water presses equally in all directions, the principle on which any weight however small can lift any weight however large, the principle of the hydraulic press. Water makes bodies immersed in it lighter by the weight of water displaced, the principle on which specific gravities are determined. Think of the importance of this, a means by which a substance can be identified! For the specific gravity of anything, say of gold, is the ratio of a pound of it to the weight of water of the same size. By means of this principle it was that Archimedes could divine that a crown which it was claimed was made of pure gold really contained alloy.

We have also a system of conceptions relating to air, for example, the air exerts a pressure of several pounds to the square inch, or rather a pressure which varies with the condition of the air, the principle of the barometer.

The waves of air creating sounds are subject to a system of conceptions on which depends music. For example, we are able to say beforehand that the number of vibrations of a tightened string per second varies as the square root of the tension. We are able to say that musical sounds must conform to certain arithmetic ratios, and the like.

Thirdly, we have systems of conceptions about heat, about light, and about electricity.

Regarding heat, we have it established that the change of temperature changes proportionately the size of a thing, different substances having different coefficients of expansion, that is to say, each a number to indicate its enlargement by heat. Each substance, too, has its boiling point, that of mercury, for example, being more than three times higher than that of water. Moreover, heat can be transformed into motion, as we say, so much heat producing so much effect.

Regarding light, we have it established that it is reflected and refracted in definite ways, the angle of reflection being the same as that of incidence, and the angle of refraction being determined by the medium. Examples of mirrors we have explained out of the law of reflection, examples of lenses out of the law of refraction. It is found also that the light from a substance in flames gives a spectrum, certain lines by which the substance can be identified, whether it be compounded with other substances or not.

Regarding electricity, we have it established that positive repels positive, but attracts negative, that negative repels negative, but attracts positive. The generation and effectuality of electricity, moreover, is in accordance with mathematical forms. When a cable which was laid in the ocean broke, Thomson, it is said, was able, on mathematical grounds, to say where in that long stretch the breakage had taken place.

Fourthly, we have systems of conceptions respecting the chemical conditions of matter. For each compound substance we have a formula expressing how it is constituted, as, for example, H_2O for water. When, indeed, we take into consideration the vast number of these formulæ which we possess, applying with precision to all ordinary things, we are made aware what a power we have over nature in the comprehension of the system of chemistry.

The physical systematization which the mind has been able to arrive at we find to be a wonderful thing. We are possessed of an intricate system of conceptions into which nature fits, the net, so to say, into which the universe is constructed, to borrow an expression from Hegel. It is to be observed, too, that these are not mere vague conceptions, but are specific in their character. It must be evident, therefore, that the mind of man has gained such an advance beyond that of the brute as to make comparison between the one and the other ludicrous. This is not to say that there is no advantage in such a comparison, as indeed there is, but it is to say that the mind of man has so far outstripped that of the brute that the mind of the brute has no chance of ever approaching it. The minds of savages, it is also apparent, having made little progress in systematization, are so inferior to the minds of many others that the comparison between the mind of a savage and that of a Gladstone, for example, is ridiculous. The minds of clowns, it is also clear, can have little importance in comparison with the minds of scientists. That the minds of all men can in time be raised up into systematization we must indeed hope, but that they are not yet raised up into it we must also acknowledge.

Biological systematization is either botanic or zoölogical, as it pertains either to plants or to animals.

The different kinds of vegetable existences in the world, which are certainly more than one hundred thousand, are grouped into a few classes. We have, in the first place, a class made up of slime-moulds, bacteria, yeast-plants, gutter-plants, and the like, the whole class sometimes called protophytes. We have, in the second place, a class made up of water-nets, desmids, diatoms, and the like, the whole class sometimes called zygospores. We have, in the third place, a class made up of sargassums, rock-weeds, blight-plants, and the like, the whole class sometimes called oöspores. We have, in the fourth place, a class made up of dulses, truffles, morels, mushrooms, rusts, black-knots, ergots, and the like, the whole class sometimes called carpospores. We have, in the fifth place, a class made up of liverworts and mosses and the like, the whole class sometimes called bryophytes. We have, in the sixth place, a class made up of horsetails, ferns, pepperworts, and the like, the whole class sometimes called pteridophytes. We have, in the seventh place, a class made up of cycads, pines, and welwitschias, the whole class sometimes called gymnosperms. We have, in the eighth place, what are sometimes called angiosperms, a class divided into monocotyledons and dicotyledons.

If, then, we had at hand, as we might easily have, bacteria, diatoms, seaweeds, mushrooms, mosses, ferns, cedars, palms, and oaks, we should have the whole vegetable kingdom assembled, so to say, in our presence, such systematization has the mind arrived at relative to plants.

The monocotyledons are found to consist of about fifty kinds, of which representatives might be taken, such as grasses, lilies, yams, bananas, palms, and so on, all of which if we had them assembled would represent to us this whole division of angiosperms.

Under the same kind, or order, as it is called, many of the varieties of monocotyledons are small and some insignificant, yet almost any kind, it appears, had the capability to produce trees. The bamboo, for example, is the tree of the grass family.

The dicotyledons are found to consist of three times or more as many kinds as the other division, representatives of which are oaks, nutmegs, beets, sage, and so on. We can say of these also that if we had them all in one company they would represent to us all the divisions of the angiosperms, by far the most important portion of the vegetable kingdom.

It is furthermore to be taken into account that each of these classes of plants is divided into others, and these often into still others, so that the divisions finally reached are very specific and not mere generalities, as were the primitive divisions made by mankind. The mind has the vegetable kingdom fast in a net, as it were.

But not only does the mind have a systematization of the whole vegetable kingdom as regards kinds. It also has a systematization of the forms which all plants tend to take. First, we have the stem, which may become runners, rootstocks, tubers, corms, axes, tendrils, and thorns. Secondly, we have the leaf, which may become bracts, scales, envelopes, stamens, carpels, tendrils, and spines. Thirdly, we have the bark, which may become hairs, bristles, prickles, scales, glands, and ovules. Fourthly, we have the root, which may become what are called aërial roots or the so-called suckers of parasites, in addition to what we usually call roots. Again, all forms of vegetation are resolvable into cells, which themselves are subject to systematization.

The countless animals of the world fall into a very few classes. Indeed, if we had an amœba, a sponge, a polyp, a starfish, a worm, an oyster, a lobster, a fly, and a vertebrate, we should possess the whole kingdom.

The class to which man belongs, by far the most important, the vertebrate, itself falls into five classes, fishes, amphibians, reptiles, birds, and mammals, the latter being of all animals those of chief note!.

We can readily find about us animals to represent half of the mammals or more, opossums, moles, bats, cats, rats, oxen, and any of our own species, but we should have to go to the ocean for whales and sea-cows, to India or Africa for an elephant, to Syria or Arabia for a cony, to Australia for a duckbill, and to South America for a sloth. If, however, we had in a small park, as we might easily have, a duckbill, an opossum, a sloth, rats, moles, bats, a whale, a sea-cow, an elephant, conies, an ox, cats, and a man or an ape, we should have present representatives of the whole class of mammals, thirteen in number.

Each of the classes of animals, however, falls into others, which are in the case of some classes still farther divided, so that the divisions which we have attained of animals map out their kingdom for us with great precision. We have reached specific distinctions. We have thus the whole animal kingdom fast in a net of systems, an advantage which is hardly to be overrated.

Moreover, of the higher kinds, any individual animal is reducible to certain systems, as the tegumentary, the osseous, the muscular, the digestive, the secretory, the circulatory, the respiratory, the nervous, and the like. Indeed, these systems fall into various forms as they are found in this or in that kind of an animal. An animal body also reduces to tissues, and these to cells. Indeed, every animal body, it is said, has been built up from a single cell.

Psychological systematizations are also attained, grammatical, logical, ethical, æsthetical, and metaphysical.

Every word belongs to one or the other of a few classes. The names of things are found to have certain forms for the plural and are in certain cases. There are certain distinctions to indicate gender. Adjectives have forms of comparison. Verbs have person, number, mood, tense, and voice. We have adverbs of time, place, manner. We have conjunctions, relative and personal pronouns. We have, in short, a system of grammar.

We have also a systematization of thought itself, having discovered that we make conclusions in a certain form which may be reduced to the syllogism, this being made up of judgments, which themselves are constituted out of notions.

Notions are individual or general. This is the primary distinction. Proper nouns, for example, denote individual existences, but common nouns denote what is common to several individuals. The same distinction, of course, applies to the terms in which notions are expressed.

A systematization has also been made of the ways in which one notion may stand to another, what notions are consistent with each other, what notions are not, the same thing applying to terms.

Judgments and the propositions standing for them are categorical, hypothetical, or disjunctive, hypothetical propositions usually containing the word *if*, and disjunctive ones the words *either, or*. Judgments and the propositions standing for them are affirmative or negative, the latter propositions usually containing the word *not*. Judgments and the propositions standing for them are universal or particular, universal propositions usually containing the word *all*, particular propositions the word *some*.

Universal judgments and propositions, if affirmative, are designated by the letter *A*, if negative by the letter *E*, while particular judgments and propositions, if affirmative, are designated by the letter *I*, if negative by the letter *O*. All the ways, therefore, which the several kinds of judgments can stand to one another are exhibited by certain combinations of these letters.

Syllogisms are categorical, hypothetical, or disjunctive, accordingly as the first judgment or proposition in them is the one or the other of these kinds, the categorical, however, being the primary form from which the others follow, an example of which is, All men are mortal, Socrates was a man—Socrates was mortal, which, it will be observed, means no more than this, that Socrates was mortal because he was human, we attributing to Socrates the characteristic mortality because it was a characteristic of that characteristic of him which we denominate humanity. The first judgment or proposition in a syllogism is called the major premise and the second the minor, the third being called the conclusion.

Moreover, as any syllogism can be expressed by some arrangement of three of the letters, *A, E, I, O,* and each judgment or proposition in them by some arrangement of two of the letters *x, y, z,* all possible syllogisms are easily canvassed and their peculiarities pointed out, it being found that only a few of these are valid, the which have names, as, for instance, *Barbara,* for a syllogism consisting of three universal affirmative judgments or propositions.

We have likewise a systematization of rules for the guidance of our thought.

As this relates to notions, it is concerned chiefly with definitions, that they be clear and precise, or with divisions, that they be exhaustive and no one of them include any of the others.

Moreover, when a notion or term contains others it is said to be the genus, and the notions or terms contained in it are said to be species, and that which distinguishes a species from its genus is called the essential difference.

As a systematization of rules relates to judgments or propositions, it is concerned chiefly with what is known as conversion, what changes are necessary, so that the subject may take the place of the predicate and the truth be preserved.

As a systematization of rules relates to syllogisms, it is concerned with methods of testing conclusions, whether they be valid or not. It is settled as a general principle that nothing follows from mere negatives or from mere particulars, a universal judgment or proposition being necessary to a just conclusion, and that if one premise be negative or particular, so also must be the conclusion. No more can be contained in the conclusion than was contained in the premises. Moreover, no syllogism can have four judgments or propositions, four notions or terms in it.

Again, it is a rule of procedure in reasoning that wherein things alone agree or differ is to be found the antecedent of a given consequent.

Some special methods also are set forth for guidance in particular cases. If we assign a reason for a premise, we have an *epichirema,* as, for example, this: "The mixture taken was poisonous because it contained strychnine; it was deliberately drunk by the person; he, therefore, committed suicide." If we make one conclusion follow upon another in a chain we have a *sorites,* as, for example, what was stated by Frederick Douglass to the colored people: "Without wealth there is no leisure, without leisure there is no thought, and without thought there is no progress." If we prove a worse case than the one in question we have an *a fortiori,* for example, "I can't walk, much more I can't run." If we show that the opposite of a proposition is absurd we have a *reductio ad absurdum.* If we show that on either supposition, one or the other of which must be true, a conclusion follows, we have a *dilemma,* as, for example, "With one draught it is impossible to take a draught in the double corner of a checker-board, this draught being capable of being moved in either of two spaces." If our reasoning proceed from antecedents to consequents it is said to be *a priori*, if from consequents to antecedents, *a posteriori*. Lastly, certain persistent fallacies are pointed out, *ambiguous middle, begging the question, mistaking the point, argumentum ad hominem, propter hoc,* etc.

We have, moreover, as everybody knows, what are called systems of ethics, the same being divided into theoretical and practical.

The ground of right is said to be in the will of God, in the nature of things, or in the end for which we exist, these manifestly, however, all coming to the same thing, the nature of things exhibiting the will of God and the end of our existence being a part of the nature of things.

Duty falls into a system, being first what one owes to God, secondly what he owes to mankind, thirdly what he owes to animals.

Duties to mankind are concerned with health, property, propriety, companionship, and knowledge. For these are ends of our being, or at least necessarily involved in the ends of our being. We are naturally obligated, therefore, to respect them not only in ourselves, but in others; for example, we cannot rightfully mar the bodily perfection of another, take away his property, discourteously treat him, keep from him proper social enjoyment, or tell him falsehoods. Lying, for instance, is merely depriving one of knowledge to which he is entitled.

The mind also forms æsthetic systematizations, as must be evident on a moment's reflection. For all are agreed that a beautiful thing is in certain definite respects distinguished from an ugly one. They will also point out in what these respects consist. Kames declares that artists have in all ages been governed by a taste for simplicity. Why this should have been so he undertakes to say. The mind can know things only under the form of unity, which makes it difficult for it to give attention to complicated circumstances and crowded ornaments; besides, says he, the mind attached to beauties of a high rank cannot descend to inferior beauties. He states also that regularity is an element of beauty, we being pleased with a due proportion of parts in a thing. Purpose he mentions as still another element of beauty—anything to please us must have some aim, must come to some point. Again, he designates a want of variety as being disagreeable to us. Now all this and countless other such observations are gathered up into the systematization that what is beautiful is that which amid variety maintains unity. For illustration, what is regular, that is to say, what is symmetrical, is that which has the same thing in different parts, is beautiful. Again, what has purpose has a unity of details.

The mind also makes a systematization of the systems of truth, such systematization constituting metaphysics, which, however, has had to advance gradually, as the systems of truth were gotten at better and better.

Aristotle, more than two thousand years ago, reduced all existence to system with the principle of what he designated as entelechy, namely, organization which conforms to an idea while ever materially varying. The human body, for example, is an entelechy—while no two moments the same, it is yet always the same. The whole universe is an entelechy—its idea is each moment expressed in the flow of events. He was led to his doctrine by the doctrine of Plato, that the indwelling principle of everything is its idea—everything exists on a pattern. For example, every triangle, in that it is a triangle, conforms to a type.

Plato obtained his doctrine from that of Socrates, which was to the effect that the universal notion of a thing is that in which its essence consists. That in which the things of a class are the same is what puts them in that class.

Plotinus, on the basis of Aristotle's systematization of the universe, arrived at the notion of its unity, the system of the truth of things is the expression of *one* power, he therefore, to this extent, enhanced the previous systematization.

Athanasius improved this in that he founded what is known as trinitarianism, taking the word here in a philosophical, not in a popular sense, seeing that he pointed out how the system of the truth of things, called by him the Logos, is one with the unity of the world, as well as with the systematization of things in men's minds. The Father is the one primeval power, the Son is the system of the truth of things, the Spirit is the guide of men to the truth, and yet these three are one and the same.

The question having been forced on the minds of men what the universal essence in any case is, it was determined that it must be certain aspects of individual things, not a generality existing outside them merely. There is a sense, therefore, in which the one power of the universe is immanent in things.

Descartes, then, reached the doctrine that the whole system of the truth of things is that of matter and that of mind, absolute certitude about them being guaranteed by the nature of mind itself, which cannot doubt that it, doubting, doubts—it knows something for certain. Whatsoever else it knows with equal certainty, it certainly knows.

The question, however, necessarily arose, How are mind and matter related to each other? Those who showed a connection of mind and matter on general principles were Malebranche, Spinoza, and Leibnitz—hence called rationalists. Those who showed the same connection from experience were Locke, Berkeley, and Hume—hence called empiricists. Those who showed the connection rationally and empirically at the same time were Kant, Herbart, and Lotze—hence called respectively transcendentalist, realistic individualist, and ideal realist.

Granting, however, the connection of mind and matter on general principles as well as from experience, the question still remained, How are mind and matter related to living organisms? We have, therefore, the systematization effected by Spencer, which is no doubt to be followed by others more specifically setting forth the systematization of all things.

It is plain also that we could go back of Socrates and enumerate the steps in the systematization of our total knowledge of things which were successively taken, from the mythological notion of things up to Socrates's philosophy.

CHAPTER X

INVENTION

The term invention may be used to designate the combination which the mind makes of primitive conceptions, so that together they form a new conception realizable in the world. We are, indeed, able to design things different from those we have before known to exist, but not able to design the parts of which they are ultimately composed.

This applies to every realm of existence, inorganic, organic, mental; whence in general we may say that inventions are mechanical, chemical, biological, institutional, and artistic. Such a division, at least, is sufficient for what we have to consider.

Mechanical invention is exemplified, for one way, in the construction of buildings. The stones of which these are made—if, indeed, they be built of stone—have existed for millions of years. Our conceptions of the stones, therefore, are primitive ones. Nevertheless, we do shape the stones, that is to say, we combine the conception of a stone with certain geometrical conceptions, these, too, going back to primitive ones. We also put the stones in certain positions, adding here again other conceptions. If we use mortar, we add still another conception, and a compound one at that, mortar itself being the result of the combination of several conceptions. The woodwork and metalwork likewise each exhibit the forms of various combined conceptions. The glass, furthermore, is the result of much transformation—a number of conceptions have been united, enabling us to manufacture and shape it. The building, finally, stands forth in the form of a thought, which itself consists of a great many primitive thoughts. The process by which this thought was obtained we call invention.

This process is not imaginary in the sense that it departs from reality. The primitive conceptions of which the compound conception is made up are forms of what has existence in nature, and they are combined on the basis of possibility. The compound conception, whether it is realized or not, at least can be realized. Suppose, for example, that the Coliseum at Rome had never been built, it would nevertheless have been possible to build it.

Once neither Solomon's Temple nor any prototype of it existed on this earth. Its construction had to be thought out, and on the ground of reality. Doubtless it was partly modelled after former structures, but these structures themselves were once non-existent. Going back to the elements of edifices, we find that the conceptions of edifices are merely embodiments of primary conceptions that are discovered in nature. The creative process consists in combining these conceptions. Sometimes a compound conception which should form part of the total was obtained on theory merely, sometimes an experiment was necessary. In all cases there was a combination of conceptions which stood for natural realities.

The temple of Solomon was destroyed more than twenty-four hundred years ago, but an account of it has descended to us so that we should be able in part to restore it. Indeed, its perfect restoration is in itself conceivable. For if we had the minute specifications of the temple which we may suppose the architect himself to have possessed, one of our own builders could reproduce the temple with such exactness that those who beheld the original temple, should they suddenly rise from the dead, would not be able to detect any difference whatsoever between this temple and that which Solomon dedicated. Should Solomon himself appear on the scene he would not know the temple we had made from the one which he caused to be built.

Roads for wagons depend on compound conception, and are, therefore, due to invention.

Sherman's army, moving northward from Savannah through the Carolinas, had to pass over moist ground. To keep the wagons from sinking into the mud, rails were taken from fences and laid down crosswise, one after the other. Over these the wagons were readily hauled, the rails being pressed into the earth, forming a hard bed. These rails of fences were here combined with the ground to make what we call a road, one primitive conception with one compound one. For rails themselves are an invention. Long before the Civil War, farmers along the road which Sherman was destined to take had chopped down trees, cut them into certain lengths, and then split the logs with beetle and wedges, little thinking, perhaps, that they were working for Sherman. The trees were in the form of a primitive conception. Cutting and splitting were other primitive conceptions that were added to them to make the conception of rails.

The Appian Way, a Roman thoroughfare, was begun more than three hundred years before the birth of Christ.

It finally extended from Rome to Brundusium. It was paved with blocks of stone cut in polygonal shapes, and on either side was a stone balustrade. The whole road was about eighteen feet wide.

The Romans filled up depressions and levelled elevations, bridged streams, and tunnelled mountains. To build their roads they had to combine many primitive conceptions into compound ones. Their bridges are still in existence, and seem likely to be the means by which even those who shall live in the days of the millennium shall pass to and fro over many a stream. One of their tunnels is to-day observed in the vicinity of Naples, having arches at the end, the stones of which were laid by hands long since ceased from their activity. The Romans at times used gravel to harden their roadbeds, the same as we do ourselves at this day, combining here two primitive conceptions into a new one.

We ourselves, however, have extended invention much farther than the Romans. We have combined the conception of a Roman road with the conception of iron. To save expense, we hit on the device of having the road only for the wheels of the vehicles, neglecting the middle and sides. On the roadbed we placed ties, and on these the rails. Here we have a handsome generalization.

It is possible to generalize still farther. A road may consist of merely a band in sections, these sections forming an endless band not many times greater in diameter than the wheel, a section to drop down in front of the wheel at the same time that one behind it shall rise up. This principle has probably never been applied on a large scale, though it is manifestly capable of being so applied, the advantage, moreover, being that the railroad would be so cheap and could be made to extend in any direction and to any length at pleasure. The vehicle could go anywhere.

Machinery is the most common illustration of mechanical invention, the saw-mill, for example. Blocks of wood or pieces of iron, forming part of a framework, were so placed as to hold an upright saw in position, and yet at the same time to allow the saw to move up or down a certain distance. Then the crank of a shaft was fastened to one of the handles of the saw, so that when the shaft revolved the saw would rise and fall, the shaft being turned by a water-wheel either directly or by means of a belt or by an arm. The log lay on a frame which was moved so as gradually to press the log against the saw. Thus boards and timbers were cut out. Here several compound conceptions were united to produce the desired result—that of the saw, that of the water-wheel, that of the carriage, that of the frame. Analyzing these, we should of course get back to the primitive conceptions.

Simple as this invention seems to us it was undoubtedly not an early one, men having had to do a great deal of thinking to produce it. It is recorded that in the year 1338 there was living at Augsburg, Germany, a man by the name of Sawmiller, whence it is inferred that saw-mills must have been in existence before that time, or whence should the man have derived his name? It seems, however, that logs were once sawed by two men, one of whom stood on the log and the other below the log in a pit. A place in which sawing of this kind was done might have been called a saw-mill. There is on record, however, a description of a saw-mill which was observed by the writer of the account about the middle of the sixteenth century, and there are indications that saw-mills were in existence a hundred years earlier.

Sewing-machines, moreover, are a mechanical invention. The needle is forced through the cloth by an arm which vibrates, and a shuttle passes a thread through the loop on the under side. The tension exerted on the thread draws it up tightly, so that a neat seam is stitched. If, then, we take one of our sewing-machines and analyze it into its primitive conceptions we shall find that the machine is the result of a compounding of primitive conceptions that are forms of things existing in nature and subject to everybody's observation.

Chemical invention was usually later than mechanical invention, being more difficult to arrive at. The production of steel is an example of it.

Primitive men, doubtless, did not melt iron ore, they merely heated certain kinds of iron which they found and pounded the iron into shape. Heating it with wood, which was in contact with it, they happened to make use of carbon, which is necessary to the reduction of iron ore. What is called cast-iron was subsequently made, the iron ore being melted in some kind of a blast-furnace, certain chemical changes being thereby effected in the ores. Wrought-iron came to be made out of cast-iron by getting rid of most of the carbon which is found in cast-iron, getting rid also, at the same time, of the phosphorus and silicon. Practice has shown, however, that an intermediate grade, having not so much carbon as cast-iron nor so little as wrought-iron, is best suited to commercial purposes, taking things as they are.

One of the main conditions on which the production of commercial steel depends is due to the invention of Bessemer—from whom, therefore, this steel takes its name—the blowing of air into melted cast-iron. The oxygen of the air combines chemically with the iron, or oxidizes it. This has the result to take the carbon out of the iron, much the same as oxygen combining with wood has the effect to take the wood out of a stove. The carbon being out of the cast-iron, then, by adding other cast-iron, carbon can be reintroduced to the desired quantity to make out of the mass what is now called Bessemer steel. It should be noted, however that a very important improvement was made in that the vessel which holds the molten mass, technically called a converter, is lined with limestone, this having the effect to take the phosphorus out of the iron, if the iron chances to contain this substance, the phosphorus uniting with the lime.

Steel has thus become a very important thing. Not only are railroads made of it, but the frames of houses, to say nothing about the other countless uses of it.

Materials for building, it would seem, are now nearly perfect. Any form of frame whatever can be made out of steel, and the frame can be filled with brick, or even with cement. Thus any form of house is easily constructed out of fluid, or, at least, out of mushy materials. We have descended to the very elements of building, as it were, and can mould them to our will. Out of these materials, moreover, structures can be built which are practically eternal. Could it be settled what we want, then we could build once for all. Houses would last not merely hundreds, nor even thousands, but millions of years. What result this would have on the cheapening of living is easily computed.

Explosives are an instance of chemical invention, gunpowder among them. Gunpowder is made by mixing sulphur and charcoal together in not quite equal quantities, and combining this mixture with about three times as much saltpetre. When fire is brought in contact with gunpowder a chemical change takes place, creating gases, the expansive force of which makes the explosion. For the gases must occupy about two hundred and eighty times as much space as the original powder occupied, and, what is more, they must occupy it in a hurry.

Gunpowder seems to have been known to the Chinese possibly thousands of years before our era. How, then, could they have discovered it? The answer has been that there are in China great plains on which saltpetre exists, and fires being kindled there would produce carbon, which becoming combined with the saltpetre would cause an explosion. The use of sulphur, it is believed, was an after-thought.

The great effect which gunpowder has had on warfare, indeed, entitles it to rank as one of the most important inventions ever effected. Barbarians are no longer able to overrun civilized peoples. What is more, valor counts for little. Thought alone is what can be of any avail in war. Furthermore, wars are rendered very expensive, and therefore are not likely to be undertaken if they can be avoided. All these results are due to the invention of gunpowder, a chemical invention which consisted in combining the conception of carbon and the conception of sulphur with the conception of saltpetre.

Dynamite is an explosive which depends on nitro-glycerine, the which is made of glycerine and acids, nitric and sulphuric, a late invention due to Sobrero. It is this mixed with some other thing, brick-dust, for example, which is called dynamite. It was found too dangerous to use the nitro-glycerine without so mixing it.

Dynamite is exploded by a shock, and, therefore, is very important as a means of blasting, having three or four times the force of gunpowder. The Hoosac Tunnel, which is about five miles in length, was blasted out with it, seventy tons being used for that purpose. It was transported in tin cans in a frozen state, and the cans were coated with paraffine. The bottoms of the boxes in which the cans were packed were covered with sponges, and rubber was wound around the outside of the boxes.

The amount of labor which can be saved by the use of an explosive like nitro-glycerine is what would once have been deemed incredible. All this saving is due to the chemical invention of Sobrero. Indeed, if he were paid for all the work which his invention has saved he would have money enough to buy out some States.

Biological invention is shown when conceptions are so combined as to affect plants or animals, and rises, therefore, above both mechanical and chemical invention.

The grass family of plants contains between four and five hundred species, and among them is wheat, the seeds of which constitute the most important food of mankind.

An experiment was made of taking a certain wild grass, planting its seeds, cultivating the shoots, and, when they themselves produced seed, selecting the best of it to sow next year. This process having been continued for twelve years, the seeds were so much improved as veritably to be wheat itself. It is argued, therefore, and with plausibility, that wheat was in the early ages of the world gotten in such a way. To produce it, the wild seeds were combined with good soil, and perhaps with moisture. The best of the seeds, moreover, were each time sown. Here, indeed, we have a combination of primitive biological conceptions into a new whole.

There are three plants derived from America which have gained great prominence in the commercial world, maize, potatoes, and tobacco, all of which probably came to perfection through biological invention.

Kernels of maize have been found in the tombs of the Incas of Peru, greatly differing from any now grown. Indeed, it is probable that all the kinds of maize which we possess are descended from some wild variety, in every way inferior to the maize which we possess. Whether the primitive maize was red, and whether the kernels were each separately enclosed in husks, are points to be raised. Red ears of corn are found in all varieties, even in the white, and kernels have been discovered individually encased with husk. The question is, are red ears and sheathed kernels reversions?

The potato belongs to the nightshade family, a family containing more than twelve hundred species, the most of which are poisonous. How mankind came to eat the potato, then, may seem a mystery, a mystery, however, easily resolved if we take into account how hard people were pressed for food. Savages observed what animals ate, and were often in this way enabled to make a selection; moreover, hurtful things were often learned from trial, thus in course of time savages came to distinguish what might be eaten and what might not. Men combined potato-seed with good soil, with watering, with weeding. They also planted each year the best seed. They produced in this way, we may suppose, the potatoes from which our varieties have sprung. Speaking psychologically, men combined primitive biological conceptions into a new whole, the doing of which we have to thank for our potatoes.

Tobacco, likewise, belongs to the nightshade family. Columbus, soon after his discovery of Cuba, was informed by an exploring party that they had seen men smoking it, the first instance, so far as we know, which came under the observation of Europeans. All the smoking of tobacco among white peoples has resulted from the practice of smoking it observed among the so-called American Indians, a momentous consequence. The aborigines chewed and snuffed as well as smoked it. Indeed, we may suppose that chewing preceded smoking. Trying herbs for food, savages tried tobacco among the rest. It was found that the chewing of it produced certain agreeable results. The plant was accordingly cultivated and improved.

Strenuous efforts were made to suppress the use of tobacco among Europeans, even the death penalty being invoked to this end, but without avail. For the use of tobacco continued to increase.

Some time ago it was computed that more than seven hundred thousand acres of land were, in the United States alone, given up to the culture of tobacco, that more than half a billion of pounds were produced annually, and that the crop was sold for more than forty millions of dollars. Now all this great result has come about from the fact that savages, when hungry, once upon a time chewed certain weeds, and were consequently led to cultivate them.

As with grains and vegetables, so with fruits, the trees producing them have descended from wild ones, these having been improved upon by selection. Moreover, it is known that any variety, say that of pippins, can be grown on any kind of an apple-tree by grafting it. Take, for example, the sourest kind of apple imaginable, small and shrivelled, into the kind of tree which produces it, when a shrub, insert small and short pieces of twigs of pippins. The limbs growing out from these pieces inserted will themselves bear pippins. This is a splendid example of biological invention. The primitive sour-apple conception is combined with the pippin-apple conception to produce a new conception, that of pippin apples grown on a sour-apple tree. Of course, the invention has to be realistic, not imaginary merely, else the boy who grafted an apple into a locust would have been successful.

Cats, dogs, horses, cows, sheep, and pigs no doubt show marks of biological invention.

Our cats descended, it is supposed, from some species of wild cat. Under domestication many varieties have been produced, some that will howl, others which will not, some that are white, and some that are black; even red cats, it is said, are known to exist.

The kinds of dogs are almost innumerable, but it is plain that each kind cannot be descended from an original stock, no such stock existing, or ever having existed. The kinds of dogs have been developed through biological invention.

It is said that nearly every trotting horse of merit in

America is descended from a horse imported from England in 1788, called Messenger, and that he himself came of a horse called Mambrino. Rysdyk's Hambletonian, from which so many trotting horses in America have sprung, was a descendant of Messenger and was valued at one hundred thousand dollars. The Goldsmith Maid descended from him left the turf at the age of twenty-one with earnings of two hundred thousand dollars. We have here a fine illustration how a stock is improved by selection and the transmission of characteristics. It is believed that the horse in general was evolved from a wild horse, which has long since perished from the sight of men, and was evolved by breeding from the best horses. No primitive wild horses possibly now exist, the so-called wild ones being descendants of escaped or abandoned tame ones.

Cattle are found in Africa with horns thirteen feet long, while, as we know, certain cattle among us have no horns at all. It is evident, also, that from horned cattle, horned cattle descend, from hornless cattle, hornless cattle. Indeed, the tendency to have large or small horns may be developed on the principle of selection. Breeds of butter or of cheese cows, moreover, exist which command very high prices, breeds which have been developed in a very short time. That all our cattle were gotten from certain wild ones no longer extant is easily conceivable.

Sheep of many varieties exist, one, for instance, which has such large, fat tails that it is found necessary for each sheep to have a cart on which to carry its tail around. That, however, such sheep have been developed through selection and heredity is apparent, since if these sheep are taken to other countries and put under other conditions their descendants come to have smaller tails.

All the kinds of pigs in the world can, according to the claim of certain naturalists, be traced back to two varieties, the wild boars and the Chinese kind. Those descended from the two species combined show, even in the first generation, it is said, modifications of the skull due to inheritance from the Chinese stock. In the ruins of Pompeii was found the skull of a pig which in appearance greatly resembled that of the breed still kept in the vicinity. Essex pigs, it is said, owe their excellent qualities to inheritance from the same variety, that is to say, from Neapolitan pigs.

Our fowls arose in the same way. It is plain that they have not existed on this earth in their present form from all antiquity. The Chinese have records of their introduction into their country. Fowls are not mentioned by the older Jewish or Egyptian writers, and are not spoken of by Homer. They seem, however, to have existed in India something like eight hundred or a thousand years before our era. We may suppose that they had been developed from wild fowl.

Institutional invention has always been considered as being of a high order. Illustrating it we may instance courts, armies, and schools, none of which things exist by nature, but have been created by man on the principle of compounding conceptions.

Among savage peoples some means of insuring justice indeed exist, and often these means may be adequate, but it is to be remembered that savages have to deal with sparse populations only, and with interests little diversified. Civilized people, on the contrary, were compelled to have some permanent and systematic way of satisfying the demand for justice, whence the invention of courts. There had to be a tribunal which should pass on cases, a fixed manner of getting cases before this tribunal, and a method of trial. The tribunal was made to consist of judges, latterly of a judge and jurors. The judges were men set apart to do nothing else but to pass on matters presented to them, men who thus came to have precedents on which to decide. To guard against possible mistakes or prejudices on the part of the judges, one not satisfied with a decision in a lower court might appeal to a higher. Certain forms were prescribed for getting a case before a court, now technically known as pleadings, the outcome of which was that the point was reached wherein one party affirmed just what the other party denied, whence the necessity of the trial of the case. The point in controversy might be either what the law was or what the fact was, and the one or the other of these might be hard to determine. First, it would be a part of the system of justice that declarations should be made by the nation or its rulers as to what the laws were, certain written statements of them. Secondly, however, as these laws could only exist in a general form, each particular case would have to be passed on as to whether it came under the rule or not. The judge or judges would have to decide the point, but not till he or they had heard the arguments on both sides. The question of fact would be still harder to settle. Evidence would have to be furnished, and this in general would be either documentary or oral, whence the multitudinous rules which would come to exist regarding the admissibility of testimony. It having been determined what in the particular case was evidence and what was not, the judge giving decisions on the points as they arose, the next thing to dispose of would be what was the weight of the evidence. Both parties would have somewhat to support the contention which it set up, the question was, whose evidence preponderated? often a most perplexing one, a matter which with us, as we know, is left to the jury. When a case was finally decided it would in general relate to one or the other of two things, either to the person or to his property. Some punishment was or was not to be inflicted upon the person, some property was or was not to pass from one person to another. There had accordingly to be some way of carrying the findings of the court out. Certain forms were to be gone through with, after which it was the duty of certain officers to punish the person or to take away his property. The institution of courts, indeed, consisted in compounding a conception out of other conceptions, those conceptions in the last resort going back to primitive ones, inalienable rights.

The creation of armies gave great power to nations, for the reason that an organized and permanent force is greatly superior to a disorganized and temporary one. Men were set apart for soldiers, trained for the work. They were divided into small bands, over which was an officer whose orders the soldiers must unhesitatingly obey. A number of these bands were under the direction of a higher officer, whom the commanders of the bands were to obey. Thus a larger band was formed. Bands of this size were combined into larger ones on the same plan, and these into still larger ones, and so on, till finally the whole constituted an army which was under the command of a single person. Whatever he said had to be done. The soldiers were each armed with some kind of weapon or weapons, some cutting instrument or some missile. In close contact they used spears and swords, being at a distance they threw stones or shot arrows. Latterly, of course, firearms came into use, but the principle was the same. Anybody who thought to interfere with the existing order, as it is usual to call it, could easily be put out of the way by one or more of the soldiers acting under the orders of superiors. If he assembled a band of persons like minded as himself, enough of these soldiers could likewise overcome them, being always ready to act at a moment's notice. It would necessarily come about, therefore, that only armies, and those of considerable size, could combat the régime of any particular people, the result being that men obtained fixed ways of doing things and worked them out to perfection. Except in time of war, order prevailed.

The institution of armies, then, it will appear, was a case of compounding conceptions, as was said. For everything pertaining to an army exists independent of it. An army is created by effecting a systematic combination of various things and carrying on the use of it systematically.

The institution of the army, doubtless, had its greatest effect on the world in the hands of the Romans. Their armies were so organized as to be practically invincible, and the management of them was so systematized that the republic on the banks of the Tiber extended its dominions so far as still to have been the greatest republic which the world has ever seen. Rome completed its principal conquests more than one hundred and thirty years before the Christian era, and it was not till two hundred and eighty-four years after that era that Diocletian began that change of constitution which led to the institution of the empire whose seat was Constantinople. Rome, therefore, as an imperial and world-dominating republic may be said to have lasted about four hundred years, the ordinary division into republic and empire being a misleading one. The Roman idea was that the emperors were magistrates of the country, sort of prime ministers, not that they were sovereigns. The effect which Rome produced on mankind in this four hundred years with its military administration was one which could never be undone. The social mind was given a certain discipline which was destined to influence its whole subsequent career.

Another institutional invention is the school, an organized means of forcing ideas into the heads of men to become there dominant. Persons known as teachers are set apart to take charge of the pupils. The pupil passes after a time from a lower to a higher grade. All the grade teachers are under the direction of a superintendent and have some system on which to proceed. The pupil is taught at first certain rudiments, both of literature and of science, that is to say, letters and numbers. He must learn how to read and write and how to calculate. The principle employed is to give little at a time and to reiterate it, the result being that the pupil comes to be able to read at sight some very simple sentences wherever he may see them, or even anything similar to them, and to make some very simple calculations, as, for instance, that if Alfred has two marbles and John has three, both together they have five. The pupil recites daily, or perhaps more than once each day, on the same or similar matter. Some methodical plan also underlies the work; for instance, a certain vocabulary is made the end in the teaching of reading, and certain elementary combinations of numbers in the teaching of calculation. When the pupil has this vocabulary and these combinations at command, he has finished the grade. Thus the pupil passes from grade to grade, till finally he has mastered the vocabulary used in common life and can perform the operations of addition, subtraction, multiplication, and division. He now reaches the point at which he enters on the study of the grammar of the language and on the study of arithmetic, takes also geography and the like, comes in this way to be prepared to enter on the study of pieces of literature and of some of the sciences, as algebra, geometry, physics, biology, psychology. From the lower schools he passes to higher ones, where literature and science are studied with much thoroughness, and finally, perhaps, specializes on some branch. It is these higher schools which are of chief importance, so far as the welfare and progress of mankind are concerned, the lower schools, however, being necessary to enable one to rise to them. The higher ones proceed on the same principles as other schools—they have system, they make matters impressive, they take a little at a time, they review.

Not till our times, indeed, was this institution brought to anything like perfection, its invention having required much thought, though, as is evident, the conception of it is merely compounded out of simple conceptions.

It is evident that the effect of schools on mankind must in time produce the greatest of changes. Ideas desirable to be had and to be put into practice will have been drummed into the heads of men so effectively that men can never be gotten away from them. Mankind, so to say, will be hypnotized to good ends, the character of the inhabitants of the globe will have been changed.

Lastly, artistic invention is illustrated in architecture, together with its accessories: sculpture and painting, in musical composition, and in literary productions.

The Egyptian temples, for example, though erected so long ago, display great inventive faculty, for instance, that of Luxor by the Nile. The approach to that end of it which we may call the front, not along the river, was a way on either side of which were sphinxes. At the termination of the rows of sphinxes, and as one came to the temple, were two obelisks, one on either side, much the same as those which can now be seen in our cemeteries, they having been copied from the Egyptian ones. Near the entrance were large statues of Rameses the Great. Masts on either side also supported colored streamers. The front of the temple had on it sculptures in relief representing scenes from the battles of Rameses the Great, beneath which was inscribed Pentaur's epic of the battle of Kadesh. Entering through the front of the temple the visitor went into a court, around which were two rows of columns, on top of them a roofing, but over the court itself none. In other words, around the court was a colonnade. Going out of this court at the opposite end the visitor came into a great hall, the roof of which was supported by giant columns, the sun streaming through openings near the top, a sort of stone-lattice work. He now passed out into a second court surrounded by a colonnade, but not as large as the first one. From this he got into a vestibule which was filled with columns, and from this into either of the two small chapels, one on each side. From the vestibule he proceeded to more rooms, in the midst of which was the sanctuary. It is to be kept in mind, too, that the walls were well decorated. Furthermore, when one entered the covered portion of the temple, called the hypostyle, he passed into twilight, and when he entered the sanctuary he found it half dark. Thus was produced an artistic effect.

This whole temple, however, was but an adjunct of the temple of Karnak, the grandest structure, it is said, ever erected by the hand of man. The hypostyle of Karnak contains great pillars, some of them nearly seventy feet high and twelve feet in diameter, so arranged that in whatever direction one looks they seem to be without end, somewhat as the trees in a forest.

We have, then, in this artistic creation, taken as a whole, a great piece of invention, though, to be sure, no one man designed the whole, since it was building through successive generations, yet of course it shows in itself a great compound conception fabricated by the inventive faculty out of primitive conceptions. The effects which it produced as a whole were due to artistic contrivance.

Music is another thing which gives scope for the exercise of invention.

Musical compositions were made by the Egyptians thousands of years ago, and the other peoples of antiquity produced them, but the great musical compositions have been the work of modern times.

Music expresses human sentiments indefinitely, so that the music may mean something to one person which it does not to another, something to one age which it does not to the next.

Handel's "Messiah," a musical epic, has been considered the best oratorio ever wrought out in the brain of man, the manuscript of which in the hand of the composer is still to be seen in Buckingham Palace. It should be observed that this is a composition requiring an evening for its performance and employing a great number and various kinds of musicians. At one performance there were twenty-seven hundred voices in the chorus. No other musical work, it is said, has enjoyed so great and so protracted popularity. Its Hallelujah choruses are the delight and wonder of mankind. Handel himself took part in its performance but eight days before his death, and it may be considered as his valedictory. One hundred years after his birth, to a day, the house in which he was born in Halle, Prussia, had placed on it in evergreen the names of his celebrated oratorios, the word, Messiah, appearing among the rest. Out of the primitive conceptions into which musical sounds can be resolved he constructed this compound conception.

Literary invention furnishes still another example of artistic creation, the "Hamlet" of Shakespeare, for instance.

In real life people come together, converse with one another, and perform while in company certain actions, the whole affair being known as a scene. The persons, it is plain, talk and act in accordance with their characters, each as to what the same is. One scene, it is plain, too, leads on to another and somewhat influences it. All this, indeed, we observe in every-day life.

The dramatic poet takes this conception, but changes it in points. He selects his men and women, those who have, this or that one, a character which he assigns him or her. He selects, also, the situations in which they are placed. He works out a plot through their conversations and actions.

It may be that no person just the same as he brings on the stage ever really existed or will exist, yet the several traits in them are well known by us in men and women whom we have seen or at least have heard about. The dramatic poet is not therefore depicting impossibilities nor even improbabilities. He is only describing what actually exists or may exist. His characterization and the action which it begets are not imaginary in the sense that a square circle is.

Everybody in whose case there is a tragedy of thought has a resemblance to Hamlet, but Hamlet is a generic character that contains much besides what we might find in this particular person.

Children's play is in some sort a dramatization. For they go on hours with a fiction, inventing it as they proceed. One is a banker, another a farmer, a third a merchant, and so on. They call bits of paper money, sticks horses, and sand sugar. The representation which they carry on in their minds is of what is possible, it may be of what somewhere exists, but it is not representative of what is at hand.

CHAPTER XI

VOLITION

What is peculiar of the will is that a notion, called by us a plan, existing in the mind as an idea, takes on, through the body, material shape, the plan of the tailor, for example, becoming a coat, the plan of the builder a house, the plan of the sculptor a statue, the plan of the painter a picture, the plan of the singer a song, and the plan of the speaker a speech. What, in short, we do with any organ of the body, what with any member thereof, the hand, for example, is an act of will.

We sometimes, it is true, use the word will to mean the wish merely to execute something, but what is now to be said shall be of will in the proper sense of the term, the power which the mind has to embody its notions in material shape.

The body is a machine of the mind, formed in such a manner that, as soon as the mind decides that a plan is to be carried into effect, forthwith the body performs the necessary movements to that end. Be the plan to walk, the feet begin to step; be the plan to toil, the hands begin to act; be the plan to speak, the lips begin to move. All the mind has to do is to have the plan uppermost, the body does the rest.

Motors of various kinds exist—those of water, those of wind, those of steam, and those of electricity. Animals of every description, man included, are idea motors, operated by the notions which they have in their heads.

What is of chief importance as regards the will is that every creature has some peculiar bent of mind by which he does things. Nearly everything that a creature performs is the outcome of habits, whence the saying that character fixes destiny means no more than that habits fix it. To set forth, therefore, what are the conditions of habit must be to set forth the conditions of will. We are required, in fact, to describe the whole system of conditions on which action depends.

The conditions of will, it is manifest, are either subjective or objective, the subjective conditions being disposition and thought, the objective conditions being the bodily constitution and the nature of things in general. The constitution of our bodies, so far as the will is concerned, reduces to the nervous system, the nature of things in general to quality, quantity, and relation. We may put the matter another way: a creature consists of body and mind, and things around him have quality, quantity, and relation. Six different determinations of the will, then, obtain—the nervous, the dispositional, the deliberative, the qualitative, the quantitative, and the relational. Possibly for the word determination we should say condition. What is meant is that, if we take up each of the six points relative to the will, we take up all that is of importance regarding it.

The nervous determination of the will is illustrated in the case of diseases, in the case of manias, and in the case of instinctive actions.

To take up cases of disease, or at least what seem to be such; there are certain persons who, owing to the state of their nerves, if left to themselves, are unable to get out of bed or even to rise from a chair. If anybody speaks to them, the purpose which they have to get out of bed or to rise from a chair becomes sufficiently strong to affect their muscles—then they can easily do the one or the other. Some persons who are accounted lazy may, after all, owe their peculiarity to nothing but a state of the nerves. We often find men, for example, who will do very little work unless somebody keeps putting ideas into their heads, their own ideas being too faint, it should seem, to affect their muscles very much. As long as we exert our influence over them they work well enough, but the moment this is withdrawn they are as indolent as ever.

On the other hand, the muscles of certain persons, owing to disease, respond too readily to suggestion. Such persons are afflicted with what is sometimes called insanity of the muscles. They make up faces, twist their bodies into awkward shapes, jerk their shoulders up, and suddenly extend their limbs. St. Vitus' dance is an instance of this. In the case of locomotor ataxia it seems to the person afflicted as if between his feet and the ground is something soft. When he tries to step, his foot is suddenly thrown out and his head descends rapidly. If he looks up or shuts his eyes, he will totter and perhaps fall down. It is for this reason that there are persons that cannot walk in the dark.

The excessive use of alcohol produces a diseased state of the nerves that influences action. An inebriate is set to acting by the smell of whiskey. The smell of it gives him the idea of drinking. This idea in his head pulls the string that sets in motion his body. It comes about, then, that the smell of whiskey takes him where whiskey is to be had. Burns, the Scottish poet, declared that to get rum he would not hesitate to pass in front of blazing cannon. The fact that certain drunkards can be cured by prescriptions proves that their difficulty is in the nerves. The physical condition removed, they recover.

A certain kind of mania is that for cleanliness. There are persons who, at the sight of water, must fall to washing their hands. Not all great Neptune's ocean, to their minds, can wash their hands clean from their stains. Such persons are, as it were, propelled by water. The idea of water sets them in motion.

Another mania is that for danger. We find, for example, persons who say they are tempted to leap out of windows at great height. The idea of danger so works on their nerves that it is hardly possible for them to control their muscles by other ideas. From this fact it was found necessary to cover the top of a certain tower in London with a cage, so many persons having leaped from it to destruction.

Bearing on this subject, we have related a certain extraordinary experience of a man. He was in the city of Halle, where is a church with two high towers, these towers connected near the top by a stone bridge. Having reached the bridge by a winding stair inside one of the towers, the man went across the bridge, terror-stricken, although he knew there was not the slightest danger, a stone wall being on either side of him, several feet high. He did not dare to walk back over the bridge, but crawled on his hands and knees to get over it, and descended as soon as he could. To this day, he says, whenever he thinks of that little bridge, high up in the air, he is still seized with fear, shrugs his shoulders, and writhes his limbs.

Some persons say they can hardly resist the temptation to put themselves in front of moving trains.

Instinctive actions are such as one performs immediately on suggestion, as, for example, shutting the eyes to keep the dust out. As somebody has said, our nervous system is so organized that certain impressions that are made by things on us have the effect to pull the triggers that set in motion the parts that perform the work. If we step and are nigh unto falling, we come quickly to our own rescue, and in a way surprisingly effective, although we deliberate not at all about it. We act merely on the impulse of the occasion. And this is also a nervous determination.

The dispositional determination of the will may be observed both in animals and in men. The case of animals may be considered, because what applies to them applies by analogy to men.

Chickens, a few days after they are hatched out, will scratch the ground in search of insects, although they cannot have learned to do so from previous experience. Spalding had chickens hatched in the dark that, on being taken into the light, in two minutes followed bugs with their eyes, the same as do old fowls. Ducks one day old will catch flies on the wing. A young turkey when first he heard the chirp of a hawk ran to the other side of the yard in great fear. A young chimpanzee, at the first sight of a snake, took the greatest alarm. Horses that have never seen a lion become restless the moment they scent one. Dogs, it is said, attack those who eat dogs' flesh, even those who have anything to do with it. Nicholls relates that he knew a dog that unaccountably attacked a man coming into a hotel. Upon investigation it was found that the man was a butcher. Huggins declares he had a dog which started back in fear at the first butcher-shop he ever saw. A tame beaver will, in the night, carry wood to bank up against the door of the farmer's house, doing this because his ancestors, in the wild state, piled up wood to build a dam. Little animals exist in the mountains of Norway called Lemings, averaging in size between a rat and a mouse. These at times descend in great numbers into the plains, traveling by night and living on roots. They are attacked by cattle and other animals, but, being so numerous, their progress is not stayed till they reach the Atlantic. Then, with unbroken front, they plunge into its waves and swim until they are all drowned. It has been sought to explain this strange performance on the ground that such animals were once able to emigrate to America—Norway being connected with America, it was thought, by land since submerged. The posterity of the Lemings, the theory has been, tries to get to America, notwithstanding the changed conditions.

The power of disposition to control actions is, however, just as well illustrated by the course of men. A certain sea-captain, when he had left off following the sea, could not content himself without having a place in his back-yard raised in imitation of the deck of a ship, on which he might promenade. Lee, the general who was dismissed by Washington for misconduct at the battle of Monmouth, June 28, 1778, had after his retirement but one room in his house, which was divided by chalk-lines into spaces, one of which he called his parlor, one his library, one his dining-room, one his kitchen, and several his bedrooms. He took his position upon a raised platform from which he could overlook the whole. Accustomed to military life, he wanted his household on the plan of a battle-field. The houses of primitive men probably contained but one room, till some reformer arose to put in a partition. What opposition he met with, by what tortures the partitionists suffered, history does not tell us. We have, too, all of us heard the story of the man who went to mill with a bag upon his shoulder, the wheat in one end, a stone in the other. The man's son proposed that he do away with the stone, merely putting part of the wheat in one end and part of it in the other end of the bag, this arrangement enabling him just as well to balance the bag upon his shoulder. But the old man said it was the strangest notion of which he ever heard; if the boy referred to it again he should flog him.

We have here the whole subject of heredity. We get dispositions from our ancestors.

Children are born with certain characteristics and proclivities, being by nature able to adapt themselves to the different men and women with whom they come in contact, avoiding harm from some and getting advantage from others. For example, a boy was known to take a decided dislike to a man from the first, although he had had no previous knowledge that the man was bad, as in fact he turned out to be. Poets, it is said, are born, and not made. Statesmen, sculptors, and painters probably brought most of their talent with them into the world—Napoleon, Phidias, Raphael, who supposes that they learned each his own art in the brief span of this earthly life? Who by taking thought can become an inventor like Edison? Mozart, when but four years old, could play the piano, and with great power of expression. Even when an infant he gained a knowledge of music from listening to the exercises of his sister.

Another condition of action is thought, seeing that by thinking over the consequences of things we come to exercise prudence with regard to them.

Men weigh the reasons for and against the several courses of action, and on what they deem the best reason proceed to act. The story which Plutarch tells of Julius Cæsar furnishes an example. Entertaining a company at Ravenna one night, forty-nine years before the Christian era, Cæsar, with a weight upon his mind, begged of a sudden to be excused, saying they should make merry until his return. To this day, however, he has failed to put in an appearance. Entering a carriage and going in the opposite direction, then quickly changing his course, he drove to the Rubicon, a stream which formed the boundary of the province over which he exercised command. Standing on the bank of the river, reasons for and against crossing it passed through his mind. For it occurred to him, says Plutarch, to consider what posterity would think of it. Should he cross the river a civil war was sure to ensue, wherein many of his countrymen would be slain; he might be unsuccessful, his reputation might be lost, his motives might be misjudged, the influence of his party might cease. On the other hand, should he not cross the river, it was certain he would lose his command; his renown, which now fills the world, would not come to exist; the cause of liberty that he believed himself to represent might be undone. Having thus balanced the reasons for and against crossing the river, it seemed to him, on the whole, best to cross it.

It would be a great mistake to suppose that we do not ourselves deliberate about everything much after the same fashion. We have to decide what kind of diet we shall have—vegetarian, meat, or mixed, how compounded and how cooked; we have to decide what shapes and what colors we shall be clothed in; we have to decide what kinds of carpets, what patterns of wall-paper we shall have; we have to decide what kind of a physician we shall employ—allopathic, homœopathic, hydropathic, electropathic, osteopathic, or psycopathic; we have to decide what schools we shall attend, what studies pursue; we have to decide what vocations we shall follow, what companions we shall choose.

At every cross-road of life there is a sphinx proposing to us a riddle, the which we must either guess or be devoured by her. We proceed in the same way that Cæsar did. Having first compared the respective merits of the courses of action that are open to us, we select one on the ground of its preference, this kind of choice being called deliberative, elective, or free.

Men of opposite habits, however, differ on the same thing, even after deliberation. One chooses to eat vegetables, another to eat meat, one to drink wine, another to drink water. On more important questions choices are equally varying, there being hundreds of religious sects, to say nothing about the divisions in politics.

How, then, it is asked, can men be free moral agents if, notwithstanding their deliberations, each, nevertheless, follows the bent of his mind?

On the one hand, it is maintained that whenever we choose one way we have at the same time power to choose not that way, but some other. Unless this were so, it is said, we should not be responsible for our actions, nobody being to blame for what he cannot help. On the other hand, it is objected that unless one were governed by his habits we should not depend on him to do things as we do. If people were not governed by their habits it would make no difference, it is said, in what bank we deposit our money, seeing that any banker may at any time do anything, nobody knows what. If people are not governed by their habits, it would not surprise us should the Darwinians any day undertake to persuade us that the heavens and earth were created on the 23d of October, 4004 years before the birth of Christ.

We have accordingly two parties, one of them maintaining that whatever we do is the result of arbitrary choice, the other that whatever we do is the result of habit, these being in ceaseless conflict. On the waves of the battle their standards ever rise and fall. Some say that our side is getting ahead, some say that your side is getting ahead, but others say that neither of us is getting ahead.

Kant proposed a reconciliation of free-will and necessity which has become famous. Every action of a man, so far as we can observe, says he, goes back for its cause to some other, so that finally it would follow that the conditions under which a man was born were due to his previous acts. This fact, however, if indeed it be a fact, avails us nothing in fixing the man's responsibility, seeing that we have ever to go back in time to hunt it up. The case, nevertheless, will be altered if we suppose that the man is of such a nature as never to have begun to be at all. His choice would then have been made from all eternity, with nothing previous to it, it being possible to conceive time itself as having originated with his choice. He would be free, since all his actions in time would be the outcome of his original choice which was without date, all dates having manifestly to be in time, but of any particular action of his we could say it was determined by a previous one. Without having power, therefore, in each particular instance to do otherwise than he does, he would yet be responsible for what he does. Any action of his would be predestinated, determined beforehand, but he would be the one who predestinated it.

But to say that a man can be bound and free at the same time—all his actions predestinated, yet he responsible for them—this, it is objected, is the same as to say that a door can be open and shut at the same time. It turns out, however, that a door can be open and shut at the same time—there being a great many such doors, consisting, as they do, of revolving fans. Freedom and necessity, indeed, may be but two sides of the same thing, just as unchangeability and changeability are; to take an example, we hold that the atoms, that is to say, those which are ultimate, are unchangeable, though we admit that they change their places.

The quality of things is another condition of the will, whether they be attractive, whether they be important, whether their mastery be easy.

To begin with, then, attractiveness aids us in the formation and retention of habits. The great hold that drinking, smoking, vulgarity, gaming, and loafing have on people is partially to be explained on this ground. Drinking is attractive in more ways than one. First, there is the good flavor of the liquor; secondly, there is the exhilaration attendant on its use; thirdly, there is the pleasure of following the fashion. Suppose the matter were otherwise, suppose the liquor had the taste of quinine, suppose that the drinking of it made one sick, suppose it were unfashionable to drink it? Would, then, so many be addicted to its use? Learning to smoke is at first disagreeable, and this is to a certain extent a bar to it; but smoking is fashionable, and very soon becomes agreeable. Vulgarity is fashionable among a certain class of people, but unfashionable among another class—it depends, therefore, very much on the company one keeps. To vulgarity a certain pleasure attaches from the gratification it affords vanity. The vulgar man seems to himself to set at naught the usages of a better class of society than that to which he belongs; sometimes he even seems to himself to be, as it were, about to suspend the laws of nature themselves—Ætna, perhaps, will cease to thunder if he goes by! Moreover, vulgarity does not, like the use of tobacco, make one sick. The use of the rod in early life, rendering it less attractive, does often prevent the formation of the habit. Gaming is attractive, because it is free from the details of a petty business, the gamester being like a superintendent, general, or prime minister, managing things only in their generalities. Every kind of business, he says, is a game. What is the use of buying a stock of goods, taking chances that they will not suffer damage, that they can be sold at a profit, that the money for them can be collected? One might better go to the chances themselves at once, without any intermediaries. Let him gamble directly for the results. Disappointment tends to make a man put away gaming. This shows that the habit tends to lessen its grip upon him as its attractiveness wanes. Loafing, likewise, has a great hold on people because of its attractiveness. A man has been known to go every day for twenty years to the corner grocery, there to sit, on the average, six hours a day, gossiping.

Curious things also have attractiveness for us, and, therefore, an influence on our actions. Emerson remarks that Cæsar, at the time he was dictator and was looking after affairs in Egypt, had his curiosity so aroused about the sources of the Nile that he was willing to leave everything, if only he might discover them. The quest after the North Pole is another case illustrating the same thing. We may cite still another example. It was once asked of a man what three things he would most desire to know, whereupon he replied, the state of the dead, what is on the planets, what is in the minds of others. No doubt, if any of us were persuaded that he could discover somewhat about any one of these things, there would be no limit to the amount of effort he would put forth to do so.

Another quality of things which has to do with action is their importance; when at first a boy keeps himself at his tasks, he would a thousand times rather be at play, but the importance of his task makes him persevere in it. It has often been remarked, also, what one will do through fear. A man, says Kant, who thinks he cannot perform a certain action, could easily enough do it were his life staked on its performance. We may, however, find an example of less violent form. A teacher finds great difficulty in keeping his pupils to their studies, not being able at times to maintain order in the room. At last, however, the examination comes. There may be a hundred pupils, each writing at his desk answers to questions. It is still as death. The fear of failure is the magic that works such wonders with the pupils. The marking system used at the recitation of a class has much the same effect—may, therefore, be justified on grounds of expediency, however inadequate as a test of real attainments it may be. Men working for property or for power have their actions influenced by the importance they attach to them. A man denies himself not only luxuries, but even necessaries, to lay up money. Again, what unremitting toil and long hours a man like Bonaparte will bear to gain power!

The ease with which a thing is mastered is another quality which has to do with our actions. We have here explained what might otherwise seem incomprehensible, the great hold that drink and such like habits quickly obtain over people. Suppose that, in order to learn to drink, a man had to be drilled several hours a day for a term of years, that is to say, suppose it were not very easy to learn to drink, would so many acquire the habit? One to become expert in vulgarity does not have to take a long course of instruction, as he does to learn Latin. Gambling, at least that form of it that depends merely on chance, requires little or no preparation. Any habit, even though formed with difficulty, when it has once come to perfection, makes practice in it easy, whence it may be hard to get rid of it. This applies, of course, to good as well as to bad habits—accounts, therefore, for the pains employers take to select men of approved habits.

The quantity of things, as well as their quality, prescribes laws to action.

We have, first, extensive quantity, the number of things. This has to do particularly with space, since the number of things are beside one another in space. Here, so far as actions are concerned, the principle is limitation—make the matters of action as few as possible. The principle comes to what is called the division of labor. As many as eighteen different kinds of work were, as Adam Smith says, in his day involved in making pins. If any one man had to do all these kinds of work himself alone, he could not make more than ten or twenty, if, indeed, he could make one pin a day. With each man doing but one kind of work, however, these same eighteen men could in one day make a hundred thousand pins! Thus, by this quantitative condition of the will, there is a difference in results not merely of a hundredfold, not merely of a thousandfold, but of one-tenth a millionfold. Each man, by concentrating his efforts, acquires the habit of doing his work quickly. He thereby becomes so expert that he can do a great deal. If he had to go from one thing to another, he could not do anything well. His action, in short, is regulated by the quantity of things, here extensive.

According to the economist Say, there are or were seventy different kinds of work in making ordinary playing-cards, the which, if any one man had to do them all, he could not in a day make more than one or two cards. Thirty men, however, each doing but one or two, or at most but three kinds of work, could in a day make fifteen thousand.

Reports made by a committee to Parliament showed as many kinds of work to be necessary in making watches as there are counties in the State of Illinois—one hundred and two. If one man had to do them all, it was said, he could not in a whole lifetime finish a single watch. As watches are now made, there are more kinds of work on them than there are days in the year, so that it is more than ever evident that no one man, alone and unaided, can in any reasonable time make a watch.

One of the Rothschilds, it is said, being asked if he wanted his son to follow nothing but banking, remarked that it was just what he wanted. For, said he, if a man be merchant, brewer, banker, and everything else, it is only a question of time when he will be sold out by the sheriff. It is well worth our while, also, earnestly to consider that remarkable statement of Andrew Carnegie that he has never yet known a man who understood two kinds of business.

We have, however, in the second place, protensive quantity, that is to say, quantity of time. By putting a great deal of time on a thing we may become expert in it. Certain persons, learning to play musical instruments, practise five or six hours a day, their dexterity being due to the quantity of time they repeat the acts.

A skilful seamstress handles a needle in a way which must seem miraculous to a clumsy beginner, yet she herself was perhaps clumsy at first; she has become expert simply from using the needle so many times.

We have seen a man take four balls, which he all the while keeps in the air, gently raising each up as it falls. It may be that he uses knives instead of balls, twirling each as he throws it up. It may be that he even uses torches, keeping four of them upright, tossing up each as it falls. He comes to be able to do such a thing as this by the number of times he has practised it.

The egg-dancing girl, as she is called, illustrates the same thing. Around her head is a band, at short distances on which are fastened little nooses, these in fact extending the whole length of the band. Without ceasing to dance, she must take, one by one, the eggs from the basket which she holds in her hand and tighten around it one of these nooses. When she has the eggs all out of the basket, she must take them, one by one, from the nooses and replace them in the basket, continuing all this while to dance. What care she must take not to break any of the eggs, besides that care necessary to surmount the other difficulties in the case, it is hardly possible for us to conceive. The proficiency of the girl is gotten by practice.

A man of the name of Patch was once accustomed to walk a rope stretched across the Niagara River. He became so expert at it that he was able to stop on his way over, balance a stove on the rope, and there cook his dinner, maintaining all the time the utmost composure. Certainly none of us would expect to succeed in doing the same thing the first time he tried it.

But we have, thirdly, intensive quantity, number of degrees. Actions are performed easier if we take the difficulty little by little, gradually overcoming it. It is conceivable that all manufacturing might be done by unskilled labor provided that the work were so laid out that each workman had but the merest trifle to accomplish. Perhaps those who talk so much about general equality hope to reach it on this principle, the wages of everybody to be the same because one does as much as another. A boy learning to swim is first instructed in some very simple positions and motions, then in those a degree more complex, and so on. A teacher remarked that he considered calculus no more difficult than fractions, provided the learner was prepared to enter on the study of it, having reached it by passing all the intermediate grades.

The grades which are established in a school exemplify the principle, graduation meaning that one has passed all the degrees below a certain point of attainment. Classification in a school, however, is, we know, anything but thorough, pupils being treated in the same way who differ greatly. Whatever disadvantages, therefore, might have been apparent in the old-fashioned way of having a private tutor for children, at least one great advantage was certainly attained, the lesson could be better adapted to the needs of the individual.

We have, in the last place, that condition of the will which depends on the relation of things.

In order to compass this subject, it is plain we must have a notion what the primary classes of relations are. Manifestly they are relations of exclusion and relations of inclusion, a third class being composed of these two taken together.

Take the first class of relations, that denominated as exclusion, in which one thing interferes with another; we have it illustrated when one way of doing a thing precludes another way of doing it. A man, for example, has, as he supposes, skill in playing a piano, but on going to a conservatory he finds that he has to unlearn it, his previous training interfering with the training he is about to take.

What is known as diverting the mind seems to depend on the principle of exclusion. Balky horses, it is asserted, on being taken to the city and there used, balk no longer, the constant noise diverting the mind of the horse, so that the notion of balking no longer occurs to him.

Diverting of the mind is often a good thing to make use of—exclude the conditions of doing the thing in question by introducing the condition of doing something at variance with it. The propensity to make use of pernicious or worthless literature, for example, can be cured by opening up the opportunity for good literature. What is called breaking the will is often nothing but strengthening it. For example, a child who is whipped for doing something may thereby only have it more strongly impressed on his mind, so that he is more likely to do it again. We are told, for example, that a boy, having been punished for something—probably not for a misdeed, but only for something held to be such—presently made application to be punished again. He wanted to repeat what he had done, but preferred to have the punishment first. A better treatment of such cases manifestly is to divert the mind. Give the child something else to do and think about incompatible with what it is desired he should not engage in.

Another class of relations in which things stand to one another is that for which we may use the word inclusion. Certain kinds of habits and actions involve others. For example, the habit of obedience somewhat insures the performance of certain actions. This is why Girard was accustomed to impose ridiculous tasks on his men, requiring them, for example, to move a heap of stones from one place to another one day, and the next day to move it back again. He wanted to test their capacity for implicit obedience. And Bonaparte, we are told, promoted the sentry who refused to let him pass the lines, knowing that his habit of obedience fitted him for an office.

The habit of attention is also a thing on which much depends. We are told, for example, of a frivolous girl, who could never get any good from study till her attention was secured by telling her of the rings of Saturn, how they give perpetual light to the planet, so that, except on cloudy nights, street-lamps there are not necessary. This allusion, however inferior might have been its scientific value, so excited her curiosity, it is said, that she became a good student.

It is on this principle of one thing's including another, so far as actions are concerned, that system has importance for the will. One action leads directly to another, one action is implied in another, all the actions in a very few.

We are told of a method of preaching, for instance, which will illustrate it. The preacher, having fixed on an idea about which he wishes to talk, proceeds to find three heads under which it may be considered, each of which he subdivides into three others, the last in each set being of the nature of an illustration. Every sermon he writes is always on this plan and is always twenty minutes long, on twenty pages of paper, and one hundred words to the page. It is said it was wonderful how well some who could not preach at all, if they went about it at random, could get along on this plan, bad as in some respects it might have been.

We are able on the same principle to understand wherein the good of manual training consists, namely, in the fact that one's activity is systematically directed in a realistic process. This we may exemplify by the way splits are gotten out for baskets. The worker takes a log of white oak, say, a few inches in diameter, a few feet in length. He splits it into halves, then into quarters, and so on, till he has pieces sufficiently small. From these he removes the heart and bark, then brings them into shape, narrow at the ends and enlarging to the middle. These he halves, quarters, and so on, till he has splits of the requisite thickness, which he proceeds to smooth. In short, he always knows just what to do, the whole prescribing the parts, and the parts of the parts on down to the smallest.

Pupils who have followed such a process as this are likely to develop habits of systematic action.

What is true of making baskets is true of adopting ways. We are caught in the process of acting. We live in a world of organized activity. We come naturally into a system of accepted behaviors and beliefs. We are easily drawn into this system of organized activity, acquiring in a short time by imitation what otherwise it would take us a lifetime to learn. We have only to get into the swim, so to say, to be borne on, such a control does the relation of things by inclusion have over the will.

The object of taking a special training in something is largely that one may put himself under a system of conditions which will carry him along.

The wonders which such men as Alexander, Cæsar, and Napoleon accomplished were not so much due to their ability as to the system of conditions into which they were able to get, a system of conditions into which, perhaps, the times placed them. They were in such a system of organized activity that things did themselves, as it were.

Change of conditions may, therefore, above everything else, be beneficial to one. A man by changing his room, his furniture, his mode of life, may get into a better way of doing things. One addicted to some bad habit, as that of drunkenness, for example, may be reformed by changing his associations.

The third and last class of relations in which things may stand to one another is that in which a thing, indeed, is involved in others, but partially so only, the relation, therefore, being partly one of exclusion, partly one of inclusion. The Esquimos, for example, coming out of the North to London, would find themselves under two systems, each of which would at the same time exclude and include the other. Naturally they would be reluctant to change their clothing, yet would almost be under the necessity of so doing; naturally they would dislike the dishes set before them, yet would have to eat something; naturally they would detest the beds and bedrooms, yet would get sleepy.

First, then, everybody to a certain extent acts according to what he has formerly been. For example, to all the expostulations which were made to an old man to induce him to take out life insurance, the only answer that could be gotten out of him was that he never fell in with it. Secondly, however, new conditions have the effect to make one change his ways. A man who will not buy a machine, for example, yet on hearing its merits so highly extolled by the agent, finally concludes to take it.

As a matter of fact, the old and the new are always contending for mastery of us; we are partly precluded from certain actions, partly impelled toward them. What is meant by saying that we should embrace the first opportunity of putting a good resolution into practice is that we should quickly get into the new current of things, lest the old one carry us away. What is meant by saying that we should allow no exception in our conduct when once we have entered on a new course of action is that we should not allow the old current to catch us again, get us into its system.

CHAPTER XII

DESIRE

Desire is the feeling of wanting something, primarily of wanting to live. The fundamental forms of desire are, therefore, for food and for offspring. Through the unfolding of life and the development of society, however, it has come about that the desires are for wealth, power, and fame, if on the one hand we neglect the satisfaction of appetite and on the other the desire for knowledge. But, as was said, the primary forms of desire are for nourishment and for propagation.

Definite stages of progress in the satisfaction of desire, particularly of that of possessing utilities and conveniences may be noted.

The amœba is an animal, consisting of a single cell, so small usually as to be seen only by the aid of a microscope. It is a nucleus surrounded by a less dense envelope. To eat, it folds portions of its body around a speck of nourishment; to walk, it bulges out and contracts portions of its body. It multiplies in that its nucleus splitting in two, over the parts thus formed grow envelopes. According to certain evolutionists, all animals have descended from such an organism.

Sponges and corals, which are a multiplicity of animals joined together and growing fast to the ground, get their nourishment from the currents of water which they draw to themselves—a socialistic community with a minimum of labor. Oysters, clams, and the like also supply their wants in the simplest manner, these wants, indeed, being few. Echinoderms, such as sea-cucumbers, move by hydraulic contrivances, water being forced from tubes into feet or fans. Fishes, though vertebrates, yet are water animals, swimming from place to place in quest of food, and depositing eggs in vast quantities from which other fishes grow. These vast quantities of eggs insure the preservation of the species in that, though most of them may come to nothing, yet enough of them will be productive. What are called mud-fish are part fish and part frog. They live during the winter months in rivers and bogs, breathing through gills, the same as fishes breathe, but in the summer they go for a vacation into dry mud, where, under coverings of leaves, they breathe air with lungs the same as amphibians. Their desires have risen above those of common fish; they make use of two sets of conditions, are, in short, aristocratic. They have the form of eels, which latter have somewhat the form of worms. Worms are assigned a great place in the animal world—according to some, not only cattle and horses, but even men are descended from them.

Worms of various sorts have desires which extend beyond the mere questions of subsistence and propagation to that of shelter. They have constructed tubes of sand in which they dwell, or they make tubes by gluing together shells. Many worms also have caves in the earth, eating the soil, being nourished by the vegetable matter which it contains. When the weather is dry they descend deeper into the earth, as they do also in winter to get away from the frost.

Animals which have legs are able to satisfy desires better than those which at best can only swim or drag themselves along, frogs, toads, and lizards, for example. The ancient lizards, which were enormous in size, had naturally to have a vast supply of food, so that it was difficult, we may suppose, for them to satisfy their desires. Elephants present a similar case; for example, an elephant may weigh five or six tons, that is to say, more than ten thousand pounds, whence we can form some idea of the amount it takes to keep him. It is conceivable, indeed, that animals as much larger than any animals known to have ever existed on the earth might have been developed in the course of time but for the impossibility such animals would have found to satisfy desire.

The satisfaction of desire in birds is somewhat complex. They have one home in the north and one home in the south, flying thousands of miles over land and sea to pass from the one to the other. Some of them, it is said, fly hundreds of miles an hour, and are sometimes at a height of two or three miles. Birds which in summer live in the far north, being habituated to a cold climate, in the winter come to countries from which other birds have flown to the south, these countries now being warm enough for them. Birds, it will be evident, live a life with which that of the lower animals will not compare.

Many beasts provide themselves some sort of houses, usually holes in the ground, but not infrequently holes in trees, trying to satisfy the desire for shelter. Beavers make use of systematic means for satisfying their desires, having advanced in this direction farther than any other beasts. Beavers gnaw down trees, which they, then gnawing, trim up, making use of which they construct dams across streams, causing the water above the dam to become of the required depth. Sometimes the dam consists almost entirely of the wood piled up, the water running through it, but not in sufficient quantities to lower the supply above. Sometimes, however, the dam is a solid wall, the beavers having mixed much mud and many stones with the wood. Often, too, a dam not so high is built above or below the main one to lessen the pressure of the water on the main dam. The beavers construct houses in the water above the dam by piling up sticks, stones, and mud, till the structure rises a little above the water, where they make a floor by gnawing the sticks bare, and upon this erect the house. They have only one room, but have from it two entrances into the water. Where the banks of the stream are steep, they dig away the earth so as to form inclines, down which they drag sticks and poles. What is more remarkable, they dig canals several feet deep and several feet wide back from the water so that they can raft down sticks and logs for use; they are known even to have systems of locks. They live on bark, twigs, and even on wood, all of which they store away in the water below. Only one family inhabits a house, though the family may consist of a dozen beavers, since the young beavers do not go out into the world to shift for themselves till about the third year, when they become of age. Beavers, as it seems, indulge also in yachting, an old one swimming around the pond with the young ones on his back, so complex has become the satisfaction of their desires.

The only animals approaching the beaver in complicated polity are the bees. The cells of the comb are six-sided, a side thus being equal in length to the radius of the circle of which the sides are chords, speaking geometrically, the result being that the system of cells is constructed with the least possible amount of wax. The bees use these cells for storing away their food, honey being the chief of it, and for holding the eggs from which new bees are hatched. Bees have division of labor and system in their work, and have established a sort of republic.

An opinion regarding the animals which has been entertained may be briefly alluded to. Insects of all kinds, bees among them, were too small to have obtained the dominion of the world, no matter how intelligent they might have been, but the same could not have been said of the beavers. With man out of the way, it is maintained, there would have been nobody to contest their supremacy. Even as it was, their empire extended from Canada to Mexico. We may—such is the contention—consider that the end which animal life has before it is to exist intellectually, that if men had perished from the earth, providence would have supplied the defect as best it could, installing in their place that species of animal which exhibited the greatest fitness to fill it. This fancy, however, need not detain us, since we come to fact.

Men, even in a low stage of thought, rise above animals in the satisfaction of desire, as appears in their use of stone, fire, leather, and wood, the principal articles, indeed, the use of which first distinguishes savages from brutes.

Men wrought spear-heads of stone, which fastening to sticks with cords of animals, they possessed weapons to be used against beasts. Out of stone they also worked knives, which enabled them to skin and dress the animals they killed, scrapers also, with which they would clean the hides. Many an animal also was killed with hammers or mauls, these being dressed stones fastened with cords to handles. Axes were stones not only dressed, but also brought to an edge, and attached to sticks. Savages used such axes not only against animals, but also against one another, employing them as weapons of warfare. The tomb of Aldus M'Gladus in Kirkcudbrightshire, opened some years ago, was found to contain the skeleton of a man, the upper bone of whose arm contained a stone sliver, doubtless from a prehistoric axe. Strange as it may seem, even surgical operations were performed with stone instruments, sometimes a portion of the human skull even being removed with them, the person recovering and doing well, as is proved by the remaining skulls which show the bone healed. The object of thus trepanning the skull, it is supposed, was to cure epilepsy, the theory being that if a hole were made in the head the devils might get out, they doubtless being glad to escape. Savages made their weapons and tools out of flint, chipping off flake after flake, using a hard material for a chisel, the tooth of a shark, for instance. Stones were also rounded and flattened by them, which, being turned on each other, constituted the first grist-mill.

Men differ, moreover, from animals in that they make use of fire for various purposes, for heat and light, for cooking food, for baking clay, and for smelting metals. Savages have fire-drills, as the same are called, made of stone, which they cause to twirl rapidly, first one way and then the other, using to accomplish this a cord or thong, both ends of which are attached to a stick. The drill revolving rapidly against some hard material produces such friction as to cause the emission of sparks of fire, which, catching in something dry, as leaves, create a blaze. Fire, indeed, may first have been obtained from burning forests or from volcanoes. While, then, the animal world was wrapped in darkness, men, though savages, might spend their evenings in the light of their camp-fires, beholding one another's faces and at the same time enjoying conversation. Animals were compelled to eat their food raw, but men, even though their stage of thought was low, might broil their meat and roast their vegetables. Certain stones exist which have somewhat the shape of cups, besides there are gourds and cocoa-nuts, natural vessels. The stone cups were raised higher with a rim of clay, the shells were coated with the same material, placed upon the fire, the clay baked, the result being that men discovered pottery. Having vessels which could resist fire, primitive peoples put water in them and placed them over the fire, being able in this way to boil vegetables or meat. They might now have more than one kind of dinner—might have roast or boiled ham, just as they chose. Again, metals being heated in fire, were softened, and were then beaten into knives, spear-heads, and the like. The time, indeed, came when men melted the metals, and, filling moulds with the liquid, cast them weapons and tools.

Man further distinguished himself from other mammals by the use of skins. Scraping the flesh clean from hides with little stone adzes, he oiled them, rendering them pliable; this was the primitive tanning. He threw a hide about his shoulders, extemporizing a jacket, or about his loins, extemporizing a skirt. He learned to fasten them on him by tying them together with cords or with withes. After a time he learned to cut them into pieces and then to sew them together, so as to make shapely garments. The skirt in time became divided, forming trousers. Where the climate was cold, caps were made for the head and moccasins for the feet. Thus it was that man became so different in appearance from the beasts. But he used skins not only for clothes, but also for houses. For, setting up sticks, he hung hides upon them, making himself a shelter. Laying skins upon the ground, he had a bed. He could, if he wished, put skins over him for a blanket. Stranger still, he made kettles out of skins. He would dig a hole in the ground and line it with a whole hide, so that the edges of the hide extended a little over the hole and upon the ground. The projections of the hide he caused to be held down with stones. Then he would fill the skin with water, and put into it turnips or other roots. Heating stones in a fire and dropping them into the water, he brought it about that the turnips or other roots were boiled.

Making use of wood, man likewise went far beyond the brute. The first thing of wood which he turned to account was no doubt the club, a weapon still wielded by certain officials among us. When he fastened a stone to his club he had a hammer, when he fastened a cutting tool to his club he had an axe, when he fastened a pointed blade to his club he had a spear. The boomerang is a club which, when it has been thrown, will of itself return to the hand of the thrower. What a surprise would such a thing be to a tribe of monkeys, if, indeed—which, however, is improbable—they had sufficient intelligence to observe the fact at all! The bow consists of a stick to both ends of which is tied a tightly drawn cord. By means of it a small spear, that is to say, an arrow, can be thrown with great force, with so much force, in fact, as to kill not only birds, but beasts as well. Another thing fabricated out of wood was the mat, splits for this purpose being plaited together. Moreover, by weaving splits or willows, men made baskets, obtaining receptacles in which to carry things. Houses were made out of wood, a frame of poles being covered with bark. Wood was also made into boats and into vehicles. Logs might first have been fastened together to form rafts. Hollowing out and shaping a log, however, made of it a canoe. Canoes were also made by fastening bark upon a frame of sticks, as we now make boats by fastening boards upon a frame of beams. The sled, either with merely a flat surface or with two runners, was a device of wood for transporting things overland.

When, then, mankind had learned what to do with stone, fire, leather, and wood, they must have supposed, comparing themselves with the animals, that they had reached the millennial age. Many of their descendants, indeed, have not to this day advanced much beyond the point then attained. To have accomplished so much implied the expenditure of a vast amount of thought and a consequent intellectual exaltation before undreamed of.

When, however, civilization became firmly established in the world, it made provisions for the satisfaction of desire, much more complicated than those which had been known to savage men. Peru, indeed, affords a good example of what was accomplished in this regard.

The people were organized, like an army, into squads of ten families, over which was an ensign. Ten of these squads made a company, over which was a captain; ten companies a regiment, over which was a colonel; and ten regiments a division, over which was a brigadier, using our terminology. Over each province of the empire, and there were four of these, was an inspector-general. At the head of the whole organization was the Inca, the hereditary commander-in-chief of the people. Each man was allotted a piece of land for the support of himself and his family, but had also to help till the lands not allotted to anyone, the returns from these being appropriated to general state uses, as, for example, the support of the military, of the priesthood, of the artisans, and of the infirm. There was no private ownership of land and materials in the sense in which we now speak of it. Stone buildings, somewhat resembling our modern ones, existed in every village as granaries. Roads connected the villages with one another, and about every five miles were public lodging-houses. Everybody really worked for the state and was supported by it, no such thing existing as private enterprise. There was no money, no buying and no selling. The state also provided everybody with house room. The houses seem to have been what we now call flats, had apartments opening on the corridor, and in the same house lived many families. Beggary there could not be, since everybody was sure of a good living, was in fact born to it—the saying that the world owes one a living having been in their case literally true. Marriage was compulsory, and a man was allowed but one wife, just as he was allowed but one piece of land and but one stock of materials. It seems that the state made the marriages, selecting for each man his wife.

Some details regarding the actual state of things in the Peruvian empire will better enable us to get a conception of them. There was an extensive system of irrigation, water being conveyed through the country in aqueducts and into reservoirs, from which it was conducted over the fields. For the country was without rain, so that, but for this watering, the fields would not have produced much. The Peruvians raised the corn common to America, more properly called maize, the white variety of which, it is said, they grew better and larger than any which has been anywhere else or subsequently produced. It is, moreover, affirmed that the potatoes which they raised have never been equaled for quality. They had no tea or coffee, but instead had good cocoa. The peppers of which chili-sauce is made were also one of their products. Their cotton was much superior to that raised in the Southern States of our country—indeed, was without rival, if we except Egyptian and sea-island cotton. The game was preserved in the forests and systematically hunted by the state for the people. The rest of the meat was supplied from herds of llamas and alpacas. The Peruvians had no horses, cattle, sheep, dogs, cats, or any other of our domestic animals. They made cotton cloth, which they stamped with dies, a sort of calico, we might call it. Their woolen cloth was made out of the fleece of the llama. What we still call alpaca was made by them from the shearings of the animal which bears that name. They made a very heavy cloth from the fibres of aloes, interweaving the cords of animals with them. They produced also a sort of a cloth of gold. Not needing gold or silver for money, they used it not only for decorations, but also for utensils. Their pottery was of a very high grade, as we know from the great quantities which have survived the wreck of their empire. It bore the shapes of men and of animals. One kind was made of an amalgam of gold and mercury, the mercury vaporizing in the baking. They possessed no iron, but made their tools out of copper mixed with silver or tin. They put up huge stone buildings, which were beautiful in appearance, fitting the stones neatly together and not employing mortar. Generally lintels were used for the doorways and windows, but arches, made by continually extending the layers of masonry, also obtained. As they had no glass or other transparent substance, so far as we know, their windows were only openings very much resembling those in which we put our window-frames. It is possible, of course, that their windows were curtained. Many of their buildings, according to the restorations which have been drawn of them, would rival the handsome structures to be found in our great cities, nor is this conclusion a matter of guesswork merely, seeing that extensive remains of their buildings are found. As there were no horses or oxen, the roads were, of course, for those who went afoot, but were eighteen, twenty-five, and even forty feet wide, paved with smooth stones. Obstructions were cut away, ravines filled up, and streams bridged. Over the rivers were suspension bridges made of cables wrought out of willows. The Peruvians had no writing, and consequently no reading, all their knowledge being held in memory and orally transmitted. It is certain, however, that they had dramas, composed without the aid of writing, one of which, indeed, has come down to us. They were able to keep accounts by means of certain knots tied in strings, which were hung as fringe upon cords. These were called quipos. Facts, it is believed, were recorded somewhat in the same way, the quipos being mnemonic strings. The Peruvians had a sort of religion, or at least what is called such. Their great temple was erected to the glory of the sun, but had apartments respectively for the moon, for the evening star, for the rainbow, and for the thunder and lightning. The main idea seems to have been praise for the fixed order of nature. We must take into account, moreover, that Peru was not a small community like Sparta, but a vast empire, a million square miles in extent, large as the States of our Union between the Atlantic and the Mississippi, fifteen hundred miles long and four hundred miles broad, and containing ten millions of people. This empire, with its grand system of providing for human wants, arose by successive growths out of the state of things existing among savages of the stone age.

Suppose, then, that the ancestors of apes and men—if, indeed, as Darwin teaches, they are the same—leaning over the battlements of heaven, had beheld the Peruvian state, must they not have wondered at the progress men had made as compared with what apes had accomplished in the satisfaction of desire; must they not, on general principles, have conceded that all things were possible to men, even evolution to spiritual perfection?

The ancient empires of the old world, which were evolved out of civilized society, offered even greater means of satisfying desire.

According to Diodorus, living was so cheap in Egypt that the whole cost of a person from birth to majority was not more than three dollars, on the average about fourteen cents a year. It can readily be seen that, from the warmth of the climate, clothing was hardly worth taking into account and that the same might be said of house-rent. Moreover, the soil produced so abundantly and with so little labor that food was not of much moment. We may suppose, for example, that in Egypt a few hours' work would produce enough to keep one a whole year or more. The Egyptians, accordingly, could put in most of their time building great monuments which should perpetuate their memory to eternity.

The people of Babylon lived in a magnificence which to the earlier civilized peoples would have been deemed utopian. Babylon was five or ten times the size of the present London, but it is to be taken into account that the buildings had extensive yards and gardens. The whole city was surrounded by a wall three hundred feet high and eighty feet thick, on top of which was a grand boulevard for chariots. Riding in vehicles drawn by horses on this elevated road persons could view the stupendous structures of the city, as, for example, the hanging gardens or the temple. The hanging gardens consisted of long and broad platforms, one above the other, supported on pillars and covered with earth—flowers, shrubs, and trees growing on the same. Each succeeding platform was smaller than the one below it, so that the whole presented somewhat the shape of a truncated wedge. We can well imagine what must have been the appearance, from the walls, of these platforms bearing their verdure and blossoms. But a still more imposing structure rose from a platform in the midst of the city, which was itself seventy-five feet high—the great temple. It consisted of seven edifices, each of one story, each succeeding one smaller and resting on the flat roof of the one below it, each a different color than the others, the uppermost one gold. We are to remember that the dress and utensils of the Babylonians were equally luxurious with their buildings, whence we understand what were their means of satisfying desire.

Nineveh was the seat of artistic excellence. The public buildings, which were huge and rose one on top of another, had wainscoting of alabaster, upon which were highly wrought sculptures. The chairs, tables, and stools of the Ninevites were about such as we possess to-day, ours often being copied from theirs. The Ninevites made use even of face-powder and perfumery, so great was their luxury. It should seem also that we have derived embroidery from them. With the needle they worked on cloth the forms of rosettes, of flowers, and of animals, the latter sometimes being representative of real, sometimes of fictitious ones. Just what were the patterns of these embroideries is known to us, since, on the wainscoting, sculptures of the dress of men show how the cloth was wrought on; the sculptured thresholds of the palaces also give us an idea of the same. The combs of the Ninevites, together with their bracelets, ear-rings, and necklaces, have come down to us, showing us their skill in designing.

Tyre and Sidon exhibit a people devoted to manufacture and commerce, a people who thrived through specialization. They made a profit on everything which they made, a profit, indeed, on what they had not made. They were the first people to discover that work is unnecessary. They produced nothing, but secured a profit on what others produced. They fitted out ships, which they moved over the sea by means of rows of men who sat on benches, whence called rowers. They went a thousand miles or more, establishing stations and warehouses where they might exchange the goods which they brought for others which they might carry away, always managing to get the best of the bargain. The goods which they took away, if they did not wish to use them themselves, they sold at advantage. They had a knowledge of all the inventions and receipts of the past, to which they added a few of their own. They even entered the undertaking business, making coffins of stone, of wood, of earthenware, and even of lead to sell.

Judea presented a people who from being shepherds had become farmers, engaging latterly, to be sure, in manufacture and commerce. The Jews thought to render easier the satisfaction of desire by limiting the title to land. Every fifty years horns were to be blown all over the country, signifying that the grand year of jubilee had come, then anybody who during the last fifty years had sold land was to get it back again for nothing. Anyone buying land, therefore, really would only pay cash rent for it as many years as were to expire till the jubilee came. The doctrine of this usage was that nobody should ultimately alienate himself from the land. Another provision somewhat along the same line was that every seventh year those who owned land were not to work it, but to give up its use to the poor. Those Jews who had sold themselves into bondage were also to be free after the expiration of a certain time, and debts were to be subject to the statute of limitation. Such, indeed, were the proposed Jewish regulations, though doubt exists as to whether they were ever generally carried out. At any rate, however, they serve to show the natural progress of mankind toward the satisfaction of desire.

Persia, a small country on the gulf of kindred name, annexing territory after territory, welded together into a single empire Egypt, Babylon, Nineveh, Phœnicia, Judea, and all the other countries between the Hellespont and the Indus. This empire exhibited in a way all the characteristics which those countries had manifested, and in addition a splendid organization. The Persian empire was three thousand miles long and from five hundred to fifteen hundred broad, and contained two million square miles, eighty million inhabitants, sixty nations. The Persians made roads through this empire over which couriers rode on fleet horses carrying the mails. Uniform coinage was adopted, an army and a navy created.

This great empire was evolved out of nations which themselves were evolved out of some state of things comparable with what once existed in the Peruvian empire—not exactly such a state of things as Peru had, perhaps, but something equivalent to it.

From the Persian empire to modern times, more than two thousand years, there have existed in succession Greece, Rome, Constantinople, Papacy, and Protestancy, so many stages of progress in the satisfaction of desire.

Greece produced Athens, Sparta, and Macedonia. Athens had a great navy and a large merchant marine, and carried on an extensive commerce, besides devoting itself to manufacture. It extended its empire over four hundred cities, everywhere building up democracy. The Athenians had their work all done for them by slaves, and devoted themselves to politics and letters. It may be doubted whether any other people ever had such an easy and delightful time. Sparta was a socialistic republic, so far as citizenship was concerned, the labor, however, being performed by slaves with no voice in affairs. The people were required to eat at public tables, where the fare was plain and the whole life of the citizen was removed as far as possible from luxury. He, indeed, did not have to work, but must prepare himself for the life of a soldier and serve in the army, in which capacity he was very successful. Macedonia, owing to the conquest of Athens by Sparta and the downfall of Thebes, a fourth great power of the Greeks, became the head of all Greece, and under Alexander the Great overthrew the Persian empire, annexing its territory, this being the greatest single conquest ever effected. The Greeks now pushed into the Persian territory, absorbing its treasures and filling positions of power there, which advantages, indeed, they continued to enjoy for centuries. This conquest of Alexander, then, changed the fate of the world, caused enlightened method to be introduced into the affairs of men, whereby the satisfaction of desire was greatly promoted.

Rome made the legion its unit of military power, an organization which came to consist of six thousand men, subdivided and officered somewhat on the plan of a modern army, and having, besides infantry, some cavalry and perhaps engines of war. Great armies were merely made up of such legions. Whenever a legion stopped for the night, the men entrenched themselves and appointed guards. They never dispersed about a town, but were constantly together and always subject to the strictest discipline. They were always ready, day and night, in season and out of season, to effect all they were capable of. Whatever lands the Roman army occupied it held, so that taxes were collected from them to fill the coffers. Commerce was also carried on with the conquered lands, the inhabitants being allowed to retain their liberty and to keep their possessions. Since, then, Rome with its machine of power kept adding on land after land, it came to hold sway from the Thames to the Euphrates. There was unity of administration, the senate directing and the consul or general executing, a dictator with absolute power being appointed, if necessary. A commander came, however, to be chosen, who exercised the executive authority somewhat as a modern president exercises it, and to whom has been applied, perhaps inappropriately, the designation of emperor. Of such commanders—emperors, as they have come to be called—there were at least forty, counting from and including Augustus up to, but excluding, Diocletian. Lastly, all questions of rights were decided in courts, according to general principles of justice, which the Romans have the merit of having worked out. The dominion of the Romans was about three thousand miles long and fifteen hundred broad, counting at the places of greatest extension. One hundred and twenty millions of people, it is believed, were found within its borders, on which people it enforced its régime for four hundred years or more. A like number of people, it seems probable, were never before so well provided for.

Constantinople was founded by Constantine the Great, from whom it got its name, and was made by him the seat of an empire which, though it was called Roman, was not such in the sense formerly attaching to that name. Republican institutions became nominal merely, Constantine being legislator, executor, and supreme court. He appointed one set of men to the civil, another to the military service, remaining himself at the head of both. As emblematical of the exalted station to which he had attained he wore upon his shoulders a silk robe gorgeously colored and embroidered with flowers, upon his head a wig of various colored hair, set off with pearls and gems. It would be a great mistake, however, to suppose that he ruled merely by caprice. The Roman law was that which determined rights between man and man, systematized finally into the Code, Institutes, and Pandects of Justinian, the source of our modern law. Christianity, with its principle of brotherly love, was made the religion of the empire, whereupon persecutions and paganism vanished.

Papacy created two great empires, which existed simultaneously—the Mahometan, which for the most part was south of the Mediterranean, and the Catholic, which was for the most part north of it. The Mahometan empire was more than thirty-five hundred miles long, stretching from France to India. The Caliph was the supreme authority, both in religion and in politics. What he said had to be done, what he said had to be believed; there was, however, more than one chief, each supreme within his jurisdiction, particularly the Caliph of Bagdad and the Emir of Cordova. All believers were nominally alike, equal before God, the same to conscience, since each was credited with a like intention. Very good laws were enacted, industry of all kinds flourished, and there was throughout the empire great prosperity, greater perhaps than had ever before existed on so large a scale. The Catholic empire extended over various kingdoms and republics, some of which were changeful. The Pope, with supreme authority in religion, assumed authority over governments, the theory being that politics should be controlled by religion. Outside of towns the feudal organization prevailed, the people getting their lands from the lords on condition of furnishing supplies and rendering service, the lords getting the lands from those higher up, and so on. Guilds existed which restricted kinds of labor to their orders, this enhancing the price. On the whole, it is believed that the lot of the average man under papal rule was not hard.

Protestancy, which appeared four hundred years ago, extended its empire over the peoples of Europe which were of German extraction. If the individual thinks the right thing, it is of no consequence that the world thinks directly the opposite; he shall prevail against the world. For example, it was nothing against the theory of Columbus that bodies of men decided it to be chimerical. This principle of setting store by the individual gave an impulse to progress never before known, allowed originality to manifest itself, individual enterprise to flourish.

Thus between the Persian empire and modern times intervened Greece, Rome, Constantinople, Papacy, and Protestancy. Greece gave mankind the free use of reason, Rome showed them how to apply this to practical affairs, Constantinople established the reign of abstract truth, namely, by legality in the temporal realm, by Christianity in the spiritual. Papacy enforced the oneness of humanity, Protestancy its diversity.

Out of savagery was evolved civilization; out of civilization, Persia; out of Persia, Protestancy; out of Protestancy, Modernity.

Modernity makes use of things on the principles of their constitution, goes back to the ultimate nature of matter and of mind from which to formulate rules for the satisfaction of desire.

This is exhibited in the universality of machinery as applied to transportation, to production, and to manufacture. From place to place extend railroads, over which are drawn vehicles loaded with passengers and freight moved on by the pressure of steam. The nature of heat, of mechanics, and of the like inherent in matter, is here made use of to supply the place of human labor, it being, indeed, a general principle that whether we are asleep or awake, alive or dead, matter is always and forevermore working in exactly the same way and to the same end. Likewise cars propelled by the dynamo carry passengers from one place to another with great rapidity. Iron roads, with mechanically moved vehicles, are doubtless destined to connect all points of importance on the land surface of the earth with one another, the result being that the earth will practically dwindle to a small territory. Wires extend around the globe, and in every direction, transmitting intelligence so rapidly that even to-day, for purposes of communication, the whole world is hardly larger than was once a single town. Production is also effected by machinery rather than by labor. Crops are planted, cultivated, and harvested by machinery, the grains are threshed and hulled by machinery. There are machines by which the ground is prepared for tillage, such as ploughs, harrows, rollers, and pulverizers. Machines exist for sowing grain, for dropping seeds, and for planting tubers, for removing weeds from between rows of vegetables, for spraying plants, and even for getting insects off them. The harvester, as it is called, used for cutting, binding, and windrowing grain, it is said, enables one man to perform the work which formerly required twenty, and not only so, but to perform all this work without working at all, he having merely to sit upon a seat driving a team. Manufacturing of all kinds is done by machinery, whether in the matter of preparing the raw material or in the matter of working it up into the finished product. The result is that our food, clothes, and dwellings are very largely made not by human hands directed by an impulse inherent in the mind, but by impersonal mechanisms inherent in matter. This is a state of things which did not belong to any former time of the world, but is characteristic of the empire of the present only. Printing and writing may also be mentioned as things effected by mechanism and greatly distinguishing our time from all others.

Chemistry further exemplifies the use to which we put the nature of matter. Thousands of utilities are cheaply manufactured by applying one sort of matter to another, so that the forces in the one affect those of the other, producing the desired product. It is said that there are factories in Germany which have perfect laboratories and employ a hundred chemists or more constantly to investigate the nature of matter with a view to obtaining useful combinations of it. Explosives of such power are now made through chemical agencies as enable the intellectual peoples of the earth to control it against any possible irruption of barbarians. One regiment of men armed in modern fashion, could they overcome the fact of time and transfer themselves to the state of Cæsar, would be able to overthrow the whole Roman empire and to dictate any policy they might see fit.

Going back to the principles of principles, if we may so say, is also characteristic of modern life, as, for example, we may observe in the case of finance. We have the banking system extended all over the world with uniformity of method, a means whereby a person has his credit available at a moment's notice in any locality and usually without the use of property, whether money or goods, the affair being simply one of bookkeeping. The banks have deposited in them credits many times the whole circulating medium of the world. The stock company is another device along the same line, a device whereby the possessions of several persons, or such part of them as they choose, are converted into a total credit, out of which may be paid the expenses of the business, the incomes from which accrue to the persons whose credit is used. Great businesses are thus reduced to bureaucratic management, certain men sitting in an office somewhere performing the labor of the world without laboring. What is more, the stockholders do not even have to sit in an office; the whole thing is done for them, and they merely take the returns. These results depend in the last resort on what is known as invested capital, the return on which is profit, interest, and insurance. Credit at interest, even at two per cent., will double itself in about a generation. A man with a thousand dollars will thus, without doing anything, come to have in that time two thousand. Risks to goods and life are covered by insurance on the principle of general averages, wherefore, if one takes the risks without having them covered, he also reaps a gain if no disaster occur. Life insurance is a great modern invention whereby by the payment of a stipulated sum each year, each quarter, or each month, a person receives a certain sum at death or at the expiration of a certain time. How these financial institutions give a power to modern society which was denied to the past must be apparent.

Education by means of the school, the newspaper, and the library also distinguishes modern from former times. Schools are now characterized by teaching based on a thorough investigation of mind as it has appeared on this earth, by the long time given up to it, and by the extent of what is taught. The value of public-school property in the United States alone is more than a half billion of dollars. More than ten millions of dollars are each month paid to teachers. The teachers employed, if gotten together, would make a body wellnigh as large as Napoleon's grand army. The number of pupils in the United States would form a body three times as great as Xerxes' host.

It is proved, just as we should have expected, that the industrial productivity of a community increases with the rise of its schools, Massachusetts, for example, where schools are best, being nearly twice as productive as the rest of the country. Among other things, accordingly, education may rank as one of the means which has been discovered to aid the satisfaction of desire.

Government through some fixed system of representation also characterizes modern times, all countries of much importance, with the exception of Russia, of Turkey, and of China, making use of it. The representative himself stands for a place, a term, and a party. Such a system, unlike any system of other days, enables a government to extend over any amount of territory. It enables a state to last any length of time. It enables the will of the people in the long run to be realized.

Such, then, is the empire of the present which has been evolved out of Protestancy. How much improvement in the means of satisfying desire has been made from the state of the amœba to ours is manifest, how much even from the state of savages to ours.

CHAPTER XIII

AFFECTION

THE general law by which affections are regulated seems to be that of the mutuality of participation. We became enamored of what is connected with our activities. This may be observed by examining the three principal classes of affections, those for kindred, those for friends, and those for things, it being understood that by affection is meant the feeling of regard which we have either for persons or for things.

Affections for kindred are conjugal, parental, filial, fraternal, and nepotal, it being assumed here that husband and wife are kindred—for it may be that a better designation for these would have been family affections.

One of the mutualities which bind together husband and wife is comradeship, husband and wife being close companions in the journey of life. Even the hardships which they are called on to endure it is a pleasure to remember, just as to the followers of Æneas it was a pleasure to remember how they had been tossed about on land and sea. The pleasures which husband and wife have had together will seem doubly pleasant on that account. Another thing by which husband and wife have their feelings for each other heightened is the mutuality of possessions. They are in a certain sense in a business partnership. The value which there may be in this world's goods is shared mutually by them, they form with their children a sort of socialistic community. The greatest mutuality subsisting between husband and wife, however, we may believe, is that of parentage.

Notwithstanding all these mutualities, it is true that conjugal affection does not always exist. We must suppose that in such cases the mutuality of participation which would make for affection is offset by something else. Husband and wife may not be companionable, their possessions may not be mutually shared, their parentage may be unhappy.

After thirty-three years of married life, Cicero was divorced from Terentia. The reasons which he assigns for this, in a letter which is still extant, are that she was intriguing, perfidious, and extravagant. We have here only another way of his saying that the concerns of himself and his wife were not one, there was not a mutuality of interests.

Had Terentia left her memoirs, we should have had some light thrown on the subject of matrimony, as, according to tradition, she not only married Sallust, the historian, but two other husbands besides. If the account is true, she has the honor of having been the wife of the greatest literary man who ever lived and also the wife of another literary man whose eminence was great. She is said to have attained the age of one hundred and three years, to have seen the men of Cicero's day pass from view and a succeeding generation come to power.

Her last husband boasted, it is said, that he had two things which belonged respectively to the two greatest men of the previous age, Cicero's wife and Cæsar's chair.

Parental affection is grounded on the law of mutuality of participation. The fact that a child is associated with his parents for so long a time is certainly one of the reasons why an affection exists for him on the part of the parents. Another reason is the multitude of details and complexity of details in which the child is associated with the parent. Greater, perhaps, may be some important matter of mutual participation, some passage of a crisis—for instance, a recovery on the part of the child from a severe illness through the watchful care of the parents.

We can, therefore, well understand why paternal affection should be strong enough to prevail even when the child has committed misdeeds or is ungrateful. To this day a tomb is pointed out which, according to tradition, is that of the ill-fated and misguided Absalom. David mourned bitterly for him and, as is supposed, built him this monument which should make known his affection to all futurity.

Cicero's Tullia affords the best example of a father's regard on record. For in her case there was nothing which might prevent affection, everything which might further it. She was the delightful companion of her father, one of the most accomplished of Roman ladies, but died at thirty-two. At the house of Atticus, Cicero read everything which he could find on the subject of assuaging grief, and wrote afterward his essay on Consolation, which unfortunately is lost. Philosophers came to comfort him and men high in public life wrote him letters of condolence, among them even Julius

Cæsar himself, so that Tullia went down in such mournful solicitude as has been vouchsafed to no other human being. Cicero retired to Astura, where in the thickest of the woods he hid himself, staying there from early morn till dewy eve, reading as best he could, but frequently blinded with tears.

Rhodiginus declares that hundreds of years afterward, in the days of the popes, the body of Tullia was found, partially embalmed, it would appear, and the hair dressed up in a golden network, but that on exposure the body crumbled to dust.

Cicero, indeed, contemplated building a monument to her which should perpetuate his affection for her to the remotest ages, but for reasons which we do not altogether understand was prevented from so doing, yet, though he built it not, he builded better than he knew. For his mention of the monument has ridden safely over the billows of time to us and is more effective than the monument itself could possibly have been, while, moreover, it is eternal and unchangeable.

Filial affection, it is easy to understand, is not likely to be as strong as parental affection, because the child cannot be as conscious as his parents of participation with them in the things which have chiefly concerned him. Parents there are, and many of them too, who show a much deeper regard for their children when little than when grown, another reason why the children lose affection for their parents. Parents, moreover, have the tendency to exercise over their children a mental tyranny which is not conducive to affection on the part of the child.

Yet there are remarkable instances of filial affection, the most remarkable on record probably being that of Alexander Pope, the poet. He tenderly cared for his mother till she passed away at the age of ninety-three. He had a sketch drawn of her after death, so that her looks have descended to us. Six men of humble station bore her remains to their resting-place in Twickenham church, followed by as many women of like degree, all dressed in gray. Pope directed that his own interment should be similar, for he would not have it more ostentatious than that of his beloved mother. He placed an obelisk in his garden, on which he had inscribed in Latin, "Ah! Edith, best of women, most loving of mothers, fare thee well!" This obelisk is preserved to this day at Gopsail, Leicestershire, where it was taken from Twickenham—seems likely, indeed, to render the record of the son's affection for his mother everlasting.

Fraternal affection also springs from mutual participation, the children of the same family have regard for one another owing to the fact that they have so many common associations. Certain limits, however, to this affection are noticeable. The unfairness with which parents deal with their children, giving one an undue advantage to the detriment of another, is a great bar to it. The great differences of disposition which children of the same family manifest is a great bar to it. The great changes that fortune makes, raising one and lowering another, is a great bar to it.

We have, nevertheless, from fiction the example of Antigone, who willingly lost her own life to prevent the desecration of the body of her deceased brother.

The popularity of the play of Sophocles, in which this is set forth, must in part be ascribed to the hold which fraternal affection had on the Athenians. Even in late years, and here in America, the play has been acted in the original Greek, and with costumes and accompaniments reproducing as nearly as possible those of the Athenian stage, and even on an American audience the effect was profound.

Charles Lamb, we know, tenderly cared for his sister, who at times lost her reason. He is admired for his writing, but perhaps not less for this affection.

Artemisia, Queen of Caria, however, has shown the most remarkable regard for a brother which the annals of time furnish. She invited the most celebrated orators to compose in competition a funeral oration on him, the choice falling on that of Theopompus, now regrettably lost. She built such an elaborate and imposing mansion of a tomb for him that it has given its name to all similar structures among us—mausoleum, from his name, Mausoleus. Though long ago wrecked, first by an earthquake and latterly by a crusade, its memory is yet preserved in its name, a proof that words are the only things which last forever. Fragments of the monument are in the museum at London, where they yet recall the affection of Artemisia for her brother. It was known as one of the seven wonders of the world, and the description of it by Pliny is extant. Lately, too, the site of it has been unearthed, whence restorations have appeared. Thus the renown of Artemisia goes on.

Nepotal affection is a designation which may be used to denote affection between relatives outside the immediate family. The relation of nephews or nieces to uncles or aunts differs very essentially from that of children to their parents or from that of children to one another, whence certain sources of affection which exist within the immediate family circle will be wanting outside of it. It would be a great mistake, however, not to perceive that there is also a certain gain in this. For most of the things which will lead to the estrangement of children from their parents or of children from one another are absent in the case of more distant relatives. The affection subsisting between such relatives is more of the nature of friendship, with this important difference, that the consanguinity is a means of approach. We have explained, then, the undying affection which has often sprung up between aunts and nephews, between uncles and nieces.

Pliny the younger was the nephew of that Pliny who wrote the "Natural History" still enjoyed by us, and was kindly cared for by him. The younger Pliny became himself a great writer, and has left us an account of the death of his uncle at Vesuvius. We can well imagine what affection the young man must have entertained for the uncle.

The word nepotal, it will be observed, properly denotes the affections subsisting between those not of the same immediate family, since the relationship between them arises from the fact that they are grandsons or granddaughters. One is a nephew, for instance, because he is a grandson, a cousin because he is a grandson, and so on.

Affection for others than those of one's own family is usually known as friendship.

Theophrastus, the pupil of Aristotle, who lived to such an advanced age and wrote so many things which have perished, or at least are supposed to have perished, wrote, among other things—which, too, is now lost—an essay on friendship. Cicero was familiar with this, and it was doubtless on the basis of it that he wrote out his own well-known tract which everybody reads. Friendship depends on persons having something in common, indeed, on their having much in common. He who looks into the face of a friend, says Cicero, beholds there, as it were, a copy of himself, for which reason it is that friendship is the most delightful of all things. Ennius, the old Roman poet, as quoted by Cicero, says in certain of his verses, which have outlasted Rome itself: "How can life be worth living if devoid of the calm trust reposed by friend in friend?" Cicero tells how, in a play of Pacuvius, when it was acted, Pylades and his friend Orestes were presented as each desiring to die for the other, the spectators roundly applauding, showing what appreciation they had of friendship. Are we charmed with office, fame, architecture, dress, and genteel appearance, says Cicero, and not with a mind endowed with virtue? Who would want wealth, says he, without friends? Friends, he declares, are the most beautiful and best furniture of life. Archytas, it is said, remarked that if one had ascended into the heavens and had become possessed of all their secrets, he would yet not enjoy his knowledge very much unless he could communicate it to others. Cicero's contention that similarity of traits is the great bond between friends is but another statement of the law of mutuality of participation. The friends of our earlier life, he reminds us, are not likely to continue such, because our interests and theirs as we come to maturity are likely to diverge. This is, in fact, but saying that community of interests, tastes, or something of the sort, is the basis of friendship. He quotes the saying of Aristotle, which indeed must have been old when Aristotle was born, that many pecks of salt must be eaten together to bring friendship to perfection. Friends would have to dine together months, it is presumed, to use up so much as one cellar of salt, a whole year perhaps to use up a gill of it—but in a peck are sixty-four gills! The statement, therefore, is an hyperbole, a way of saying that long and intimate association is favorable to friendship. This community of association merely, does in fact count for something, yet its effect must be very limited without similar dispositions obtain in the persons associating. Cicero well remarks that friendship is rare among those in public office and concerned in the affairs of state. For who is there, says he, who prefers his friend's promotion to his own? Those who are prosperous, says he, despise the friends of their former condition, as they also despise those who, from having been prosperous, have fallen into adversity. Many things, then, there are which may break up friendships—rivalry, neglect, what not—the reason, doubtless, why so few friendships exist. One of the most common obstacles to friendship is, according to Cicero, the demand of one person of another to do something questionable, nearly everybody having some regard for truth and right. He mentions, however, the case of Blossius, who was an exception to the rule. Tiberius Gracchus was endeavoring to exercise in behalf of the people dictatorial power, in the doing of which he was violently opposed by the senate. Blossius, his friend, however, stuck to him. Asked if he would have set fire to the capitol if Tiberius Gracchus had told him to do so, he replied that he would. Regard for truth and right, however, has in general such a deep lodgment in the human breast that it has passed into a proverb that there can be no friendship among the bad. This, however, is not an exception to the principle that friendship rests on community of mind, seeing that on matters of baseness people can seldom agree. Participation in good character, Cicero has it, is such a firm basis for friendship that divergence of mind in certain other particulars is not important. A failure to do kindly offices or even reproving a friend may not, he thinks, be fatal to friendship if the one or the other spring from a virtuous regard. Persons, firm, steadfast, and self-consistent, he says, are those whom we should choose for friends, this, however, involving the difficulty that there is a lack of such persons. Cicero makes Scipio, the same who defeated Hannibal at Zama, say that we should at least give as much attention to the choice of friends as we give to the choice of horses.

About nineteen hundred years after Cicero finished his essay on friendship, Emerson wrote one on the same subject. It is interesting, therefore, to observe that, though Emerson thought out things for himself and was not guided solely by authority, he yet makes friendship, as does Cicero, turn on mutuality. He who hears and understands me, says Emerson, becomes mine. A man may have all the thought and eloquence conceivable yet be unable to converse with his cousin or his uncle, unless, indeed, these be kindred souls. We have explained why the intellectual and active powers increase with affection as they do, since we know that a man can write to a friend what he otherwise could not think of, can speak to a friend what he otherwise could not say. When we can indulge our affection, says Emerson, the preceding eternity vanishes, all things begin *de novo,* we suddenly awaken, as it were, to life. If a soul might be assured that somewhere in the universe it should regain its friend, says he, it would be content and cheerful alone for a thousand years to come. A friend, declares Emerson, is one with whom I can be sincere, that is to say, one with whom I can be myself, one with whom I do not have to appear other than I am. Everybody, when alone, says he, is sincere; he becomes insincere only when a second person enters. The need of mutuality, he thinks, explains why conversation is best between two persons only. Three cannot take part in it. We have suggested the dinner-parties, where there is an effort made to please everybody, to reduce all as much as possible to one mind, to suppress every appearance of individuality. That man, said a host, I cannot have at my parties, he does not agree to the opinions of some present, he argues a point. The host, in fact, seems to be a man whose business it is to see that nobody enjoys himself, whose business it is to curb the spontaneity of thought, or at least to stop its expression. The only fault of the host, however, is that he endeavors to insure a mutuality where none is possible; he is right enough in his purpose. We expect much of a stranger, says Emerson, but as soon as he begins to intrude his partialities, his definitions, his defects into the conversation, it is all over, the want of mutuality is apparent. Moreover, it is necessary that the mutuality be real, and not feigned. A friend, says Emerson, must be himself —he is mine only to the extent that he is not mine. This explains why self-possession is a necessary attribute of one in whom we put confidence. If we perceive that he is not at ease, we infer that his mind and ours are not in harmony. Where there are friends, says Emerson, each must stand for the whole world. The only way to be a friend, he teaches, is to be one, discover in another the mutual requisite. We cannot get nearer to a man by getting into his house, but only by getting into his heart. It is of no avail to know his mother, his brothers, or his sisters. After all, Emerson thinks, friendship is at best but a matter of approximation, something like the value of π or e, or the square root of 2. All association, he says, has to be a compromise. Our ideals of friendship, he thinks, are dreams and fables, something that we might hope to have realized. We may, indeed, conceive that in the depths of the milky way are worlds on which all that might be desired or conceived of in a friend actually exists.

Of an opposite nature to friendship is malevolence, examples of which are anger, hatred, revenge, contempt, envy, and jealousy. The case of Achilles well illustrates anger. Incensed at Agamemnon on account of the injustice which Agamemnon had inflicted on him, he refused longer to take part in the operations connected with the siege of Troy, the consequence being that the Greeks were overwhelmed with defeat. Agamemnon prayed his forgiveness and begged him again to lead the Greeks, offering him great rewards, whereupon Achilles merely replied that, even if the gifts were fabulous beyond measure, yet should his resentment remain, he would let the Greeks perish to the last man rather than lift a finger to help them. Examples like this may yet be found, and almost anywhere. An illustration of hatred is that recorded by Xenophon. Cyrus the younger exceedingly despised his brother Artaxerxes, who was King of Persia. Having raised an insurrection against him and penetrated with his army wellnigh to Babylon, the capital, he was engaging the king's forces with every prospect of success at Cunaxa, when, spying his brother among the Persians, he could not restrain himself, but, crying out, "I see the man," rushed upon him with his few attendants, thereby losing his own life and destroying all chance of success. It may be doubted whether this, also, is any uncommon example of the display of hatred. Revenge shows itself in many instances, yea, in instances innumerable. Not having been appointed to an office, which he coveted, by the president, the applicant inflicted, when opportunity offered, a mortal wound on the president, exceeding the injury which the president had done him—if, indeed, injury it could be called—infinitely. Something of the sort, but on a smaller scale, may be observed in country precincts when an election is in progress. It is nothing to the one who scratches the ballot that the candidate is good and capable, so sweet to him is his revenge. Contempt, as is known, arises out of the undue importance which one attaches to himself. This, indeed, may go so far that he attaches an importance to the opinions of others on the ground of their falsity; he may desire persons to consider him meritorious, even when he knows himself not to be so. Of jealousy Othello furnishes the standing example. The man has come to the pass that he believes another person to be his absolute possession. She should not dare even to put in a claim to her own soul. His position is, indeed, so ridiculous that he is made the victim of plots and deep-laid schemes on the part of Iago, he even goes to the extent of committing murder—indeed, takes the life of his wife on the ground that he adores her. The nature of jealousy, then, is that the mind is pained to have its possession, or at least its supposed possession, contribute even in the most trivial manner to the advantage or pleasure of another. Envy is the pain which one feels in the happiness or good fortune of another, usually in the happiness or good fortune of one of his own class. Beggars, it is said, have no envy of those in affluence, but only of their fellow beggars who may be a little better off than themselves, of a fellow beggar, for example, who may chance to have a better pair of shoes than any of the rest possesses. Envy leads to detraction, the envious person representing that the object of his envy does not know as much as he thinks he knows, or perhaps as much as some others think he knows, that he has not as many possessions as he appears to have, that he does not manage his affairs as well as he might, although all this in no way concerns the man who is envious of him. The envious man looks after the affairs of others for nothing, even to his own detriment perhaps. Often an envious man will miss no chance to browbeat one by unpleasant allusion or question, as, "That was a pretty bad bargain you made in buying that house," or "What do you suppose I heard a person remark about your speech last night?"

The question has often been raised, what can be the natural purpose of such affections as envy, jealousy, and the like, or if they have no natural purpose, whence then their origin?

An hypothesis may be ventured whether they are not to be accounted for somewhat as are the monsters of bygone ages. Once on the earth, as we know, were gigantic lizards, some fifteen feet in height, some sixty feet long, some, indeed, with jaws not less than twenty feet in length, some with eyes fully two feet in diameter. They are to be explained on the ground that the conditions of the earth were once favorable to their evolution, conditions which no longer obtain. May it not be that envy, jealousy, and revenge, and, in a large measure, contempt, anger, and hatred, are monsters of human feeling which certain conditions have developed, but which, with those conditions ceasing, are destined to extinction?

As we look on a picture representing a giant lizard of the past, with its huge tail, huge neck, and still huger body, large eye and small brain, we shall perhaps be unable to keep from laughing. If we accept the doctrine of Schelling that all animal life is an attempt to reach rationality full and complete, our laughter will be uproarious. These animals were the attempt to get at something in the wrong way.

It is not necessary to suppose that future ages will attach the same importance to the characterization of Othello that the Elizabethans did, the conditions producing jealousy ceasing, jealousy itself will cease.

We have the cases of parents who will not allow some of their children to have the delicacies which they permit their other children to share, a circumstance which occasions much bad feeling. States of society in which discrimination, and on trivial grounds, is made in favor of one to the detriment of another would, we may suppose, have the tendency to produce just such feelings as anger, hatred, revenge, contempt, envy, and jealousy, the which conditions passing away, these feelings will likewise cease.

When the waste lands of the earth have been taken up and the resources of the earth have been developed, when migration has ceased, when people are compelled to make the place in which they live a desirable one instead of fleeing to another, then we may expect that these juster conditions will prevail.

Affections not for persons are those for animals, and plants, and inanimate things.

Alexander the Great, we are told, persuaded his father, Philip, of whom everybody has heard, to buy a certain refractory horse for him, having himself broken in the animal, which was the condition set. The horse, in fact, would never allow anybody but Alexander to ride him, if we may believe the historians. The cost of this horse was something like twenty thousand dollars, but it appears that he was worth as much as that —indeed, a great deal more. For it is remarkable that this horse, called Bucephalus, was the companion of Alexander nearly all the rest of his life and made the conquest of Asia with him, taking part in all the battles, including that of Arbela. This faithful horse finally died in India on the bank of the river known as Jhylum, where his body was buried. Alexander founded a town there, calling it Bucephalia, as a monument to his horse, and a town supposed to be on the same spot is still pointed out.

What, then, must have been the feeling of Alexander for the horse when he witnessed the interment of its body we can well conceive. As he stood at the grave of the horse, memories of his youth must have crowded upon him—how he had recited when a boy in the presence of Demosthenes himself, how he had been instructed by Aristotle, how his mother had been separated from his father, how he had himself, in behalf of his mother, quarreled with his father, how at the wedding feast of his sister his father had been assassinated, how he had himself since overcome the world, undergoing untold hardships and dangers.

The bodies of cats and the bodies of birds are found embalmed in Egypt, which, it seems, were there in their coffins when the Israelites were making their exodus, animals which the Egyptians remembered with the tenderest affection.

It is rehearsed by a man that his parents had, during his stay at home, one dog after another, seven in all, and that he has a distinct recollection of each that he shall always cherish. Though fond of all these dogs, he yet professed a preference for the sixth one, Jack, which, he says, he hopes to meet in the paradise to come. Of the first cat which he remembers his parents to have had, the name of which was Dill, he is still able to give a description—remembers, indeed, how he once thoughtlessly put her in the oven.

There are few persons probably who cannot relate something similar, and the fact that they can do so shows the interest which they take in household animals.

We have all heard of the man who had his whole life transformed by the affection which he formed for a flower which grew in a pot in his prison.

The Dutch had, and still have, a great fondness for tulips, which grow in their gardens, just as many a one among us has a fondness for some particular flower which he cultivates.

What is called the tulip mania had its origin in this regard for flowers. Tulips in Holland became an object of speculation, much as pork, wheat, and corn, or even stocks have become objects of speculation with us. Extraordinary prices were paid for tulips. For example, for one root of a tulip a man gave twelve acres of land, not, indeed, that this was the price which he set on his affection for it, but that he hoped to sell it at a still higher price. The very fact, however, that tulips could be made objects of speculation proves that they must have been in demand. Even in the nineteenth century, it is said, a tulip bulb brought upward of fifteen hundred dollars.

Our affection for places is very marked, particularly affection for home or country.

What a certain man once remarked is doubtless that to which everybody will assent, namely, that there is no other spot on the whole earth which has the same significance to a man as that where he spent his childhood and youth. The geography of it means more to him than the geography of all lands besides.

The house in which George Washington's parents lived, and in which he was born, stood on the south bank of the Potomac, Virginia, such a primitive house as we have often seen, having huge chimneys on the outside and the roof twice as long on one side as on the other.

Custis, son of Martha Washington, 1815, had loaded on a boat at Alexandria, Virginia, a piece of marble wrapped in an American flag, which he transported to the place where the old house had stood, the house itself having been destroyed eighty years previously. Out of bricks which had belonged to one of the chimneys he laid a foundation, upon which he placed the marble to mark the site of Washington's old home.

Years afterward, the historian Lossing came to the spot, finding the stone of Custis broken and around it, and even over it, growing vines, briers, and weeds. He could perceive here and there a stunted cedar sapling and shrubs of figs, descendants no doubt of trees which stood there when Washington was a boy.

Sherman, who had made his famous march to the sea, came to the place, 1878, and beheld one of the old chimneys of the house still standing.

What happened in the case of Washington is that which has happened in the case of us all. Any one of us may go to another state, province, or country, and there perhaps find the remains of an old cellar in the midst of brush over which once stood the house of his great-grandfather. Some old pear-trees, even, may yet be standing near the spot.

We have all realized the truth of the poet's portrayal of a sentiment in which we all participate more or less:

> " Long years have past and I behold
> My father's elms and mansions old,
> The brook's bright wave,—
> But ah ! the scenes which fancy drew
> Deceived my heart, the friends I knew,
> Are sleeping now beneath the yew,
> Low in the grave."

Not very far from the site of the old house in which Washington was born is a vault, surrounded with shrubbery, wherein repose the bodies of his father and kindred. How different is the scene which one now witnesses on visiting the place from the scene it presented to the childhood of the man whom we have all come to honor!

We have an affection for distinguished places in our own country, and even for such places in any country, as, for example, for Jamestown, for Plymouth, for Winchester, for Rome, for Troy, for Tyre, for Babylon, and for Memphis.

Jamestown may be considered as the first capital of America, where even to-day the remnant of the old church tower is descried in the midst of trees and shrubs, and round which are the graves of the early settlers.

When we think of this great republic, whose dominions extend beyond the setting sun and into the region of to-morrow, shall we not feel affection for the spot?

Winchester, of Hampshire, may be regarded as the first capital of Anglo-Saxondom, Winchester having been seized by Cerdic fourteen hundred years ago.

The state which the Saxons founded in Hampshire, together with the states derived from it and the states subject to Anglo-Saxon rule, now cover a quarter of the land surface of the globe.

It is not, therefore, without affection that we shall regard Winchester, from which all this result has come.

Places connected with religion are objects of affection, as Jerusalem. Jerusalem, the literal meaning of which is Peaceville, we understand was a city before the Jews conquered Palestine. For, strange as it may seem, letters or copies of such from a ruler of Jerusalem to a king of Egypt, antedating Joshua, have in our day been discovered. When these letters were written, all the matters which have since given distinction to Jerusalem were existent potentially only. None of our Bible had as then been written. Jerusalem we are informed was taken by David and on what was the thrashing-floor of Araunah Solomon built the temple, the corner stones of which are still pointed out. The Jews have such an affection for the place that they meet there every day to wail, mourning the downfall of their empire. All Christians and all Mahometans as well join in their affection for Jerusalem, particularly all Christians, their regard for it not being exceeded by that of the Jews themselves, whence it is that they fervently chant—

> "Glorious things of thee are spoken,
> Zion, city of our God,
> He whose word cannot be broken,
> Formed thee for his own abode."

Places connected with the progress of knowledge are endeared to us. Columbus seeking the aid of Spain to make his voyage of discovery stopped at the convent of La Rabida to beg bread for his son, he who had in his head an idea which was worth more than all Europe. The good priest of that place gave him help in his project which enabled him to carry it out. So much affection, therefore, does the world feel for the place that four hundred years afterwards an exact copy of the convent is erected on the shore of Lake Michigan in commemoration of the fact.

About fifteen miles west of Genoa, Italy, is the village of Cogoleto, containing about twenty-four hundred inhabitants, the place where Columbus is reputed to have been born. The house which is regarded as his birthplace is now a shop, but bears an inscription.

Genoa, where Columbus lived, has, however, a monument to him in a public place, the monument being a statue resting on an anchor and upon a pedestal set off with the prows of ships, at the feet of the statue a figure of America kneeling, besides allegorical figures, one of which is Geography.

There is no American probably who would not like to make a journey, if not to Genoa, at least to the little town of Cogoleto, so much affection does he entertain for the places connected with this greatest of geographical discoverers.

We have in like manner an affection for relics whether ancestral, or historical, or biological, or mineralogical.

There are few people who have not some keepsakes, as the same are called, which they highly value, these having once belonged to their parents or to other members of the family.

A man, for example, has an old spinning-wheel which he remembers to have seen his mother use. She had rolls of wool laid in a pile, taking up one of which, she would fasten it to a piece of yarn which was wound around the spindle, then stepping backward and holding the roll in one hand, she would give the large wheel a turn with the other. The spindle was thus whirled rapidly around and the roll twisted into yarn. The machinery of our times has done away with the use of the spinning-wheel, yet the man greatly prizes it, because his mother used it and because perhaps it stands for a state of things which has passed away.

For similar reasons, one keeps old chairs, tables, and bedsteads, dishes, knives and forks, watches and clocks, nay, what not? The older a family relic is, usually the more it is treasured, a snuff-box, for example, which belonged to one's great-grandmother.

Of historical relics the number is truly great, as one well knows who has visited museums.

Guericke, who discovered how to make the air-pump at Magdeburg, in order to show its workings had two hollow half spheres which fitted together, the air being exhausted from which they could not easily be pulled apart. Indeed, he caused fifteen horses to be hitched to one of these half spheres and fifteen to the other and then let them all pull back to back, as hard as they could and yet they could not separate the half spheres from each other, though nothing in the world held them together but the pressure of the air. So much were these half spheres esteemed as relics that to this day they have been reverently preserved in the library of Berlin. At Magdeburg even pieces of Guericke's house are kept as relics.

On Christmas eve, 1801, Trevithick making use of a sort of locomotive gave some persons a ride, the first load of passengers, it is said, ever moved by steam, a circumstance in which we cannot help but take great interest, knowing the use which has since been made of steam to transport persons and goods not only from New York to San Francisco, but also from Paris to Vladivostok. Previous to this time, Trevithick had made models of locomotives which were moved by steam on a table, one of which models is still to be seen at South Kensington, an object of the deepest regard. There is also there a mandrel, weighing half a ton, which Trevithick often lifted when he was a youth of eighteen, possessing great power of muscle as well as of brain.

Our affection for biological relics is also strong. For example, there once lived a certain animal, sort of baboon or perhaps of manlike ape, nobody knows exactly when, though a long time ago, his life doubtless precarious and his death unmourned, he in fact having no idea of his own importance. Lately, however, naturalists found in a heap of volcanic ashes in Java, part of his skull, two of his teeth, and a thigh bone, when suddenly he became an object of affectionate regard and acquired great fame, since he is supposed to have filled in some measure the office of missing link.

The bones or fossils of the primitive horse, an animal with four toes in front and three behind, and about as large as a cat, probably also striped like one of our prairie squirrels, have likewise been the objects of affection, since from such an animal as this it is supposed all our horses have descended, even those which at present trot a mile in two minutes.

Suetonius, the historian, mentions that Julius Cæsar possessed a horse which had toes, not dreaming of the importance which attached to his statement, since it was not till Darwin's time that it was understood that horses have descended from toed animals.

We also form attachments for the minerals and metals that are contained in our cabinets. Fragments of meteoric stones are met with and are rightly made objects of regard. Quartz rocks containing gold are also very common in cabinets, enormous pieces of which have sometimes been discovered, one it is said that weighed two hundred and thirty pounds, and many such a large piece is contained in some museum to be highly treasured. Diamonds, so large as to be worth thousands of dollars have been taken from the mines. Of cut diamonds indeed there is a great collection at Dresden.

As, moreover, each kind of rock exhibits a certain kind of crystal known among other things by its angle, a collection of rocks has also on this account an importance and, therefore, a claim on our affection.

CHAPTER XIV

EMOTION

THE emotions, according to some, are all æsthetic, but whether they are so or not, at least æsthetic emotions are those that particularly require to be treated of.

It has been common, moreover, to speak of æsthetic emotions as feelings produced either by things sublime or by things beautiful, but in truth they are also produced by things pathetic, by things ludicrous, by things picturesque, and by things wonderful, there being at least six classes of them. What we have reason to believe, however, is this—the sublime, the pathetic, the ludicrous, the beautiful, the picturesque, and the wonderful are but different forms of unity in variety, this principle, according to Schopenhauer, being the concept regarded as fixed, the many grasped unchangeably in the one, whereby, indeed, more unity is, perhaps, ascribed to things than they actually possess.

The sublime may be one of extent merely, in which case it is properly spoken of as the extensive sublime, though the term mathematical is that which is usually employed to designate it.

Things which awaken in us sublime feelings affect us, not by the variety which they contain, but by their unity—the unbroken sameness in them swallowing up the variety. All the waters of the ocean, for example, are nearly alike, it is not their variety, but their sameness that delights us, the unity of all the waters, so to say.

The ocean which appears boundless to the eye, the prairies of America, the deserts of Africa produce in us feelings of the sublime, as do mountains, the Alps, for instance—indeed, any such objects.

When the question is one of power, however, rather than one of extent, the sublime is said to be dynamical. Whatever is able, as it were, to unite in itself all power, that is to say, to subject to itself, as a unity, all opposing forces, is dynamically sublime, as, for example, are volcanoes, earthquakes, avalanches, floods, and winds.

An eruption of the volcano, Kilauea, Hawaii, 1840, was sublime. Burning lava, red as blood, burst forth from that volcano, forming a river of fire that flowed forty miles to the sea, half a mile wide, two hundred feet deep, irresistible in its fury, heating the water for twenty miles along the coast and turning night into day. Mauna Loa, on the same island, was a fountain of fire, 1852, such as artifice has not produced, there issuing from it a red-hot column of burning lava to the height of seven hundred feet, a thousand feet in diameter.

Two streams of burning lava burst out of Skapter Jocul, Iceland, 1783, which continued to flow for two years to the sea, sweeping away in their courses twenty villages and nine thousand inhabitants.

Earthquakes, manifesting, as they do, such gigantic power, are well calculated to rouse within us emotions of the sublime. The earthquake of Lisbon, 1755, furnishes a good example. Within the space of six minutes, incredible as it may seem, great fragments were torn off mountains and precipitated to the valleys below, the waters of the ocean were lifted fifty feet, a great part of the city was made a mass of shapeless ruins, and thirty thousand people were hurried into eternity. The earthquake of Calabria, 1783, is an example—the ground, suddenly yawning into great seams, swallowed a hundred thousand persons. The earthquake of Caracas, 1812, is an example, the city being tumbled into ruins in the twinkling of an eye. The earthquake of New Madrid, 1811, may also be cited—the ground suddenly lifted the Mississippi River, so that its waters flowed backward and over-ran its banks, indeed forming lakes, some that were twenty miles in extent.

When we hear of such things as these, feelings of the sublime well up within us, feelings of the dynamic sublime, as it is called, the sublime of power.

An Alpine avalanche is sublime, a huge body of ice on the summit of a mountain breaking loose, falling down the mountain side, taking with it rocks and trees, plunging at last headlong into the valley below, crushing towns, as a pebble might crush an egg-shell.

The power exerted by water is also sublime, the great geyser of Iceland, for example, throws a stream of boiling water, ten feet in diameter, a hundred feet high and that continuously. The waters of Niagara plunge in great mass over a rocky wall one hundred and fifty feet or more. The strong ocean tide moving with irresistible might up the mouths of great rivers, as for example, up the mouth of the Ho-hong-ho, meets the hardly less strong current of the rivers, causing great columns of water to rise high in the air and to rush up stream. Near Johnstown, Pennsylvania, 1889, a lake in the mountains, having broken over an artificial embankment, filled the valley below with a mighty flood, bearing down all before it—trees, houses, humanity itself.

These things are sublime because a unity of power, great enough to subdue all other varieties is here manifest.

Tornadoes, moreover, are sublime, sweeping everything before them and raising houses and ships into the air.

Furthermore, the sure working of nature's laws by which death is a certainty to every creature is sublime, this power of death uniting in itself, as it were, all others. Sublime, therefore, was the thought of Xerxes, when standing on the shore of the Hellespont, he surveyed the mightiest army ever assembled, five millions of men, as some say, sixty different nations each in its own garb of war, power enough as he thought to subdue the world:

> "Ere a hundred years were finished
> Where would all those myriads be?
> Hellespont would still be rolling
> His bright waters to the sea,
> But of all those countless numbers
> Not one living could be found,
> A dead host with their dead monarch,
> Silent in the silent ground."

Besides the extensive sublime and the dynamical sublime, we have also the moral sublime, that which exemplifies the triumph of right over might through desperate human actions. Xerxes with his mighty host, for example, comes to the pass of Thermopylæ, there to find Leonidas with only three hundred men to dispute his passage. "Give up your arms," is the demand of the

Persians, "Come and take them," the reply of the Greeks. "Our arrows are so many," say the Persians, "that, when we discharge them, they darken the sun." "So much the better," retort the Greeks, "for, then, we shall fight in the shade." What could more awaken within us the feeling of the sublime, particularly when we remember that Greece was the one hope of the world for all time to come? Similarly productive of sublime emotions is the meeting of two great armies in deadly conflict when some great principle is to be decided, the Greeks and Persians at Marathon, the Romans and Carthaginians at Zama.

Another instance of the moral sublime may be mentioned. Napoleon, when his grand army, on its retreat from Moscow, had diminished to eleven thousand men, without ammunition at that—cold, hungry, and in rags—yet to rescue Marshal Ney, turned them back into the snows of Russia, despite the countless hosts which the Czar could muster against him, an example of what is morally sublime.

When Alexander the Great, with the world at his beck, asked Diogenes who had nothing of his own but his tub, if he could do anything for him, Diogenes replied that it would be an accommodation if Alexander would stand to one side a little, so as not to keep from him the direct rays of the sun. This also was morally sublime.

The pathetic, imperfectly treated of by investigators, may perhaps receive an explanation, as being an adjunct of the sublime.

All are agreed that pathetic feelings are occasioned by what is sad, yet manifestly it is not the sadness as such that is pleasurable. What is pleasurable must be some aspect of the sad event.

Sad things, in so far as they are sublime, may be pleasant, notwithstanding that in another respect they are unpleasant. Here, perhaps, we have a clue to explaining the pathetic.

Death, for example, an event occupying but a moment of time, gathers up into itself the consequences of futurity, unifies the variety of the years, so to say—whence this event is sublime, painful though, in other respects, it be.

Indeed, that there may be pleasure in spite of pain is illustrated in the havoc which the eruption of a volcano produces. The pleasure is not on account of the havoc but in spite of it, no doubt on account of the sublime aspect which the volcano manifests.

What sadness there is in the case of the pathetic, moreover, is softened by the consolations of religion. For we believe that the death of the person, though from one point of view a misfortune, yet in the economy of providence is compensated for.

Furthermore, whatever sadness there may be, since it mingles with the pleasure of the sublime, heightens it by contrast.

Actual occurrences that have the power to raise pathetic emotions are probably oftener connected with the family than with anything else, the death of children being one of the sources of the pathetic most noted.

When we read, for example, in Sterne's sketch of his own life how his father's family having removed from Bristol to Hampshire, lost there his little brother, "Poor Jothram," as he calls him, "a pretty boy four years old," there wells up within us the feeling in question.

The state of the poor boy, so far as this earthly life is concerned, no time, however long, will be able to change—that one event of his death, brief though it was, unifies all the events of the future, so far as they might have been joined to him, whence his death, whatever else it was, was sublime.

Still another instance is this. A little boy having left his mother's humble cottage, one afternoon, went up the side of the neighboring cliff to play, an earthquake in the meantime chancing to take place, so that by the opening of a seam in the ground the cliff was made inaccessible from the cottage. The boy, doubtless destroyed, was never heard of more—but for years his little coat, which he had hung on the limb of a tree, could still be seen flapping in the breeze upon the cliff.

What we are told of Lucy Gray is pathetic. Caught in a blinding snowstorm, late one afternoon, no adequate search could be made for her until morning, when her little footsteps were followed to the bridge, beyond which no trace of her ever could be found.

Descriptive points, as they help to bring her vividly before us, increase the pathos. She was sent by her father to go to the neighboring town to accompany her mother home who worked there during the day in a factory, she went blithe as a roe, she had a lantern in her hand, and she kicked the snow before her as she walked.

Another point is to be taken into account, namely that it is not known what did actually become of her, the chance existing that she may not have perished after all, except, of course, in the minds of others, the sadness which we might naturally feel being thereby somewhat softened.

What we are told of the babes in the woods is pathetic. They were left to wander in the pathless solitude, till broken-hearted, they died of hunger.

Details woven in make the scene impressive. The children, a boy and a girl, were greatly beloved by their parents, who, dying left them well provided for and to the care of an uncle who caused them to suffer death in order that he might obtain the property. They were attractive. Not even the ruffian to whom they were committed to be killed would put them to death.

Next after the family, the career of a person is a source of the pathetic.

The "one more unfortunate," as she is called, illustrates the point—in fact by no means a rare case—closing the course of her life prematurely.

Particulars are introduced to set the matter in a strong light. Her body is found in the river near a large city—her auburn tresses, though somewhat loosened, are still beautiful—her garments drip with water—she must have had parents, perhaps even friends—she found nothing, however, worth living for—in fact, plunged into the water, shivering in the bleak wind of March.

We have also an example of the pathetic in the death of Saul and Jonathan, an example heightened by the circumstances that they were pleasant in their lives and in their death were not divided.

It may be noted as a matter of interest that all words such as changeless, ceaseless, and the like raise emotions of the sublime, since they denote an infinite deprivation of quality. We may quote, for example, Ingersoll's "dreamless sleep of the tongueless dust."

The pathetic is aroused by certain architectural arrangements of tombs whereby sadness for the departure of friends is expressed. More particularly, however, is this done by certain sculptures, as, for example, that of the weeping willow, that of the sheaf of wheat, that of the broken column.

The Laocoon, a piece of sculpture dug up at Rome, in the year 1506, represents a pathetic scene, the priest and his young sons perishing together in the grasp of the bodies of serpents wound around them.

Paintings of the Crucifixion exhibit pathos—the mother of Jesus witnessing the untimely and unnatural death of her son.

Requiems are pieces of music that have the effect to cause within us pathetic emotions, as for example, that composed by Schumann and known as the Requiem for Mignon.

One of the characters of Goethe's "Wilhelm Meister" is a very interesting girl by the name of Mignon, who dies an untimely death and for whose funeral a piece is represented as having been rendered. It was this which furnished the point for Schumann.

Poetry exhibits many instances of the pathetic, a few of which may be given. From Shakespeare take the instance of Imogen—

> Fear no more the heat o' the sun
> Nor the furious winter's rages,
> Thou thy earthly task hast done,
> Home art gone and ta'en thy wages.

From Pope take the instance of the unfortunate lady—

> By foreign hands thy dying eyes were closed,
> By foreign hands thy decent limbs composed,

By foreign hands thy humble grave adorned,
By strangers honored and by strangers mourned.

From Gray take the instance of the rude forefathers—

No more for them the blazing hearth shall burn
Nor busy housewife ply her evening care,
No children run to lisp their sire's return
Nor climb his knee the envied kiss to share.

From Pierpont take the instance of Napoleon—

Here sleeps he now, alone, not one
Of all the kings whose crowns he gave
Bends o'er his dust, nor wife, nor son
Has ever seen or sought his grave.

From an unknown poet take the instance of a man unknown—

Lay him down, his work is done,
Vain for him is friend or foeman,
Rise of moon or set of sun,
Hand of man or kiss of woman.

From Holland take the instance of humanity—

Oh, the rigid rock is frigid, though its bed be summer mould,
And the diamond glitters ever in the grasp of changeless gold;
And the laws that bring the seasons swing their cycles as they must,
Though the ample road they trample blind the eyes with human dust,
Moons will wax in ardent glory though man wane to hopeless gloom,
Stars will sparkle in their splendor though he darkle to his doom.

We have, in the case of the sublime, variety absorbed in unity, but directly the opposite of this in the case of the ludicrous, unity absorbed in variety. For it is agreed, on all hands, that things which call up the ludicrous are incongruous, characterized by inconsistency. Such unity as the ludicrous exhibits is a pretence merely, no substantial unity at all subsisting. On account of this make-believe consistency, or, what is the same thing, on account of this assumed unity, we laugh.

Ludicrous, therefore, is this example in Arithmetic—if it took a hundred thousand men twenty years to build the great pyramid of Gizeh, how long would have taken one man to build it alone? Ludicrous is this question asked by a teacher to secure the attention of his class—"I live at 529 Broadway, and drive a white horse, what is my name?" Ludicrous, if true, is what is related of a German tutor, that he tried to prove to his pupils that the earth is round by citing the fact that shoe heels run over, wear off on one side. Ludicrous is the explanation which a negro made of telegraphy. There is, said he, a huge dog, his hind feet in New York, his fore feet in London—every time they step on his tail in New York, he barks in London. Ludicrous is what is told of an Irishman. His horse having caught one of his feet in the stirrup—"If you are going to get on," said the Irishman, "I will get off." Ludicrous is what is told of an Englishman. Coming to the cross-roads with a friend, he read on the sign, "2½ miles to Bristol, those who cannot read inquire of the blacksmith." "I see," said he, after pondering much, "the joke is that the blacksmith might not be in."

Ludicrous is a scene described by Jean Paul Richter. A returning funeral procession passing near a river, a droll fellow ran to the water and plunged in, evidently with intent to commit suicide. The procession stopped and those in the carriages getting out, hastened to the river to see what might be done by way of rescuing him—and with some hope of success—as it seemed, since, standing in the water, he began to address them, saying that he was yet open to conviction, could they show good reasons why he should not make an end of himself. He related how everything upon which he had entered in life had turned out amiss. He had tried keeping a home for old snipes in Vienna, but it had not paid him anything, owing to the fact that there were no snipes there. Going to London, he had made a business of writing speeches for those who were to be hanged, but had come near having to use one of them himself. Besides, his domestic relations were unsatisfactory. He continued, in fact, to discourse to the assembled multitude till finally it dawned upon them that he was but playing a practical joke upon them, having caused them to stop the procession to gather at the river for that very purpose.

Ludicrous is what is told of an actor who gave a dinner to certain others of his profession. All the guests except one had arrived. "It would be a good joke," said he, "If you would all get under the table and make him believe, when he comes in, that he is the first one to arrive." This was readily assented to by all. The remaining guest arriving, however, the host entered into a lengthy conversation with him, nowise referring to those under the table. These, at last getting weary, emerged one by one much to their chagrin.

Ludicrous is what is reported of a backwoods preacher. Given to exaggeration, he had the assistance of a deacon who sat near him to whistle when he exceeded the bounds of truth, so that he might introduce timely modifications. Once the theme being the taking of the foxes by Samson, the preacher was explaining how he was able to catch so many foxes. "The foxes' tails in those days," he went on to say, "were twenty feet long." The deacon hereupon whistling, the preacher reduced the length of the tails to fifteen and even to ten feet, but without avail—the deacon continued to whistle. Becoming angry, the preacher then straightened himself up and cried out—"I won't take another inch off those foxes' tails if you whistle to all eternity!"

Ludicrous is what is related of a negro who heard a sermon on the passage in Genesis which describes the creation of man. "What has been done once," said he, "can be done again. I am resolved to try it." Going to the brook, therefore, he shaped, as best he could, a man of mud. "To-morrow," said he, "I will come back and breathe into you the breath of life." It happened, however, on his return the next day that the man could nowhere be found, meddlesome boys having thrown it into the water. Shortly afterwards, however, seeing in town a misshapen tramp who asked him why he kept following him around, he demanded of the tramp why he had run away before he got him finished.

Ludicrous is this which is represented as a passage from an oration—"At Peoria, Illinois, is a bridge 500 feet high, extending across the Illinois River. The other day a drover was driving through this bridge a flock of ten thousand sheep. The old bell-wether had nearly reached the middle of the bridge, when spying at his right an open window through which broad daylight streamed, he at once, recognizing his destiny, made a rush for glory and the grave. And not till he had passed far out into the open sunlight did he appreciate his critical situation, when stretching out his four feet to the cardinal points of the compass, with a plaintive bleat, he descended to his fate. The next sheep and the next followed, each imitating the remark and gesture of the leader. For hours it rained sheep. The erewhile placid stream soon became incarnadine with the life-blood of moribund mutton. And not until the brief tail of the last sheep, as it passed through the window, waved adieu to this wicked world, did the movement cease."

While the sublime is a case in which variety is gathered up in unity and the ludicrous is a case in which unity is gathered up in variety, the beautiful is a case in which unity and variety stand in even balance, it is the symmetrical—the use of the word beautiful here being, of course, in the restricted sense.

The Parthenon of Athens, a temple on the acropolis, is reputed to have been the most beautiful building the world has ever seen. The parts of it were adjusted to one another according to ratios, there being, as the Greeks discovered, a rule for the harmony of sights, quite as much as a rule for the harmony of sounds, an optical as well as a musical scale. The whole building was made of pure white marble, contrasting pleasantly with the blue sky and with the green earth. Certain small portions of it and the statues and reliefs of the gables were painted in colors, while the reins of the sculptured horses were of metal, the eyes of gems. Within and without the temple were rows of white marble pillars, fluted and capped, equal in height, in the distance of their spaces equal. Inside the temple was an ivory statue of Minerva with a dress of gold.

The Taj Mehal of Agra, esteemed the most beautiful of mausoleums, is a building composed of white marble which, by its purity, exhibits symmetry, a like condition being in every part of it. This white marble in appropriate places is inlaid with agates, jaspers, bloodstones, and the like, forming wreaths, scrolls, and frets, which by the just proportions and symmetrical arrangements of parts are fine in their effects—unsurpassed even, it is said. The minarets at the corners of the building are considered the most beautiful in existence, manifesting such perfect harmony. The dome in the centre, likewise captivates the beholder by the way its variety is made consistent with itself. The light of the sun is admitted through trellis work of white marble, so as to be subdued in its effects, extravagance or disproportion thus being avoided.

The human body with its many parts, so adapted as to serve and preserve the whole is an object of beauty, especially when there is perfect symmetry, but more perfect in form than the human body is a statue of it by the Greeks, in which the parts are all of the proper size and posture. All contradictions and inconsistencies have been excluded from it, there is the strict application of reason to art.

The statue made by Phidias representing Jupiter was the finest one which has ever appeared. The expression of the face, though majestic, was yet mild and peaceful—its symmetry permitted no extravagance. The statue was made of white ivory, but the draping and the wreath on the head were of gold, the contrast in the color of these materials being such as in the taste of the Greeks to heighten the effect. For it was delicate and not disproportionate. Jupiter was represented as sitting on a throne, holding in his right hand the well-known statue, Winged Victory, in his left a sceptre surmounted by an eagle. The garment of gold, which covered the entire body, except the head and neck, was worked with figures and lilies. We may not wonder that everybody who had seen this statue was accounted fortunate.

Perhaps the most beautiful picture of the Greeks was that which is known as Venus Rising from the Sea, one for which Augustus, we are told, paid a hundred thousand dollars; but the most beautiful picture of all time, it is presumed, is the Sistine Madonna, painted by Raphael, a picture which is still to be seen at Dresden. Curtains are represented as having just been drawn back. The mother of Jesus is seen stepping triumphantly forward in flowing robes, holding the infant Saviour in her arms. On the one side kneels St. Sixtus, on the other St. Catherine. Beneath them are two cherubs in perfect repose; above, the faces of the heavenly host. Everything is in due proportion. Everything harmonizes with everything else.

Music, by the harmony of its sounds, is beautiful, every note in an opera, for example, having an exact ratio to every other. Whatever the music, if *do* is made by 128 vibrations, *re* can only be made by 144, *mi* by 160, and so on, a harmony of parts being necessary to the very existence of music.

The Œdipus Tyrannus of Sophocles by the unbroken unity of its action and the concentration of the interest is the most beautiful drama in existence—that is to say, while other dramas, as notably those of Shakespeare, surpass the Œdipus in content, none, we may believe, has ever surpassed it in form.

An army of soldiers is beautiful, the men all dressed in the same manner, formed into companies, regiments, brigades, divisions, and corps, moving in perfect order and with perfect precision, the perfect expression of the harmonious blending of unity and variety.

A plowman's furrows are to a certain extent beautiful, for the reason that he has worn away the glebe by turning over a set portion of the ground every time he went through the field. For the same reason, rows of growing vegetables, swathes of grain, and the like are beautiful.

Principles of science or of art are beautiful, since they show the one in the many, each principle being the gist of innumerable examples, an even balance being thus exhibited between law and fact. The rule for quadratics, for example, is good for all possible cases of equations of the second degree with one unknown quantity. The law of causality holds for everything which takes place throughout the universe. The golden rule prescribes a method for all the manifold dealings between men.

The character of a man is said to be beautiful, if it begets actions all of which are directed by some simple principle, without any exaggeration or disproportion.

The picturesque is a case in which great and prominent variety has yet a sufficing, though slight unity.

It finds the best of illustrations in a landscape, inasmuch as here multitudinous details blend in the general effect. For example, gnarled and scraggy oak trees, amidst rocks and the underbrush of the woods, are picturesque. It has often been remarked that a moss-covered cottage on a rough and stony bank, overlooking a river whose course is irregular and whose motion is slow is picturesque. Again, the scene of the old oaken bucket is picturesque—a small cottage, an old dairy, a well, the aforesaid bucket, a wide-spreading chestnut, a deep-tangled wild-wood, a meadow, a stream pouring over rocks, a quaint bridge over this stream, and an old mill.

The landscape of the Jamestown ruins is picturesque—the broken tower of the old church, the quaint tombstones of the founders of Virginia, shrubbery, birds, and the murmur of the water.

The landscape described by Keats in his Endymion is picturesque. Hidden in the depth of the woods was a lawn in the exact shape of a parallelogram, the green grass of which was interspersed with daisies. This lawn was walled in on all sides, so to say, by the trees and undergrowing stems. All that could be seen of the sky, therefore, was a parallelogram of blue. The air of the lawn was sweet-scented from the moistened eglantine of the woods. An altar of white marble with a tress of newly budded flowers upon it was at one end of the lawn. To this came a great procession, observing some religious rite, men, women, and children with fair faces and dressed in white, then the priest wearing on his head a chaplet of beechen leaves. In his right hand he carried a vase filled with sparking wine, in his left hand he had a basket full of flowers—cresses, lilies, and thyme. Lastly came a car drawn by prancing steeds. The priest after exhorting the people to thanksgiving, puts the flowers upon the altar, pours the wine upon the ground. The choir chants and the youth dance to harps and pipes.

The Yosemite presents a picturesque landscape. Standing on some commanding eminence, the visitor beholds a valley situated between high granite walls over which pour small streams of water, spread out into cascades by the breeze. The rocky steeples of the granite walls pierce the blue vault of heaven above, below is the carpet of the valley, flowers in profusion. The oldest trees on earth are there in the form of giant evergreens. The river is so clear as to reveal shoals of trout.

The cemetery, known as Mount Auburn, near Boston, presents a landscape which is highly picturesque. A large tract of land composed of ridges and hills is covered with trees and shrubbery. Interspersed are glens in which are ponds and fountains. Paths wind and circle in all directions, many roads are also seen. A large chapel supports a growth of ivy. On an eminence is a high tower. Everywhere are tombs, stone or bronze, and many of them with statues. Here rests Longfellow whose name recalls the Psalm of Life, upon a ridge, there lies Lowell of the Biglow Papers. Yonder rises the shaft of Anson Burlingame, once special envoy of China. On a side-hill is the red granite of Rufus Choate. Within a little vale is the abode of Edward Everett, he who discoursed of the dead at Gettysburg, now dead himself. Not far off, John Pierpont, who once made verses about Napoleon's tomb, now fills a tomb himself. Agassiz, who discovered that boulders were brought to us on blocks of ice, here sleeps under one of those very boulders. On a certain tombstone are carved some fern leaves, fittingly memorial of the so-called Fanny Fern. On another is wrought the image of a harp to typify the poetical powers of Frances Osgood. Here the ill-fated Margaret Fuller is recalled only by the stone of her ill-fated child. Charlotte Cushman's expression is an obelisk merely. The breezes rustle in the branches of the trees, the birds fly about, while fleecy clouds float in the blue sky above. The whole—hills, ridges, glens, vales, fountains, ponds, shrubbery, trees, tombstones, statues, breezes, birds, and clouds—makes up a picturesque scene, seldom, if ever, excelled.

Other things than landscapes, however, call out feelings of the picturesque, for example, cathedrals, markets, the character of a man and his style.

The mediæval cathedrals are picturesque, built as they are, with steeples, gables, and vaulted ceilings, the interior effect being heightened by stained glass, by pictures, by statues, and by tombs. The priest is in his robes, speaking Latin, the choir chanting, candles burning, incense rising, the whole congregation kneeling at mass, princes by the side of beggars, fustian in contact with satin.

The ordinary German market is picturesque. There are present men, women, boys, and girls in great numbers with multitudes of things to sell—pails, bowls, tubs, barrels, butter, cheese, eggs, potatoes, onions, lettuce, peas, cabbage, radishes, pickles, fish, sausages, hams, beef, mutton, pork, apples, oranges, peaches, cherries, huckleberries, melons. The place is filled with dogs, dog-wagons, horses, donkeys. All sorts of people are buying, all sorts of people are selling.

The features of certain men are picturesque—rugged, misshapen, overgrown with beard, overhung with hair—yet pleasing.

The character of many a man is picturesque, as for example, that of Abraham Lincoln, who was a man awkward in his actions, peculiar in his dress, given to jocularity, easily forgiving and forgetting injuries, yet withal capable, stern, profound.

The style of certain writers is picturesque, as for example, that of Carlyle. Wishing to express the truth that in the gain or loss of one man all the rest have equal share, he said that at the top of a hill lived a wealthy family in a palace, at the foot of the hill a poor family in a hovel. The family at the foot of the hill, dying and having nothing else to leave the family at the top of the hill, left them the typhoid fever of which accordingly the family at the top of the hill all died.

Contrasted, with the ordinary, the wonderful has indeed marked variety, varies much from the ordinary, yet as the wonderful is matter of fact, or if not, is represented as such, it stands in unison with things the most commonplace.

The wonderful, then, like the sublime, the pathetic, the ludicrous, the beautiful, and the picturesque is but another case of the principle, known as unity in variety.

The form of our thought is that of unity in variety, every thought being in fact expressible in a sentence, as the junction of subject and predicate.

Whatever, then, takes the form of unity in variety pleases us—we see ourselves in it, so to say, see in it the form under which things exist.

Of unity in variety, however, there may be several kinds, what is known as the sublime, what is known as the pathetic, what is known as the ludicrous, what is known as the beautiful, what is known as the picturesque, lastly, what is known as the wonderful.

There are things to excite our wonder in the mineral, vegetable, and animal world. For example, the falling of stones from the sky, particularly, when accompanied with a blaze and an explosion, has been deemed wonderful. It is likewise a matter of wonder that at Hildesheim is a rose-bush 800 years old. It is further wonderful that in Colombia should be found a bird which has by nature an image of the sun and moon on its wings, just as there is among us the death's-head moth, which has upon its back the skull and cross-bones.

The scope of the wonderful, however, belongs more particularly to human action and the vicissitudes of human life.

Who has not felt pleasure when he has heard of the statue of Memnon, a work of art, wrought by human hands, which stood in the sands of Egpyt and sang a song every morning as the sun arose?

It adds, perhaps, to our pleasure to know that, after all the ravages of time, that statue is still standing in the same place, although it now sings no more.

The name of Rameses the Great calls forth feelings of the wonderful. It was he who had built the grotto temple of Abusimbel which can still be seen. It was he who was many a time and oft at the temple of Karnak which is still visited, it was he who had made of himself four massive statues, three of which still look proudly over the Egyptian sands, it was he who had engraved on the rocks of Egypt those words which we still read there, "I will make mankind talk eternally and forever of me." All this is wonderful enough, in itself, but is more wonderful when we remember that all this was before Moses led the Jews by the waters of the Red Sea, before one word of our Bible had as yet been written, before Jerusalem, Athens, Carthage, and Rome were founded, before Homer and Virgil, Demosthenes and Cicero, Alexander and Cæsar were born. With Rameses, however, the wonderful does not cease, his strange prediction to make mankind talk forever of him seeming likely to be fulfilled. For, after lying for thirty-three hundred years in a vault, his body, in our day, again sees the light. Every little hamlet of the world may now behold a likeness of his dying gaze.

We have the case of an unsolved mystery as an example of the wonderful. A mason by trade, such is the story, was one evening accosted on the streets of Paris and asked to do a little work the reward for which should be ample. He was taken blindfolded he knew not where, till he found himself in a room, the ceiling, walls, and floor of which were covered with black cloth, only an opening on one side appearing. Here he was obliged to wall up with a trowel a young woman who was thrust alive into the opening. Everybody around him was masked. When the work was done he was taken back to the city and set at liberty. He, as quickly as he could, notified the authorities, but though diligent search was made, Bonaparte especially urging it, no clue to the mystery ever could be found.

The case of the Man in the Iron Mask, as the same is called, is another example, it being impossible, to this day, to say who he was, although seventeen hundred volumes of archives have been gone through for that purpose.

The affair imagined by Jean Paul Richter is still another good example. Albano, together with his tutors, meets his father for the first time and by appointment on the beautiful island of Lake Maggiore. His father informs him that his mother, whom the boy never remembers to have seen, she having died in his infancy, left certain queer directions which he when he arrives at manhood, is to follow. Three different persons will meet him on the same day in different places, each giving him a sealed envelope, the contents in each case being a card with the name and number of a street in a certain city. To that house, Albano is to repair, where, searching through it, he shall find betimes a room in which are pictures hanging against the wall. Pressing the knobs by which these pictures are hung, one after another, a certain one, when so pressed, will set off an alarm clock. Taking down this picture he shall open the secret doors behind it. He will discover there the image of a woman, in her right hand a crayon, on her left hand three rings. When he presses the ring on the middle finger of the image of the woman, the image, operated by clock-work, will rise, step forward, and with the crayon mark on the wall a spot where is another secret compartment. Opening this, he shall find a sort of spy-glass. Looking at a certain medallion, which his father has given him, through the eye-piece of this glass he shall see the likeness of his sister whom he has never known. Looking at another medallion, which his father has likewise given him, with the object-piece of this glass, he shall see the likeness of his deceased mother. Out of these medallions, without the glasses, however, he can make nothing. Having, then, done all this, he shall next press the ring finger of the image of the woman, when the image will write with the crayon the name of the church where is deposited his mother's coffin. Within the coffin he will find a stone slab and inside of that a document wherein everything will be explained to him, but till the things mentioned have been gone through with, he is to know nothing of them.

CHAPTER XV

DESTINY

The processes of the mind being what they are, the question arises, What is the natural destiny of the mind? Machines show in their make-up for what they were intended. We do not mistake a printing press for a corn-sheller, or a road-scraper for a lathe. The mind by its peculiarity also shows for what it exists. We do not mistake its natural purpose for an unnatural one. The end of the mind is its own perfection, intellectuality.

We have, then, to justify the choice of Solomon, we have to show that wisdom is our being's end and aim.

The proof of the proposition that the supreme end of human existence is knowledge turns on three considerations, first, that there are no ends possible to us but secularity and spirituality; secondly, that secularity is subordinate to spirituality; and thirdly, that among spiritual things knowledge is chiefest.

To take up the first point, it must strike us as a very strange circumstance that man is fitted to attain so few things, nothing, in fact, but secularity and spirituality. Secularity is a name which stands mainly for wealth, power, and fame, spirituality a name which stands mainly for art, morality, piety, and knowledge. What anybody can attain to, it might be shown, is one, or more, or all of these things, nothing else. The question of the natural destiny of the mind is therefore circumscribed within narrow limits.

Coming to the second consideration, namely, that secularity is dependent on spirituality, this, it may be said, is the same thing as that wealth, power, and fame are dependent on refinement, morality, religion, and knowledge. We are to seek first the kingdom of heaven to the end that other desirable things be added unto us.

For attaining wealth, power, and fame, not only is honesty, but also courtesy and even piety, the best policy; knowledge, moreover, is needed.

It is generally admitted, indeed, that knowledge is of great importance toward securing wealth, power, and fame, if, for no other reason, because intelligent organization counts for so much.

Organization is particularly important for accomplishing anything secular, because of the uncertainty which the nature of time introduces into human affairs.

The future is not present, nor the present future. When the opportunity is at hand, we are not prepared for it, when we are ready for it, the opportunity has gone by. Everything, moreover, is arrived at only through a tedious process. The seed which has been stored up over winter has to be put in the ground in the spring, the growing plants have to be tended, the vegetables have to be gathered, cleaned, and cooked—how many times, indeed, must they be moved! On the same principle, one's capacity for doing anything does not spring ready made into being, as Minerva is said to have done from the head of Jupiter. Think also of the evanescence of things! Our eating and drinking will last us but for a few hours, when we must eat and drink again; our sleep refreshes us but for a day, when we must again sleep. Our toilet cannot be made once for all, but has constantly to be repeated. Our garments wax old unlike those which the Israelites had in the desert, our houses have to be repaired, that is to say, built over. Furthermore, we can give our attention to but a few things at a time, our doing these things well meaning our doing others badly.

Against the uncertainty brought into affairs because of the nature of time, organization, as was said, is the great specific, organization which can be gotten, however, only through knowledge, whence, for this reason, secularity can succeed but through spirituality, that is to say, through wisdom.

The necessary dependence of secularity on spirituality is also apparent from common observation, the boorish, wicked, impious, and ignorant being usually neither prosperous, nor powerful, nor renowned.

We may notice in passing that the necessity which our nature imposes on us to subject secularity to spirituality explains things otherwise not easy to understand, the disregard of secular things for spiritual ends. The Hindoos, with a view to getting spiritual good even inflict on themselves great tortures. A man, for instance, will have a hook stuck in the skin of his back and tied to a sweep by which means he is then swung rapidly in the air, the theory being that this improves his mind. A man with the same end in view, will also hold his hand above his head for days, weeks, and even for months, till from inaction and its unnatural position, the hand almost withers away. A man will even fall in front of the car of Juggernaut to be crushed to death, abandoning for spirituality all things secular whatsoever. Mankind have been loud in their praises of Regulus for keeping his word and returning to Carthage, though his doing so was the giving up of secularity altogether. We also commend Jane Eyre and Jean Valjean for acting on the same principle.

It being settled, then, that there are not other ends than secularity and spirituality and that secularity is subject to spirituality, it only remains to settle what in spirituality is of most importance.

Knowledge being indispensable to religion, art, and morality, knowledge is for that reason, it should seem, entitled to the primacy.

It is only through knowledge that correct ideas on religion can be formed. Besides, it is a fact that men of the greatest piety—Wesley, for instance—have been men of the greatest knowledge.

Knowledge, it is also conceded, is necessary to correct taste, the man without high attainments in knowledge not being able to chisel captivating shapes from the marble, or to paint enrapturing scenes on the canvas.

As to what concerns morality, although the general principles of it require no great knowledge, yet the application of them requires, we might say, all knowledge.

How great in fact is the liability to error has often been set forth and its chief cases pointed out, after which manner we may proceed to indicate them. Through indolence, we often fail to make a proper investigation of a matter thereby inducing improper action. Had Bonaparte's officers made the right study of the defiles of Kaluga, the disasters of Moscow, it is said, would have been unknown. Some trivial association, moreover, may so impose on us as to render us incapable of doing what otherwise we should not find it difficult to perform, whence the need of knowledge. For instance, Herodotus relates that the Scythians being at war with their slaves were unable to overcome them till they attacked them with whips, the reason being, the slaves had been used to cowering before whips and now, even though armed, they were, because of the association, incapable of offering resistance. What happened in the case of these slaves, happens in the case of us all, indeed we are all the slaves of associations. It is only knowledge that can deliver us from their thraldom. Our interest, or at least what we take to be such, may warp our minds from the living truth, unless indeed knowledge save us from this. Preachers, for example, have been known to lay ten times as much stress on what is unessential in religion as on what is essential in it, simply because their lives were so bound up in some sect. A pugnacious disposition may prevent us from forming a proper estimation of the merits of a case, if our knowledge is inadequate. The Campbellites and their opponents used to debate with much alacrity the question of the divinity of Christ, without, however, ever coming to any satisfactory conclusion on the subject, each party to the controversy being so desirous of carrying their point. Each party were a little surer of their position after each debate than before, the arguments on the other side having had just the contrary effect of what they were intended to have. Two men would debate very spiritedly for a long time, then going home, each would tell his family how he vanquished the other. Cæsar, in the account of the wars which he waged in France two thousand years ago tells us that men easily believe what they wish to have true. Without great knowledge, we are also likely to err from our proneness to follow the fashion. Opinions, because they are fads, obtain great hold on us, we shall as soon shake off the old man of the sea. There was once a world, it is said, in which everybody was hump-backed, in short to be such was there the fashion. A man chancing to appear in that world without a hump on his back was thought to be too unsightly to live. Worse than things, themselves, to make us err, are words. How many are their meanings! How difficult it is for us to arrive at the right one! Everything we hear or read may, in fact, be regarded as a series of hints, we getting according to our ability to guess. The Dutchman thought that transubstantiation meant bowing at the high altâr, the Irishman that it meant doing one's whole duty ! Those who say that they take the Scriptures just as they read, at best mean no more than this—that they take them just as they think they read.

The sources of error then being so many and so great, knowledge becomes necessary, if we are to act properly, good acting being possible only through good thinking.

It has truly been said that a man's fate in each instance depends on his finding the right class in which to put a thing. He must decide whether this or that is the right thing to be done with reference to this or that object in view. Everybody has at each moment to conduct a sort of last judgment, to part the sheep from the goats, so to say. If he does not know a sheep from a goat, it is plain what mistakes he must make.

We always decide a case on the ground of some reason, we should decide it better if we had better reasons.

It is noticed that efforts to reform persons consist in getting certain ideas into their heads. There would, indeed, be no use in talking to one, without we assumed that knowledge is a condition of right action.

We are led up to the conclusion, therefore, that knowledge is chief among spiritual attainments, the one on which in fact the others depend.

We may also argue in this way—art, morality, and religion are founded on the truth of things, deriving as they do their nature from it, wherefore the coming through knowledge at the truth is the coming at them. All else than the truth, says Hegel, is error, trouble, opinion, strife, caprice, and evanescence.

The truth of things, then, being the basis of art, morality, and religion, we bring art, morality, and religion to perfection only by having a knowledge of the truth. This is the sense in which a knowledge of the truth of things is the end of our existence.

It turns out, then, that the fulfilling of the end for which we were born into the world is possible only through those branches of learning which make up our courses of study, these being concerned with the system of truth as such.

The truth of things, the knowledge of which is to make us free, consists primarily in mathematics, physics, psychology, and biology. For things in general are time, space, matter, mind, and life. Arithmetic is the truth of time, geometry the truth of space, physics the truth of matter, psychology the truth of mind, and biology the truth of life.

A knowledge of these subjects, therefore, it is which is necessary if we are to attain the end of our being.

Arithmetic is the science of the succession of the moments of time, one, two, three—in short, the science of numbers. Geometry is the science of extension, treating, accordingly, of lines, surfaces, and solids. Physics, in an extended sense, is the science of matter, including chemistry, astronomy, and other branches. Psychology, in the general sense of the term, is inclusive of logic, æsthetics, and ethics, even history. Biology comprehends physiology, botany, zoölogy, and the like. A general view of the consistency of all the sciences taken together is metaphysics.

Inasmuch as a knowledge of the truth of things consists primarily in knowing mathematics, physics, psychology, and biology, if, then, these sciences existed in perfection, a mastery of them would constitute a perfect knowledge of the truth of things.

It has, indeed, been claimed that they do exist in perfection. For in the Himalaya Mountains, it is said, is a brotherhood which knows everything. Were we in their condition, we might say that we had attained the end of our being, we should know as we are known. We should have the means of a perfect conduct. The story of the Himalaya brotherhood, however, we may take as a myth, teaching us the perfectability of mankind.

We must take into account, nevertheless, that many persons claim that the human mind can never arrive at a satisfactory knowledge of things, owing either to the limitation of our faculties or to the nature of things.

To the first objection, it seems a sufficient reply to make that, if there are things which, because of our natural constitution, we are prevented from knowing, it is the same to us as if these things do not exist—that of which there can be no experience being practically non-existent, notwithstanding its existence in fact. To know all else would be virtually to know all things.

The second objection, that we can never arrive at a complete knowledge of things, owing to their complexity, is better, though, perhaps, not well founded. It is the objection of those who bear a banner with the strange device, "Ignoramus, ignorabimus," certain positivists, such as Comte, for example.

According to Comte, our great knowledge of astronomy is due solely to the simplicity of our solar system, the planets being few in number, widely separated, and unequal in mass. Had this all been different, says he, had the planets been numerous, crowded together, and in mass nearly the same, we must have remained ignorant of astronomy.

He cites the case of medicine, a science in which comparatively little progress has been made. The reason, he says, is not far to seek. The subject matter of medicine is so complicated that we are unable to disentangle facts of it from combinations in which they are found.

Comte admits that every problem is merely one of number, every phenomenon being susceptible of expression in an equation, logically so, indeed, but not practically so.

In the case of medicine, even could we isolate a certain phenomenon from the complexity in which it exists, we should not, he thinks, be able to trace out the multitude of relations which it sustains to other things. The great amount of detail would overwhelm us. We should not be able to grasp in the mind so many things whereby to come at the law of the whole.

He supposes that, if it were possible for us to do so, the practice of medicine would be something like engineering or surveying. What to do in case of a certain disease, say one of the liver, would be discovered by making an algebraic calculation, possibly by finding the hyperbolic logarithm of a certain infinitesimal.

He allows that the discovery of the calculus has enabled us to solve problems the solution of which was formerly despaired of. How, then, it might be asked, does it appear that the discovery of still other processes may not render easy the solution of problems now deemed insolvable?

Moreover, for all we know to the contrary, nature may at bottom be very simple, depending merely on a few atomistic conditions, the which being known, we should arrive at all truth.

We may say, also, that with our present knowledge, it would be no more wonderful, if we should arrive at a knowledge of all things, than it once would have been wonderful that we should arrive at the knowledge which we already possess. What idea, for example, can the ox or the horse have of finding the distance around the earth or that of the earth to the sun, what of discovering how the boulders came to be where they now are or of discovering what the climate of Greenland was ages ago? What idea could savages even have had of the possibility of determining such questions?

Of mathematics, of psychology, of physics, we already know much. What we are chiefly ignorant of is biology. How are mind and matter related to living organisms? This is the question. It involves the question of the habitation of the planets, has relation therefore to every part of space. It involves the question of the succession of forms of life, has therefore relation to every part of time.

What is already known of the truth of things is much. What is matter of chief regret is that so few persons possess it. It is even now as if there is a brotherhood, small in numbers, to which is confided the secrets of existence, the other members of the human family being deprived of them. What is known of mathematics it would take a long time to compass, what is known of physics a long time, what is known of pyschology a long time.

Everybody has the opportunity to join the brotherhood of those who know, is in fact obligated by his nature to join it. He must join it in fact or miss his mission.

Even to acquire the elements of mathematics, of physics, of psychology, and of biology is to take an honorable degree in the brotherhood of science, all further attainments depending on these elements.

It cannot be said that one has not time to learn these elements, must forsooth labor for a living—it having already been demonstrated that even a living depends on their being known. It is not necessary to ask what shall it profit a man, if he shall gain the whole world and lose his own mind? For without his mind he cannot even gain the whole world.

Why our courses of study are partly literary is explained from the fact that the attainment of truth is possible only through language, it being just as necessary that we should be able to tell what we know as it is to know it—indeed how should we even know it without somebody had told it?

All courses of study, therefore, consist of two and only two parts, the scientific and the literary, the mastery of which is necessary to our arriving at the end of our existence, science being concerned with the truth of things, literature with making it known.

The grand divisions of literary expression are essays, history, oratory, poetry. To be more specific, the expression of certain phases of truth is accomplished in the essay which if it be long and systematic is called a treatise. But instead of expressing truth in abstract form, we may use narrative, tell what happened—this is history. When, instead of narrative by another, the one interested expresses the truth directly himself, we have oratory, one, as we say, makes a speech. Lastly, poetry arises because truth may be expressed generally as well as individually—we may tell what is true of classes of society and what is true of these not in one time or place merely but in all times and places. The Achilles of Homer for example, is not Achilles as Cyrus is Cyrus, but is, in a way a general character, what in fact many a man is.

Literature as it exists on this earth, flows from a few great elevations, just as the rivers of the earth descend from a few sheds.

The four greatest names in literature are Homer, Dante, Shakespeare, Goethe. But with Homer may be placed Job and with Shakespeare Cervantes. From Homer descend Herodotus, Thucydides, Pindar, Sophocles, Demosthenes, and Plato, men of such powerful literary expression as still to be in some ways unsurpassed. The Romans, however, improved upon these in some important particulars of judgment, whence we have Virgil, Cæsar, Sallust, Livy, Tacitus, Horace, Plautus, Terence, and Cicero. But Roman literature nevertheless is descended from Homer the same as the Greek. All things considered, it reaches its highest point in Cicero, he being in many ways the best example of literary expression in the annals of time, the greatest master of composition that the world has ever known. Of his writings, though he died before the birth of our Saviour, there remain nearly eight hundred letters, the greatest source of information respecting his time we possess. More than fifty of his speeches have withstood the shock of time and it may truly be said of them that none as good as they, since he spoke them, have been heard on earth. Moreover, fourteen of his dialogues on philosophy are still preserved which all the generations of men are fated to read. From Job are descended David, Isaiah, Ezekiel, and Jeremiah, the expressions of whom are destined to work their way into the mind of every inhabitant of the earth. From Dante, not as many descend as from Homer, yet Petrarch, Boccaccio, Milton, and Pollok. We are to understand that Dante was really portraying all human life as it was, is, and will be, was doing this under the guise of depicting a world of retribution. From Shakespeare descend Bunyan, Bruyère, Fielding, Macaulay, and the like, their name being legion. From Cervantes descend Lope de Vega, Rabelais, Swift, Sterne, and Voltaire. From Goethe descend Chateaubriand, Victor Hugo, Carlyle, Browning, Tolstoi, and Ibsen, indeed many more.

This is literature, the mastery of which enables us to attain the subsidiary end of our existence, though, of course, some importance must attach to expression through arts other than literature, through music especially.

So much then for the theoretical proof that the attainment of truth is the end for which we were created.

Here is the place to notice the claim of Schopenhauer that we have no end at all, our whole existence as rational creatures being a bad blunder. We must take into account that Schopenhauer distinguishes between a proximate and an ultimate end, admitting the existence of the former, but denying that of the latter. Schopenhauer teaches that spirituality, primarily knowledge, is the proximate end of our existence, that which it is our natural destiny to attain unto. Since, then, what is the purpose of our being here and now is of chief importance to us, we may take the claim of Schopenhauer about the ultimate purpose of our being as practically not coming to so much after all.

Manifestly, it is possible also to prove from experience that knowledge is what we exist for. We may instance the history of communities and that of individuals.

To enter on the first case—those communities which have done most for knowledge and the expression of it are those which are the most renowned, Athens, for example, whence it seems to follow that knowledge is the end for which we entered on life.

It was at Athens that Plato, the first of the human race to do so, brought the explanation of all things within definite bounds, indeed, his discovery that everything is dominated by eternal principles can hardly be overestimated. He has opened a fountain in the wilderness of this world, at which the weary still slake their thirst. Well, therefore, has he earned the sobriquet of the divine. It was at Athens that Aristotle discovered logic, the greatest of all the discoveries vouchsafed man to make, that of Columbus, in comparison with it, paling into insignificance. He expounded the universe on principles of logic, being in fact blamed by Alexander for letting out the secrets of existence. Furnished by Alexander with thousands of men and with nearly a million of dollars, he was able to have collected a multitude of specimens, making use of which he founded Zoölogy, writing an account still extant of five hundred animals. Theophrastus, a pupil of his, completed the first great treatise on Botany. Moreover, psychology was founded by Aristotle, his writing on that subject being the first to appear. At Athens was produced the first history which is entitled to rank as a work of art, Herodotus in it presenting a multitude of facts and legends with unity of design, employing to do so a pure and simple style. At Athens Thucydides wrote the first history which was ever conceived and worked out from a philosophical point of view, the best history which up to our times has yet appeared. At Athens Demosthenes made the speech on the crown, a speech better than any which has subsequently been delivered. At Athens Sophocles produced those plays which for concentration of effect and unity of design surpass anything else ever attempted. At Athens Æschylus and Euripides exhibited their plays, they, with Sophocles, being the founders of tragedy. At Athens Aristophanes brought out his comic plays, which Jebb says combine excellencies found nowhere else—extravagant fancy, delicate humor, and exquisite song. At Athens Ictinus constructed the Parthenon, the most beautiful building ever erected on the face of the earth. At Athens Phidias wrought those sculptures which are esteemed the best of time. At Athens was developed popular government, government by discussion, as it is called, that is to say, government by appeal to reason. The Greeks, in truth, discovered reason, a circumstance which explains all their works, why they originated republics, why they excluded inconsistencies from art, why they founded sciences.

Athens, then, having done more for the advancement of knowledge than any other community, its fame is the greatest of all, this demonstrating, it should seem, that knowledge is our being's end and aim.

The meaning of historical progress is that things get better and better adapted for mankind to perfect themselves spiritually, as time advances. Battles, therefore, which have had the result to bring about conditions favorable to knowledge, are deemed important and are spoken of as decisive; Marathon, for instance.

Creasy has well described how, four hundred and ninety years before the birth of Christ, the Athenians held a council of war on the slope of the mountain which overlooks the plain of Marathon, the question being whether or not they should fight the Persians who were in camp below them. The Athenians had only about eleven thousand men, their country was but a few miles in extent, and they were inexperienced in war, while the Persians were more than a hundred thousand strong, with a country reaching from the Hellespont to the Indus, from the Jaxartes to the Nile, and had never yet been beaten in battle. Still another thing put the Athenians at a disadvantage. The Spartans, though in sympathy with the Athenians, yet refused to assist them, owing to superstition. They thought it would be unlucky to engage in battle before the full of the moon, an unfortunate circumstance, as Creasy remarks, since the Athenians had no way of hurrying up the full of the moon and no way of making the Persians wait for it.

The matters at stake were truly momentous. Those men for whom Athens is now so much renowned, Plato, Aristotle, Herodotus, Thucydides, Æschylus, Sophocles, Euripides, Aristophanes, Pericles, Demosthenes, Ictinus, Phidias, had not yet been born, and unless the Athenians should at once attack and put to rout the Persians, there was no chance whatever that they ever would be born, for the Athenians would certainly be taken captive to Persia.

If the Persians effected a conquest of the territory, Athens as we now know it would never come to exist—Rome, Christianity, the Middle Ages, the Renaissance, and the modern world would never have any semblance.

Some authorities indeed think that Gutenberg settled it that newspapers should be published, but really Miltiades settled it on the plain of Marathon.

There was a tie vote in the council of war, but Callimachus, the archon, persuaded by the speech of Miltiades, gave the deciding vote to engage the Persians, the most momentous ballot ever cast, since it was the occasion of the Athenians completely overthrowing the Persians.

It is plain that our obligations to Miltiades have been but imperfectly discharged, indeed, never can be discharged. They are our debt for arithmetic, geometry, trigonometry, calculus, quaternions, chemistry, astronomy, geology, mineralogy, anatomy, physiology, zoölogy, botany, psychology, logic, ethics, æsthetics, treatises, histories, oratory, poetry, railroads, steamboats, telegraphs, libraries, newspapers, schools, liberty, Christianity.

The tomb of Miltiades, if it can be found, should be kept covered with freshly cut flowers, his monument should be reared to the skies.

The Athenians guided, as we may suppose, by some divine instinct, realized the immensity of what they were doing, so impressed were they as to believe that men even rose from the dead and took their places in their ranks to fight. For hundreds of years afterwards, people believed that they could still see at night the contending armies on the plain, could hear the shouts of warriors, the neighs of the horses. Even to this day shepherds living in the vicinity have a similar experience.

Pausanias records that he saw six hundred years after the battle the monuments which the Athenians erected to the memory of the slain. The mound which covers their bodies survives to this day. The battle was depicted on the temple of Victory, where even now it is said, some of the figures can be dimly made out.

This battle has become so fixed in the minds of men because it was the occasion of so much progress on the part of the race.

History, indeed, consists of a series of stages each more favorable to knowledge than the preceding, the Egyptian, the Judean, the Athenian, the Roman, the Patristic, the Mediæval, the Revival, and the Modern.

To glance now at the history of individuals, the estimation in which great men are held we may explain on the ground that knowledge is the end of our existence, great men being, indeed, but examples of what everybody should be.

That the notion of the Messiahship was in the minds of men, thousands of years before Christianity, Gentiles as well as Jews, shows that they had discovered the end of life to be spirituality. There is in us, indeed, what may be called a disadvantageous state of mind, a spiritual imperfection fraught with baleful results which it behooves us to be rid of; the extent to which one perfects himself spiritually, therefore, makes his greatness. We have accordingly the idea of redemption, the idea of deliverance from our imperfection, an idea which anyone anywhere may have. Whatever else our Saviour stands for, he at least stands for all we ought to attain to, being in all things our pattern.

When everybody reaches perfection of mind, the perfection of society obtains. When everybody possesses the truth, the bounds of progress are arrived at. This is our sure ground for believing in a millennium. Whatever else it may be it is a time in which the generality of mankind reaches perfection, theoretically, therefore, a time in which everybody reaches perfection.

Zoroaster, though he is believed to have lived as long ago as Moses, yet foretold the coming of such a time, being able to do so because he perceived the necessity that the race get the truth.

Our Saviour represents to us absolute perfection, but there are a great many men who approximately represent perfection, conspicuous among them Homer, Job, Dante, Shakespeare, Cervantes, Goethe, Plato, Aristotle, Kant, Hegel, Cicero, Plutarch, Macaulay, Victor Hugo.

Homer is worthy, not because he wrote the Iliad, but because he knew what to write. He and the rest are examples to us because they did what we ought to do, approximately at least, attained the truth.

The fame of Buddha shows that spirituality is the end for which we came into the flesh, he being among the greatest apostles of knowledge that the world has ever known. About five hundred years before the birth of Christ, he was living in the village of Kapilavastu, northward of Benares, where he had a view of the Himalayas rising to imprint themselves on the blue. He was a prince, living in a palace surrounded by every luxury, had, in short, all the gifts of secularity—riches, honor, and power—but he awoke one night, his mind aroused, it is said, as if his house were on fire. The thought had taken irresistible hold of him that he must do something to deliver humanity from its misery. He had in fact the day before seen the most loathsome examples of it, beggary, disease, and death. Mounting therefore his horse, he rode away from his palace and its luxury, freely abandoning all secularity to the end that he might secure salvation for men, rode away into the desert and its desolation. As he thus rode away from his palace, might seem to have been heard the deafening applause of after ages, the acclaims of the millions who should yet be blest on account of what he was then doing. Fainting from continual fasting, it was forcibly impressed upon him that he could never deliver mankind from their sorrows merely by starving himself. Going a distance farther, he seated himself under a tree, where at last it dawned upon him that what made all the trouble with men was their ignorance. There are trees in the world now growing which have been derived, it is said, from that under which he had his momentous revelation, trees held sacred by mankind, because of the ultimate truth which he attained to under the branches of the original one. Asked where he was going he replied: "To Benares, there to give light to those enshrouded in darkness, and to open the gates of immortality to men. For now," said he, "I only live to be the prophet of perfect truth." Establishing, as Wesley did after him, an itinerary, he began to preach salvation through knowledge.

Whatsoever imperfections there may have been in his teaching, and it is acknowledged that there were such, at least he was Christian to this extent, that he gave primacy to the kingdom of heaven and relegated to a subsidiary position secularity. He was right also in that he set perfect knowledge as the condition of perfect spirituality. For how, indeed, shall a man properly perform that of which he knows nothing, how properly perform that of which he does not know enough?

The case of Fichte is even more remarkable, since by showing his countrymen that knowledge is the end of life, he thereby induced them totally to change for the better their affairs. Prussia was wholly given up to secularity, no spiritual fitness was required for office, the schools also were inconceivably bad. The outcome was that nobody cared anything for his country. Napoleon, therefore, in overthrowing German power at Jena was hailed as a sort of deliverer, as indeed he really was. It was then that Fichte recalled men's minds to first principles, told them in effect that a man's life consisteth not in the abundance of things which he possesseth, that the end of humanity is to attain wisdom. Things then became changed, the principle that every position of honor and emolument shall depend on education was made supreme. The present Germany, as the exponent of science is the result, the mighty power for progress. Fitting therefore, is the inscription which the traveler now reads over the grave of Fichte, " Those who turn many to the truth shall shine on as the stars forever and ever."

At Königsberg, Kant rests in a chapel by himself, to the side of which is the great cathedral in which rest the dukes and princes. Fain would the dukes and princes have him come over to them that he might add a drop of fame to theirs, fain would they have him sent to their posterity that it come not into the place in which they are. Kant, indeed, was the son of a humble strap-cutter, yet, because of his intellectuality, his fame is greater than that of kings.

At Ratisbon there is what is called a temple of fame, built after the fashion of the Parthenon, the depository of the statues of the great men of Germany. It was the happy thought of Pope that there exists on this plan a much larger temple in which are contained the statues of the great men of all time. He represents that there are six statues, however, given a far more conspicuous place in the temple than the rest, that of Homer, that of Virgil, that of Pindar, that of Horace, that of Aristotle, and that of Cicero. These statues are placed around the throne of fame itself directly beneath the dome of the temple. They are raised above that of fame. The reflections of the light from the gems in the statue of fame form a rainbow over the heads of the six statues, mingled rays of emeralds, rubies, sapphires, and ambers. Here we have an allegorical representation of the fact that the natural destiny of man is intellectual perfection, men of the greatest knowledge having the greatest fame.

If the end of the human mind is in fact not knowledge, why then should we not have clowns represented as having attained the glorified state, statues, for instance, of such as dug the grave of Ophelia placed beneath the dome of the temple of fame? Why should we not have a choir chanting their praises, " Such be the examples of men for aye? "

We might, of course, imagine a burlesque temple of fame, those whose statues are in it being examples of what nobody should become. Seneca seems to have had the main idea of such a thing in mind when he said of Tiberius that nature brought him forth to show what folly and stupidity can accomplish.

We may even look upon a rampant blackguard as a sort of burlesque Saviour of the world, he representing about everything which nobody should be.

Many a man is preaching the gospel very effectively, although the thought of his doing so is most remote from him. Ever does he remind us not to be what he is, such is the irony of fate.

As everybody has in himself the standard of perfection by which he is under obligation to know what the truth of things is, it follows that by means of this standard, we are entitled to ascend the judgment throne of the world and to pronounce the verdict. Anybody in fact may follow the example of Dante.

The judgment will be of the quick and of the dead, those still inhabiting the earth and those deceased. We need mention only such as against whom the judgment is.

Respecting the living, our judgment will have to be condemnatory of those who now living in Greece have yet never heard of Demosthenes, condemnatory of those who are now living in Königsberg, yet do not exactly know what Kant taught. We shall have to condemn those who would rather put children out to hire than send them to school, thinking it profitable at the loss of the soul to gain a mere pittance. We shall have to condemn those who act as if they were born into the world for no other purpose than to repair old wagons or to mend crockery, unmindful what Burritt accomplished at the blacksmith's forge. We shall have to condemn those who care not whether Shakespeare meant to represent Hamlet as crazy or rather as crafty, whether gravitation vary inversely as the square or rather as the cube of the distance. We shall have to condemn those who are swayed by Mumbo Jumbo merely, frivolous, incapable of considering anything seriously, always borne about on the winds of opinion. We shall have to condemn those who think they have made some high attainment, because forsooth they possess a hundred suits of raiment, whereas Hawthorne had but two or three and Bonaparte at times not more than one.

Coming to the dead, we shall have to condemn all those of past ages who were savages or barbarians, they never having beheld the glorious dawn of self-consciousness. We shall have to condemn all the hosts of the dead who were the worshipers of mediocrity or the devotees of immediate good. Of those who burned the Alexandrian library, let the name be hooted and hissed adown the corridors of time, to those who tried to stop the mouth of Galileo, be it known they never have forgiveness.

CHAPTER XVI

ORIGIN

The question of the origin of the human mind is disposed of to the extent we can show it had no origin. This question manifestly has in it the question of immortality. For if the mind had no origin it exists independent of time. It will not end.

The argument for the eternity of the mind may be embraced under three heads—physical, moral and biological, accordingly as we have a view to matter, to mind, or to life.

The argument from matter itself consists of two parts, first that matter is without origin, secondly that it has resemblance to mind.

The natural eternity of matter is implied in what we observe of it. The things of which material nature is composed, as for example, hydrogen, nitrogen, oxygen, and carbon continue to be the same.

Hydrogen may be put into a vessel and left there in the gaseous state, yet after years it will unite with oxygen to form water, a proof that all through those years it has been the same thing. Hydrogen reaches back into the past, being found in the ancient suns of the milky way, hydrogen reaches forward into the future, being about to be in the oceans that shall be formed. Hydrogen may have wandered the heavens for untold ages in a meteor, yet for all that time it has been hydrogen.

Again, we live in a great sea of nitrogen, the air which we breathe being this together with a mixture of oxygen and gaseous carbon. The nitrogen which forms part of our flesh to-day was a few days ago in the flesh of an ox, a few days before in the grass that the ox ate. When hair is burnt, there is always the same smell from it because the nitrogen in it is but one and the same thing always. The only wrinkles on the brow of nitrogen are those which appear in the spectrum and those are always the same, a proof that time did not write them there.

Still again, the very same oxygen will combine with every known simple substance, fluorine excepted, being, as it is, nothing but oxygen. Oxygen has taken part in every fire kindled, both before and since the conflagration of Troy, and has been able to do so on account of what it is. The very same oxygen of the earth has supported all the animals which have lived upon the earth. The breath which a man draws into his lungs is that which a bear once inhaled.

Moreover, when we snuff a lamp-wick, we gaze on a piece of carbon which is just the same as it was when the builders of Solomon's temple were hewing out the timbers in the woods, the very same to be when the millennium dawns. The same carbon is at one time a part of wood, at another a part of bone, at still another a part of hair, yet is the same.

Wherefore hydrogen, nitrogen, oxygen, and carbon being always the same, the things of which they are composed must always be the same. Any one of these, hydrogen for example, we may, to be sure, conceive to be changing but only in the sense that like things replace like.

Our bodies are for the most part composed of hydrogen, nitrogen, oxygen, and carbon, though they contain small quantities of many other things. Whatsoever they contain, however, is of the nature of hydrogen, of nitrogen, of oxygen, and of carbon, so far as the question of change is concerned, the atoms of everything being ever the same.

Not only is this thought to be so from observation but follows from the law of causality, it being impossible that like combinations of things should produce like effects unless those things were constant in their natures. It was foretold, for example, more than a hundred years beforehand that a great eclipse of the sun would occur on a certain day, at a certain moment, but how could this have been done unless all the particles of matter be unchangeable in their actions?

Experiments, moreover, have been made, demonstrating what is called the conservation of energy, the unchangeability of matter.

And the unchangeability of matter, be it kept in mind, means that matter had no origin in time, time having no relevancy to its atoms.

The argument from the eternity of matter to that of mind is analogical, we conclude that mind is eternal from its similarity to matter.

The grounds of the similarity of mind to matter may, for the purposes in hand, be comprised under three separate heads, first that both mind and matter participate in existence, secondly that they are connected with each other in the human body, and thirdly that matter being infinitely divisible is therefore immaterial.

Some importance even must attach to the first ground, namely, the likeness of mind and matter, in the bare fact that each exists, the ground upon which Spinoza took his stand.

The second ground of similarity between mind and matter, namely their connection with each other in the human body, manifestly falls under two heads, first the action of matter on mind and secondly the action of mind on matter, the first being exemplified in sensation, the second in volition.

The mind has in sensation intimations of matter through sight, hearing, touch, smell and taste.

A person standing at Niagara Falls has the consciousness that the waters are rolling over that wall of rocks, the water so affecting his mind as to show that the water is not at variance with it. As one listens to the moaning of the wind, he is made to realize that wind is not so much at enmity with mind as not to be on speaking terms with it. If one draws the hand over a piece of velvet, he is made aware of its smoothness, velvet not being entirely out of sorts with mind. If one comes into a room where there is perfume, no sooner does he enter than the perfume bids him welcome, showing there is an affiliation between it and mind. Vanilla, placed in the mouth, occasions in us a sense of pleasure, evincing that it is not altogether opposite in nature to mind.

How all this can be, unless there is some similarity between mind and matter, it were impossible to conceive.

We have in fact, still much to learn from Thales who twenty-five hundred years ago maintained that all things are made out of water—not that all things are made out of water, though a great many of them are—but that all things are so connected, the one with the others, as to show they must all somehow participate in a common nature.

Volition shows mind actually affecting matter, mind, as strange as it may seem, impressing on matter its ideas.

Do we conclude at this moment to walk, immediately do our feet move, a state of the body being in this way made by a state of the mind, showing that the mind has with the things of the body something in common. The army of Sherman marched from Atlanta to the sea by continuing to put one foot before the other. All that mass of matter of which his army was composed was transported from the interior of Georgia to the seacoast, merely by the ideas which were in the heads of the men. The men were mental motors, if the expression be allowed.

Do we conclude at this moment to handle something, immediately do our hands move, a state of the body being in this way made by a state of the mind, showing that the mind has with the things of the body somewhat in common. Long ago the minds of certain men caused their hands to build temples. The mind of Phidias, setting his hands in motion, removed chip after chip from a great block of marble, till the sculptured forms which once adorned the Parthenon stood forth. The hands of Raphael were by his mind made to put paints on a canvas in such a way as that those paints enrapture the mind of every beholder, his mind actually having an effect on the paints. Mozart's mind affecting his fingers, and through them the piano, he made music which filled the minds of his hearers with visions of a brighter world. The scribes of Judea, making the pen subject to the mind, through the hand wrote the parchments which have preserved for us the Psalms, the Proverbs, and the Prophecies. How it is that mind can so act on matter as to mould it to its uses, except on the supposition that mind has somewhat in common with matter, it were impossible to say.

The remaining ground of similarity between mind and matter is that derived from the infinite divisibility of things.

The material universe consists of small particles of matter, moving, as we suppose, in a sea of ether. What may be the size of these particles even has in some cases been made out, the density of a gas depending on it. Many billions of them, it is found, are crowded within the space of a single cubic inch. But these particles themselves, what of them? Are they made up of others and those still of others and so on without end?

As the space which any piece of matter occupies must be infinitely divisible, it follows that the piece of matter itself in that space exists infinitely divisible—nay more, that the piece of matter exists in the space infinitely divided, consists in fact of an infinite number of parts.

Each of those parts is infinitely small, that is to say, is a point of force merely and does not occupy any space, is in short what is called an atom.

It is not difficult at all to conceive that matter is composed of forces having no extensity. For on this supposition, one of these forces is at every point of space, the combined effect of them having to us the appearance of things spread out, such as the bodies of which we are sensible, though, in truth, the things, which we see, be composed of things which do not appear.

We know that things which can be seen only under the glass, yet when combined with others of the same kind can easily be observed with the naked eye, not the single things of course, but their united effects, whence it is plain that things which we see may be made up of things invisible.

For all that appears to the contrary, therefore, matter is similar to mind in being immaterial. The point in which it was supposed that there was complete difference between mind and matter, mind having no extension in space, matter having such extension, vanishes altogether. It turns out that it is only the combinations of matter which occupy space, not matter itself, just as it is only the combinations of matter that occupy time, not matter itself.

This conclusion, as was said, depends on the infinite divisibility of space, a thing which requires a more extended consideration.

If we suppose, for example, a man to travel from one place to another, it is plain he must first go half the distance, then half the remaining distance, and so on, having continually to bisect a line, so to say. As long then as the halvings which he makes of distances are finite, he will not reach the point for which he set out, there always being left over an undivided remainder. If, however, the number of halvings which he makes, of distances, be infinite, he will reach the point for which he started. For in that case, the last bisection will result in two points merely, these having position but no extension.

This result agrees with the proof which algebra furnishes. Zero multiplied by infinity equals anything.

The zero is here, the point without extension, the infinity, the number of divisions of the line, the product of the two, the whole line which was to be divided.

We observe also from certain algebraic series that an infinite number of small quantities actually constitutes a definite quantity, for example, the geometric series, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, and so on, continued to infinity, it is established, an algebraic grounds, exactly equals the number 1 (or unity).

If it be asked how space can be divided into an infinity of parts in a finite time, the answer of Aristotle is that any time, like any space, consists of an infinite number of parts. We, therefore, divide the time, at the same time that we divide the distance.

Moreover, if space were not infinitely divisible, the contention of Zeno would be correct, that motion is impossible.

Zeno, who lived at Elea, an Italian town, four hundred years before the birth of Christ, proposed among other puzzles wherewith to bother the brains of men that one which is called Achilles and the tortoise. Achilles travels fast, the tortoise slow, yet if the tortoise has the start, Achilles can never overtake him, this being the paradox. The proof which Zeno gave was this. Achilles to reach the point where the tortoise starts from must first go half the distance thereto, then half the remainder, and so on. A remainder always being left over, it is plain he will never come up to the point. On the same principle it follows, if space be not ultimately divisible into points, no progress of a body can be made from one position to another; what is the same thing, motion is impossible.

Space, however, being actually divisible into points, the last remainder in the infinite division of a line, as was said, is nothing at all, whence the possibility of motion.

Furthermore, as motion actually does take place, space is proved to be infinitely divisible by *reductio ad absurdum.*

If it be objected that, on these principles, space must in the last resort consist of what is not space, being ultimately composed of points having position merely but no extension, what we fail to consider is that space does not exist apart from things, but is only the condition of their combination.

Thus far the attempt has been made to argue the eternity of mind from that of matter, but we come now to the second point, the attempt to argue the eternity of mind from the nature of mind itself.

What is of importance here is the proposed reconciliation between the dogma of predestination and that of free will.

We find that our actions are governed by habit, inasmuch as we always make a decision on the strength of some motive, that motive too depending on our former manner of life. Kant declares that, if we knew all about a man, we could foretell his actions with as much certainty as we can foretell the occurrence of an eclipse. Knowing men no better than we do, we yet predict reasonably well how each will act. For example, a debt may not be collectible of a man at law, yet we do not hesitate to lend the man money; the fact that we do not, it is said, shows our faith in predestination, we reasoning that the man's habits are such as to fix beforehand his actions.

It has been observed by everybody that one fault goes back to another. We find, for instance, that a thieving propensity arises from covetousness, covetousness from envy, envy from vanity, vanity from stupidity, stupidity from laziness, laziness from slovenliness, and slovenliness from inaccuracy.

But in tracing back the genealogy of a man's vices, and we may say the same of his virtues, we come at last to the disposition with which the man was born.

Are we, then, responsible for the circumstances under which we are born? If we are not responsible for them, why should we be rewarded or punished for having been born as we were?

Let not this point be taken lightly. For there is no doubt that to be subject to some of the horrors which Dante depicts would be a less ill than it is to be born under such circumstances as many a man is born under, while, on the other hand, to attain the paradise of Mahomet would be a less felicity than it is to be born under such circumstances as many another man is born under.

We are confronted, then, says Kant, by the seeming contradiction that whereas our actions are predestined, we yet are responsible for them.

To explain this seeming contradiction, our ancestors hit upon the dogma known as the transmigration of souls.

It was held that everybody who is in a particular condition of life, as, indeed, everybody is, is not living in this world for the first time, but has lived in it untold times before. When anybody is born, it was said that he is merely resurrected from the dead, this world and the next being right here in our midst, or to be more precise, we ourselves are in what was once to us the next world. We who are now living are, according to this theory, in process of judgment for what we did when we lived the life before this. Is a man a beggar, going from place to place, having but little to eat, and nowhere to lay his head, it was held that he must have done somewhat bad in a former life, just as he must have done somewhat good, if he is blest with every comfort and convenience. Everybody, it was said, is making his way to future bliss just to the extent that he is overcoming the ill effects of what he did in former lives. Some time, if he perseveres, he will be born into a state of society and of personal disposition which we are wont to designate as heaven. His progress to such a state is slow on account of the law of consequences whereby every condition is bound up in other conditions, whence from the predicament in which he is, he can extricate himself only through time. What will finally deliver him from every woe is perfect knowledge, the comprehension of truth as it is in itself, the which, till he attain, he is doomed to the treadmill of his trials. Why we are still in an imperfect state of existence, though having been born and reborn from time immemorial, was explained on the principle that everything repeats itself. For, when after ages of toil, one has at last reached perfection, he does not forever remain in it, but in time lapses out of it. Everybody, it was said, is going an everlasting round which repeats itself, if not in all its details, at least substantially. Some make this round quickly, others slowly, some quickly once but slowly again. Some there are who have lingered in the world of bliss so long as may seem eternity, others having been an equal time at some other stage. The principles held were that the universe is one of diversity on the one hand and one of permanence on the other, worlds all the time arising, all the time disappearing, the general character of them, however, persisting. Every particle of existence, it was said, whether water, stone, or what not is a soul capable of making the general round, wanting only the opportunity. The greatest mind in fact might once have been an atom helping to make the field fertile, the greatest mind might again be such an atom. It was indeed thought that in the ages of time, the length of which it is impossible to compute, every particle of being does actually make the whole circuit of possibility, there having to be an exchange of services among things, a human soul, for example, when its turn comes, becoming an atom of lamp-black to allow an atom of lamp-black to become a human soul. All things, it was believed, are one in their nature, diversity arising out of the combinations. At any rate, howsoever these things be, each of us, it was said, has gone through the states of existence times without number and is to-day at some definite point in the great circle of existence having a bodily constitution befitting his character. For the kind of character a person has, it was believed, determines the condition in which he is born, he virtually choosing all the circumstances of his birth, his parentage, and the like.

This is the famous doctrine of metempsychosis, a doctrine which has without doubt been the means of enlightening thousands, bringing forcibly before the mind, as it does, the dependence of one's condition on his actions, but it will be noticed that, taking the theory literally, we never get any nearer to the source of the difficulty, no matter how far we go back in time, the one answer made to the question why anything is as it is being always this, "what the person did before."

The theory of transmigration, therefore, is inadequate to solve the mystery of evil, since by it we are put to unraveling a series the end of which does not appear.

The solution of the difficulty proposed by Kant, however, is not open to this objection. Each of us, according to the theory which he propounded, made a free-will choice from all eternity of everything which befalls him in life, time, itself, originating only in connection with his choice.

As there was nothing before this choice, we cannot say that the choice was predestined, there was not time in which the choice of anybody from eternity was made.

All our actions, then, says Kant, are predestinated, as each of them is the result of what stands before it in time, but we are the ones who predestinated them, having chosen those actions as a whole from all eternity.

As, then, the supposition that the mind of man was created from eternity clears up the seeming contradiction between predestination and free will, the supposition that the mind of man was created from eternity gains somewhat plausibility.

But did not the deity, it will be asked, create matter and mind by the word of his power?

Doubtless he did, but not in time, seeing that he made time as much as he made anything else. We cannot, for example, say that time was made before matter was, since no time being in existence but as it was made, no date can be assigned to the creation of time, all dates manifestly having to be in time. Neither can we say that matter was made subsequently to the making of time, since there being no date from which to reckon the creation of time, it is absurd to speak of anything as being made after time was. As time was made along with matter and mind, matter and mind did not originate in time, but only with time. The notions of before and after are merely notions of time and are without application to the creation, since the creator, inhabiting eternity, made things not inside but outside time. The expression " made out of nothing " has not a temporal but only a logical significance, meaning merely that things are eternally existent alone through the Supreme.

We are not to think that God makes worlds as the artisan makes stools. God creates the materials of which things are formed, the artisan merely shapes them. The arising and disappearing of worlds in particular places is but a question of composition and decomposition, not to be confounded with that of the original creation. " In the beginning God created the heavens and the earth," that is to say those heavens and that earth which we now behold. These indeed, began to exist, but not the things of which they are made. The things of which they are made go back to other worlds and these to others and so on, as far back as we are pleased to go, and even farther.

Time, space, and substance are in deity, not deity in them. Deity, as the confessions of our faiths declare is without variableness or shadow of turning, without body, passions, or parts. On this point are agreed Brahminists, Buddhists, Jews, Christians, and Mahometans, three-fourths or more of all the inhabitants of the earth.

Certain small sects, however, hold to anthropomorphism, imagining the creator to be possessed of body and to be in time, a notion of all ever held the crudest, conceived, as it is, as if the creator is subject to his own creation.

Anthropomorphists, speaking of the creator as if he were a finite creature say, for instance, that they could not respect him, should he do so and so, forgetting that what he does is after the nature of mathematics. What they say is, in fact, the same as if they should maintain they cannot respect him because he has made it farther round a circle than through the diameter, this sometimes being an inconvenience.

The Deity is the Supreme power on which everything depends. It is only figuratively that we can speak of this being as we would of a finite one.

The proof that mind and matter are eternal plainly enough depends on the assumption that something cannot come out of nothing, in other words, it depends on the granting of an axiom. The axiom that something cannot come out of nothing is the same as what is known as the law of identity, namely that a thing is always itself, never anything else.

Without the truth of this law of identity the other laws of thought would not hold, to wit, the law of contradiction, the law of excluded middle, and the law of sufficient reason, the latter being also known as the law of causality.

Suppose that something could come out of nothing, a thing could, on that hypothesis, be and not be at the same point of time; it would be impossible also to say that a thing must either be or not be, since it might be both existent and non-existent at the same moment. The law of causality would not hold, since subsequent conditions of things would not necessarily depend on their previous conditions.

Suppose that something might become nothing, all the laws of thought would likewise fail.

We may argue, therefore, that as all conclusions whatsoever depend on the truth of the laws of thought and as these laws, without exception, depend on the principle that something cannot come out of nothing, either no conclusions of any kind are certain or else matter and mind were created from eternity.

Causality is regarded as the great principle of nature, that like combinations produce like results. Why they should do so, however, is because the things combined have unchangeability, are always the same. Like combinations of hydrogen and oxygen would not always give the same effects, unless hydrogen were always just exactly hydrogen, oxygen always just exactly oxygen. If the law of identity holds, namely, that every atom is always itself, never anything else, then, it is plain to see that the law of causality must hold also.

We might, indeed, as well say that the axioms of mathematics do not hold as to say that something can come out of nothing. If the whole were not greater than any of its parts, then by merely entering the hall of a house, we might enter all the rooms. But what more certainty is there that the whole is greater than any of its parts than there is that something cannot come out of nothing?

Nothing is so plain, of course, that somebody may not have called it in question, the truth of axioms being no

Sextus Empericus, who lived two hundred and forty years subsequent to our Saviour's birth or thereabouts, wrote in Greek a still surviving book, one part of which labors to show that no reliance can be placed on mathematics. Ever since his day, however, people have continued to do business by means of arithmetic and to trust the titles of their lands to geometry, just as though he had never written a word. Sextus himself, who was a physician, it is not to be doubted made out his bills on principles of arithmetic, charging for example, if he had made six visits more than if he had made but three. It is hardly possible that he could have been persuaded to take four dollars for six visits at a dollar a visit, on the ground that the multiplication table is false!

Sextus argued that axioms are unprovable, because all attempts to prove them must assume that they are true, an objection, however, which in the opinion of many will amount to a demonstration of their truth. Kant, indeed, has shown that the human mind is of such a nature as that it has existence only, provided the axioms be true, the axioms being implied in its very nature, whence, it would seem, we have here a proof of the axioms by *reductio ad absurdum.*

What on this theory would be meant by the self-evidence of the axioms would be no more than that the proof of the axioms is easy.

We are all familiar with the question, " Who was the father of the Zebedee children? " Who, indeed, he was, is, doubtless, self-evident, yet to have it clear in the mind makes a little demand on thought. It was once asked of a man, " How many years of Sundays there are in seventy years," and forthwith he began to enter on a laborious calculation to find how many there might be, not having stopped to reflect that one-seventh of the time is on general principles Sundays. Of a similar nature is the question, "How many odd numbers there are in a billion?" It would take a long time to count them, perhaps nobody ever has or ever will count them, yet is it evident, on thinking, that in a billion there is just half a billion odd numbers. Of the same nature is the truth that something cannot come out of nothing, it is evident on a little thinking, consequently said to be self-evident.

The question of the origin of the human mind having now been considered from the point of view of matter and from the point of view of mind, it remains to consider it from the point of view of both matter and mind taken together; in other words it remains to consider the origin of the human mind from the point of view of living organisms.

Dante, as we are aware, represents that he saw men, heard them speak, even, the bodies of whom were not like ours but were veritable trees of the forest. Let us then suppose that a race of men answering to this description actually exists on the earth, what are the conclusions to which we must come respecting it?

It is recalled by a man that in his boyhood, there was along the road which led out from his father's house, a row of locust trees. Supposing then that these trees had been the bodies of men, what then? Locust trees send out under the ground runners from which new trees sprout up and grow, as, indeed, everybody must have observed. If, then, we suppose that the trees along the road were human beings, each of them having an active, sensitive, conscious mind, we must suppose that the new trees sprouting up from the runners of the old ones were new men and women come upon earth.

Manifestly the tender shoots would be boys and girls, but with a lapse of time would wax into manhood and womanhood. When, then, a new man of a tree sprouted up from the runner of an old one, and we might ask the same question respecting a new woman of a tree, where should we say that this man or this woman came from?

It would, of course, be admitted that the hydrogen, nitrogen, oxygen, and carbon of which the visible tree springing up from the ground was made, came from the air, water, and mineral of the earth, the atoms of which from age to age change not, but whence should we say that the mind itself of the tree came?

We have supposed, it will be remembered, that the tree newly sprouting up from the runner of the old one was veritably a human being, having like ourselves ideas, volitions, and feelings, the same as Dante imagined his trees to have.

When, then, a new tree sprouted up from the runner of an old one, would it be proper to say that its mind came out of nothing, never having before that time had any existence at all?

It is one of those things which are said to be self-evident that something cannot come out of nothing, to say that something can come out of nothing being equivalent to saying that what is not, exists.

Does anybody pretend that this is a subject beyond his comprehension, let him be warned to what he is committing himself. He in effect says that he does not understand how the non-existence of a thing precludes its existence.

We are speaking, it is proper to observe, of ultimate realities, those that cannot be analyzed into any others, not of things compounded out of these.

When, then, a person who holds the nature of first truths to be beyond his comprehension, orders his dinner at a restaurant, the waiter shall place nothing before him, but merely make an appeal to his agnosticism, "For all he knows the non-existence of the atoms which might compose his dinner is the same as their existence!"

It has been set down to the credit of Hegel that he was willing to accept, without any mental reservations, whatsoever follows inevitably from general principles, launching his skiff on the sea of thought regardless as to what shores it might be wafted, an attitude of mind which we may well emulate.

If, then, trees were men having minds like our own, we should have to suppose that, when a tree sprouted up, the mind of it at the same time emerged from the solitudes of eternity, being in fact obliged to grant this or to concede that nothing may become something.

Should anyone wonder why this example from trees has been urged, he should be reminded that in the sea animals in the form of trees actually do exist, so that Dante's idea is far from being a mere fiction.

Such animals grow fast to the earth like trees and bushes, being, indeed, often mistaken for forms of vegetation, some of them even blossoming, yet are they actually possessed of minds, as we, ourselves, strange as this may seem.

These animals are, for instance, certain corals of which there are many varieties in the sea. From any one of these animals, others of like nature sprout up and grow.

We have, therefore, actual examples in the world which are but little removed from the example of the locust trees.

When, then, a new animal of this kind sprouts up, as indeed, multitudes of them do, the question meets us, "Where does its mind come from?"

Is not the old body from which the new body sprouts up merely the means by which a certain mind gets organs for the accomplishment of its purposes? Has not, in fact, the mind of the new body been existing from eternity, ready at any time to enter the flesh?

If the hydrogen, nitrogen, oxygen, and carbon which the machinery of life organizes into the new body be of such a nature as that the atoms of the same have preserved each its identity from eternity, what precludes the possibility that the mind of the new body may likewise have been able to preserve its identity from eternity?

The coming into existence of animals through subdivision shows the same principle as appears in branching.

The so-called starfishes, animals found in the sea growing much like plants, devour the bait which fishermen put upon their hooks. Often, drawing up starfishes which have got fast to the hooks, the fishermen in a rage tear them to pieces and throw the pieces back into the water, thinking thus that they have destroyed the starfishes. The truth is, however, that each of the pieces thrown back becomes an animal like the one which was torn to pieces, so that the fishermen do but multiply the evil which they seek to lessen.

Here it is plain the mind of each of the new animals existed previously to the animals themselves, minds being scattered, so to say, all through the body of the original starfish.

Many an animal, it is true, makes its entrance on earthly life growing from some sort of an egg. The machinery of an egg, however, it is proved, differs not in principle from the machinery of a branch, so that in the case of an animal growing from an egg we have involved just the same thing which is involved in the case of an animal growing from a branch. It is, in fact, just the same as if an animal that grows from an egg sprouts up from some portion of another animal.

The question, therefore, which it was possible to ask about every animal springing up from a branch of another, it is possible to ask about every animal growing out of an egg, "Where does its mind come from?"

It is admitted that the materials of its body come from the water, air, and earth, those materials being in the last analysis atoms, those atoms having no beginning of days or end of years, what is better said, existing altogether independent of time.

Are we then reduced to such desperate straits as to be under the necessity of conceding that the mind of the animal in order to enter into alliance with the atoms of matter had to be changed out of nothing into something?

If it were possible that the mind of the animal from being nothing might on a sudden and to meet an emergency become something, it must possess a happier knack than any known to sleight-of-hand.

When the body of a bird is formed in an egg of the nest, where, we may ask, does its mind come from?

From nothing at all? Or like its body, from something at hand?

If there were but two birds in the world, yet in the space of a few years there would be birds enough so that everybody could have one.

Would the minds of these birds that should direct their songs and in their songs take delight, have all originated out of the abyss of nothingness? Either we must admit this or else grant that mind like matter is non-temporal in its nature.

What a countless number of feathered creatures there are in the world not alone on the land, but also on the water, where the wing of the sea-gull never wearies! All those which now exist, however, are descendants of those which lived before them. The lives of most of them are short. Think then of the many generations of birds, what a vast number of minds have appeared on the earth in this shape! Whence did they come? Out of nothing or out of selfhood?

The fish deposits a million of eggs in each of which there is a mind, this mind having either existed from eternity or having come out of nothing this very summer!

The young of the paramecium numbers a quarter of a million, all hatched out in the brief space of a single month! Is it possible that the mind of each of these came out of nothing for the occasion? If we might think so, we must suppose that nothing has a prolixity beyond what it is possible to conceive!

How innumerable are the creatures, visible and invisible, of appreciable size and infinitesimal which swim the seas or inhabit the dust of the earth, to say nothing about those on the land and in the water! Mind is a very important thing in the make-up of the world and may, therefore, well enough be of the nature of the other things in the world, existing as Spinoza would have said under the form of eternity.

Beasts, such as horses, cattle, and sheep, indeed all beasts whatsoever, are no exception to the rule of propagation by means of eggs. We have, therefore, in regard to each one of them, as to any animal whatsoever, originating from an egg, the pertinent question, "Where its mind comes from?"

The hydrogen, nitrogen, oxygen, carbon, and the like of which the bodies of beasts are composed, it is granted do not come out of nothing. Why, then, should we suppose that the mind of a beast, the same too exhibiting so much intelligence and power, should once have been a mere nonentity?

We might better believe all the fables of the Koran, to make use of Bacon's expression.

Should objection be raised that comparison has so often been instituted between the mere animal and the human mind, this objection can in some degree be mitigated by the supposition that there are several kinds of minds just as there are several kinds of matter.

Mind of a very low order it might be assumed is to be found in every part of an animal's body, every animal on this hypothesis being a compound one, every cell in its body a veritable animal.

We should have come to the point of view of Anaxagoras that all things consist of non-extensive potencies, mind among them that organizes things.

At any rate the human mind is not more abased by having connection with animal mind than by having connection with matter itself.

The animal nature of man being like that of beasts, no difference whatsoever being observable, the same principles of life must apply to men as apply to beasts. Could then a human being have got himself born, his mind we mean, unless he had been on hand to be born?

It is not claimed of course that the particular mind of an individual man has previous to his birth gone through a succession of states in time, but only that his mind, as such, is independent of time, originating from eternity.

THE END

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