SCIENCE

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*TRUTH AND ERROR.**

"IF to do were as easy as to know what were good to do, chapels had been churches, and poor men's cottages princes' palaces. It is a good divine that follows his own instruction. I can easier teach twenty what were good to be done than be one of the twenty to follow mine own teaching."

"Science," says Powell, "deals with realities. These are bodies and their properties. Known realities are those about which mankind have knowledge; scientific research is the endeavor to increase knowledge, and its methods are experience, observation and verification."

While most men of science admit all this as good precept, history warns them that they must be on their guard, lest they fall unknowingly into the dream-land of the 'philosophers;' for our author tells us that "The dream of intellectual intoxication seems to some to be more real and more worthy of the human mind than the simple truths discovered by science."

While rebuking the metaphysicians, our author does not spare those men of science who assert that while science deals with the *properties* of matter the real nature of matter—what it is in itself—is quite unknown: "As though its properties did not constitute its essential nature."

"Would a sane person," he asks, "speak

* By J. W. Powell. Chicago, The Open Court Publishing Co., 1898.

of the horse and head, the horse and body, the horse and legs, the horse and tail, and then consider the horse as one thing, the head, body, legs and tail as other things? Yet this is the error of those who consider matter as one thing and properties as other things."

"As it is of matter, so it is of space: One man sees the disc of the moon when it is riding high as having the size of the top of a teacup, another as large as a cartwheel. But the moon will be seen larger than a barn if it is seen behind a distant barn, or it may seem to be as large as a great mountain when it rises behind such a mountain. As the moon rides the heavens it seems to be this side of the surface of the sky, although we know that there is no such surface. Such habitual judgments of space and time seem to contradict each other. By a natural process of fallacious judgment the idea of space as void is developed as an existing thing or body. This is the ghost of space—the creation of an entity out of nothing. The space of which we speak is occupied. We can by no possibility consider true space or void as a term of reality. If we reason about it mathematically, and call it x, the meaning of x in the equation is finally resolved by expressing it in terms of body as they are represented by surface. This non-space has no number; it is not one or many in one—it is nothing. It is not extension as figure or structure—it is nothing. The fallacy concerning space is born of careless reasoning. No harm is done by this popular misconception of space until we use it in reasoning as a term of reality; then the attributes of space may be anything because they are nothing."

"The universe is a concourse of related factors composed of related particles. A relation cannot exist independent of terms We may consider a relation abstractly, but it cannot exist abstractly. To affirm a relation the terms must be implied. When an abstract is reified, that is supposed to exist by itself independent of other essentials, and the illusion is entertained that there is something independent of the essentials which supports them, a mythology is created so subtle as to simulate reality. So when relations are reified and supposed to exist independent of terms the mind is astray in the realm of fallacies."

All this seems to me to be so important and significant that it cannot be said too often, for it is all so essential to clear thinking upon the significance of science that I believe the author has done good service in repeating it although it was all said long ago in still simpler and clearer words.

Berkeley tells us that "what seems to have had a chief part in rendering speculation intricate and perplexed, and to have occasioned innumerable errors and difficulties in almost all parts of knowledge, is the opinion that the mind hath a power of framing *abstract ideas* or notions of things. He who is not a perfect stranger to the writings and disputes of the philosophers most needs acknowledge that no small part of them are spent about abstract ideas. These are in a more especial manner thought to be the object of those exercises which go by the name of Logic and Metaphysics, and of all that which passes under the notion of the most abstract and sublime learning. Whether others have this wonderful faculty of abstracting their ideas they can best tell; as for myself I dare be confident I have it not." ('Human Knowledge,' Introduction, 6–10.)

"I am tempted to think nobody else can form these ideas any more than I can. Pray, Alciphron, which are those things you would call absolutely impossible?"

"Such as include a contradiction."

"Can you form an idea of what includes a contradiction?"

"I can not."

"Consequently, whatever is absolutely impossible you cannot form an idea of?"

"This I grant."

"But can a color or a triangle, such as you describe these abstract general ideas, really exist?"

"It is absolutely impossible such things exist in nature."

"Should it not follow, then, that they can not exist in your mind, or, in other words, that you cannot conceive or frame an idea of them? I do not perceive that I can, by any faculty, whether intellect or imagination, conceive or form an idea of that which is impossible and includes a contradiction." (Alciphron VII., 6.)

"I am of a vulgar cast, simple enough to believe my senses and to leave things as I find them. To be plain, it is my opinion that the real things are the very things I see and feel and perceive by my senses. These I know and, finding they answer all the necessities and purposes of life, have no reason to be solicitous about any other unknown beings. A piece of sensible bread, for instance, would stay my stomach better than ten thousand times as much of that insensible, unintelligible real bread you speak of. It is likewise my opinion that colors and other sensible qualities are in the objects. I cannot, for my life, help thinking that snow is white and fire hot. Away, then, with all that skepticism, all those ridiculous philosophical doubts. I might as well doubt my own being as the being of those things I actually see and feel." (Three Dialogues, III.)

While we are unable to doubt the being of those things we see and feel, we do continually doubt or question the evidence of our senses, for error and illusion and hallucination are, unfortunately, as real as truth; and the part of Powell's book which deals with illusions is that which the reader will find most attractive and suggestive.

"When a youth, as I was breaking prairie with an ox team, my labor was interrupted by a rattlesnake, and, during the day, I saw and killed several of these serpents. At one time the lash of my whip flew off. In trying to pick it up I grasped a stick. The fear of being bitten by a snake, and the degree of expectant attention to which I was wrought, caused me to interpret the sense impression of touch as caused by a rattlesnake. At the same time I distinctly heard the rattle of the snake."

"A soldier in the suspense which precedes the battle, when sharpshooters are now and then picking off a man, may have his gun or his clothing touched by a rifle ball and in the suspense of the occasion may imagine that he has received a serious, perhaps a deadly wound, and may shriek with pain. A mustard plaster on the head may cause a man to dream of an Indian conflict in which he is scalped, as I have observed."

All savages believe that hallucinations are a means of divination, and, as many intoxicants produce hallucinations, all of the North American tribes make use of these, supplemented with many rites, such as dancing, singing, ululation, the beating of drums, and the tormenting of the body by various painful operations, all designed to produce ecstatic states and the consequent hallucinations.

If the Society for Psychical Research were to make a census of those who believe that hallucinations often reveal the unknown past or future, Powell tells us that they would find among the North American Indians one hundred per cent. ready to testify to the truth of this opinion.

Erroneous judgments once made may be repeated in perpetuating fallacies, and myths are invented to explain them. Then the myths become sacred, and the moral nature is enlisted in their defense.

"The stars were seen to move along the firmament, or the surface of a solid, from

east to west, as men run along the surface of the earth at will. But the heavenly bodies move by constantly repeated paths, and so primitive man invents myths to explain these repeated paths."

"Fallacies are," as our author clearly points out, "erroneous inferences in relation to things known. If there were no realities about which inferences are made, fallacies would not be possible. The history of science is the discovery of the simple and the true; in its progress fallacies are dispelled and certitude remains."

These extracts from Powell's book will show how much that is valuable and suggestive and instructive is to be found in it. I regret that I am forced to form a very different estimate of the constructive part of the book, for, as the author expounds his own system of philosophy, he seems to me to be one of those ungracious pastors who, while pointing out to others the steep and thorny way, themselves the primrose path of dalliance tread, and reck not their own read.

The book begins with a delightful and instructive anecdote of a party of Indians throwing stones across a cañon. The distance from the brink to the opposite wall did not seem very great, yet no man could throw a stone across the chasm, though Chuar, the Indian Chief, could strike the opposite wall very near its brink. The stones thrown by others fell into the depths of the cañon. "I discussed these feats with Chuar, leading him to an explanation of gravity. Now Chuar believed that he could throw a stone much farther along the level of the plateau than over the cañon. His first illusion was thus one very common among mountain travelers—an underestimate of the distance of towering and massive rocks when the eye has no intervening object to divide space into parts as measure of the whole."

"I did not venture," says our author, "to correct Chuar's judgment, but simply sought to discuss his method of reasoning."

He explained that the stone could not go far over the cañon, because the empty space pulled it down, and, interpreting subjective fear of falling as an objective pull, he pointed out how strongly the empty void pulls upon the man who stands on the brink of a lofty cliff.

"Now, in the language of Chuar's people, a wise man is said to be a traveler, for such is the metaphor by which they express great wisdom, as they suppose that a man must learn by journeying much. So in the moonlight of the last evening's sojourn in the camp on the brink of the cañon, I told Chuar that he was a great traveler, and that I knew of two other great travelers among the seers of the East, one by the name of Hegel, and another by the name of Spencer, and that I should ever remember these three wise men, who spoke like words of wisdom, for it passed through my mind that all three of these philosophers had reified void and founded a philosophy thereon."

The system of philosophy which it is the aim of this book to expound is, so far as I can gather it from a single reading, about as follows:

"It was more than chance," our author tells us, "that produced the decimal system, for the universe is pentalogic, as all of the fundamental series discovered in nature are pentalogic by reason of the five concomitant properties. The origin of the decimal system was the recognition by primitive man of the reciprocal pentalogic system involved in the two hands of the human body." P. 112.

"Thus, in geonomy, p. 43, we deal with an earth composed of five encapsulated globes enclosing a nucleus, and presenting: (1) the centrosphere, (2) the lithosphere, (3) the hydrosphere, (4) the atmosphere, (5) the etherosphere."

"In the human mind, again, we have the

five psychic faculties: (1) sensation, (2) perception, (3) apprehension, (4) reflection and (5) ideation." P. 418.

"These five psychic faculties arise in the mind through the cognition of the five properties of the ultimate particles of matter. Every body, whether it be a stellar system or an atom of hydrogen, has certain fundamental characteristics found in all. These are number, space, motion, time (p. 13), and (p. 14) the fifth property here called judgment."

"All particles of plants, soils and stars have judgment as consciousness and choice; but having no organization for the psychical functions, they have not recollection or inference; they, therefore, do not have intellections or emotions. Only animal beings have these psychical functions. Molecules, stars, stones and plants do not think; that which we have attributed to them as consciousness and choice is only the judgment of particles, but it is the ground, the foundation, the substrate of that which appears in animals when they are organized for conception." P. 413.

"These things are necessary to a primitive judgment: First, a sense impression; second, a consciousness of that impression; third, a desire to know its cause; fourth, a choice of a cause; fifth, a consciousness of the concept of that cause; sixth, a comparison of one conscious term with the other; and seventh, a judgment of likeness or of unlikeness."

For all I know, that which chemists call affinity may be the 'choice of particles to associate in bodies.' All the chemist tells us of the matter is that the word 'affinity' is a sign or symbol to generalize his observations and experiments, and it is clear that this is no reason why he who finds reason to do so may not regard it as evidence of consciousness and choice. The question the chemist is likely to ask is whether Major Powell can so play on the emotions of an atom of hydrogen as to persuade it to do anything which we have not every reason to expect in course of nature. If he cannot do this his hypothesis is worthless, not because we can disprove it, but because we find no evidence of its truth and no value in its practical application. In fact, it seems to me to be one of the 'reified voids' of which he has warned us.

"The Utes say that the Sun could once go where he pleased, but when he came near the people he burned them. Tevots, the Rabbit-god, fought with the Sun and compelled him to travel by an appointed path along the surface of the sky, so that there might be night and day."

Truly, "It is a good divine that follows his own instruction. If to do were as easy as to know what were good to do, chapels had been churches, and poor men's cottages princes' palaces. I can easier teach twenty what were good to be done than be one of the twenty to follow mine own teaching."

Powell tells us that he has been robbed of his 'beautiful world' by Bishop Berkeley, but his attempt to neutralize the evils of 'idealism' by a new philosophy seems to me to be anything but a happy one, for the application of his own principles to his system of philosophy seems to carry idealism to dizzy heights where even Berkeley never dared to soar.

If every particle of matter has conscious judgment of number, space, motion and time, as he tells us that it has, what becomes of these concomitant properties? Why may not an ultimate particle assert that, while it cannot doubt the reality of the number, space, motion and time of which it is conscious, belief in these properties, as distinct from the judgment of particles, 'reifies a void' and carries us into the realm of 'ghosts,' since the essence of these properties is to be perceived or known, in-

asmuch as every particle knows them, and it is only as known that they exist.

According to our author's own principles and assumptions, space or time, or number or motion, which are not the consciousness of particles are but the ghosts of judgment, the creation of entities out of nothing, for if he is right the *esse* of these properties must be *percipi*.

It must not be inferred that I am myself an idealist, for nothing could be farther from the truth. I seek to be neither an idealist nor a materialist, nor a realist nor a monist, but a naturalist, believing that it will be time to have an opinion as to the relation between mind and matter after we have found out.

For all I know to the contrary, Powell may be right, and every particle of matter may have judgment as consciousness and choice; but the test of truth is evidence, and not the absence of disproof, and belief in the judgment of particles does not concern me.

Our author's belief that all mind is matter in motion, and all matter in motion mind, or, at least, the raw material of mind, is not new. In fact, it seems to be the most characteristic 'philosophy' of our day.

"All systems of philosophy are vanity," say the students of science; but to Sam Weller's question: "What is your particular vanity?" they all, with one accord, begin to cry 'Monism!'

If I seem to some to have devoted more space to this new book on 'philosophy' than it deserves; if I sit patiently among the audience, listening attentively as the philosophers play out their little plays; it is because of my hope that they may destroy each other like Kilkenny cats before the curtain drops, and that, in the last act, they who are no philosophers, but simple honest folks, may come by their own and live at ease.

Because of this hope I study the philosophers as well as I can that I may be the better able to do my part in bringing the desired end about.

W. K. Brooks.

Johns Hopkins University.

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*TRUTH AND ERROR.**

Whatever else may be thought or said, all will probably agree that this is a unique and remarkable book. It is intensely original. The author is omniscient and discusses the universe. He treats, like Scaliger of old, *de omni re scibili et quibusdam aliis*. As a specimen of what Kant called 'architectonic symmetry' it probably has never been excelled. It is essentially a philosophic or scientific terminology, but all the terms are new, for even where old terms are used they are invariably given new meanings. The whole book is, therefore, like a foreign language, and the reader's first task is to learn the language. Everything that has been said or done by man is rejected as unsatisfactory and the temple of philosophy is entirely rebuilt out of new bricks cast in new molds. The friction thus caused in reading the book will, therefore, probably deter many from making so great an effort, and one of the objects of a sympathetic treatment should be to point out that the effort will be repaid.

Notwithstanding, however, this 'architectonic symmetry,' the reader has a right justly to complain that his path has not been made as easy as it might have been. The terms are generally defined, it is true, but the definitions are scattered through the text and have to be hunted up many times, as they cannot be remembered on once reading. They should have been all collected together in one place and arranged in alphabetical order as a complete glossary.

* Truth and Error, or the Science of Intellection. By J. W. Powell. Chicago, The Open Court Publishing Company.

As it is, even the index is absolutely worthless. But this is not the worst fault of method. The terms are all interrelated and these interrelations are set forth in divers ways and places in the text, but there are no tabular exhibits of the relations, no graphic or diagrammatic representations. The reader is compelled to carry in his mind all these never-before-heard-of correlations among ideas expressed in wholly unaccustomed language. Whether the author wrote his book from such a condensed scheme or not, he should have drawn it up for the use of others who have never dreamed of these things before. There are indications, however, that he worked entirely from a system evolved in his own mind, and certain passages show that he would have written it better if he had first worked it out in schedules, tables and diagrams.

It is, of course, no part of our duty to undertake the task of tabulating the contents of a book, and few would probably be capable of doing this in the present case, but some attempt or stagger at this seems to be the only way of condensing the enormous mass of matter that the book contains into the compass of a reasonable summary. All the manifold terms employed stand for principles, laws, relations, facts, or phenomena, and these are of widely different character, making it very difficult to find any one term that will embrace them all. For want of a better one, and because little used by the author, let us call them all *principles*. In the second place, all these different kinds of principles are arranged in series, or groups, or classes, each series, group, or class being distinct from any other. In the third place, each series, group or class consists of exactly five terms, standing for five principles, which have a definite and invariable order in the series. The universe is found to be quinary, or, as he calls it, *pentalogic*. Each principle in any series is related to the ones standing before and after it, but if it has any relation to those of other series it must be to those occupying the same place in the series, and not to any others. There are, therefore, vertical and horizontal relationships, but there can be no diagonal or oblique ones.

There are, at least, twenty of these pentalogic series, each of five terms, which alone would raise the number of terms to one hundred, but there are, of course, many other terms employed in defining and discussing these primary ones. The author nowhere tells us the order in which the numerous pentalogic series should stand, and every one must arrange them as seems most logical. The following attempt in this direction makes no claim to infallibility.

I. It seems clear that the first series must be that which relates to the constitution of matter. The five principles here involved are what he calls the *constituents* of matter, but which he quite as frequently denominates *concomitants*, because, as he explains, they always go together and cannot be separated. These five constituents are: (1) number; (2) space; (3) motion; (4) time; (5) judgment.

II. Without stopping to discuss the first series we may pass to another, the terms of which are correlated, *i. e.*, horizontally related, to the first. It embraces what he calls *essentials* or manifestations, and which, he says, are absolute. They are: (1) unity; (2) extension; (3) speed; (4) persistence; (5) consciousness.

III. Corresponding to these five essentials, which are absolute, there are five *variables*, which are relative, and stand as follows: (1) plurality; (2) position; (3) path; (4) change; (5) choice.

IV. Next in order seem to come what he calls the five *categories*, to which everything in the universe must be referred. These are: (1) kinds; (2) forms; (3) forces; (4) causations; (5) concepts. They also corre-

spond to the five constituents, the five essentials, and the five variables, number by number.

V. Thus far the order of the series seems tolerably clear, but from this point on there may be room for difference. We will regard as the next and fifth series what he calls *particles*, and, without apologizing for the word, proceed to enumerate them as follows: (1) ethereal; (2) stellar; (3) terrestrial (geonomic); (4) vegetal; (5) animal.

VI. He has also a series of what he calls *natural bodies*, which are not precisely parallel with the series of particles. These are: (1) celestial; (2) terrestrial; (3) vegetal; (4) animal; (5) social. The first term here corresponds to the second in the last series, and so on through to the last term, which is not represented in series V.

VII. To the five particles (series V) there are five corresponding *states*, as follows: (1) ethereal; (2) fluid; (3) solid; (4) vital; (5) motile.

VIII. Several series could probably be worked out, representing principles inhering in ethereal, stellar and terrestrial particles, but to find clear statements of them in the book would be a difficult task. The author was anxious to reach the higher, psychological aspects of the subject, and hastened to deal with animal particles. In these he finds five processes, or operations, which he calls *animal principles*. These are: (1) metabolism; (2) reconstruction; (3) motility; (4) reproduction; (5) conception.

IX. These might have been called functions, and for carrying them on there are five corresponding *systems of organs*, as follows: (1) digestive; (2) circulatory; (3) motor; (4) generative; (5) cogitative (not his word).

X. Adhering to the psychic elements, the five *senses* may be next considered. These vary slightly from the traditional five senses in very properly grouping taste and smell together as one and recognizing the muscular sense: (1) taste and smell; (2) touch; (3) the muscular sense; (4) hearing; (5) sight.

XI. Parallel to these are the five *modes of appeal to the senses*, the senses representing subjective states, modes of appeal objective properties: (1) savors; (2) odors; (3) pressures; (4) sounds; (5) colors.

XII. Major Powell distinguishes between sensations and feelings. The former term he confines to the subjective states residing in the end organs of sense (of course referred to the brain), while the other he restricts to internal states, such as most psychologists recognize as emotional states in a broad sense. Without stopping to show that such a classification is illogical, we may enumerate here what he calls *feeling impressions*, of which there are, of course, exactly five. Expressed adjectively, they are: (1) metabolic; (2) circulatory; (3) motor; (4) reproductive; (5) cognitional. The reader cannot fail to note the close resemblance of these terms to those describing the five systems of animal organs.

XIII. The twelve series of principles thus far enumerated, though falling far short of the whole number that a closer analysis of the book would probably reveal, only bring us up abreast of the subject of mind in its intellectual manifestation, *i. e.*, intellection. The first series to be considered here is that of the *faculties*. Of these there are also five, viz.: (1) sensation; (2) perception; (3) apprehension; (4) reflection; (5) ideation.

XIV. Each faculty probably has five elements or factors, but only three of them seem to be treated from this point of view. In harmony with the fifth and last primary constituent of matter, judgment, all operations of the mind, including sensations, are judgments, and the five *elements of a judgment of sensation* are: (1) choice of a past concept; (2) the consciousness of this

choice; (3) the choice of another concept; (4) a consciousness of this; (5) the comparison of the one with the other.

XV. The five *elements of a judgment of perception*, which he says are the same as for apprehension, are these: (1) consciousness of a concept; (2) choice or recollection of another concept; (3) consciousness of the second concept; (4) comparison of the two concepts; (5) the final judgment.

XVI. In addition to these there are enumerated the five *elements of a judgment* proper (for he does not always use the word judgment in the same sense). They are: (1) consciousness of a sense impression; (2) desire to know its cause; (3) guess or choice as to its cause, reviving the consciousness of the concept of the object chosen; (4) comparison of this second consciousness with the first; (5) judgment of the likeness or unlikeness of the terms compared.

Sixteen cosmic series have now been enumerated, each consisting of five principles expressed by five terms or phrases, the whole forming a kind of diapason rising from the primary constituents of matter and culminating in an act of mind, or intellection. These sixteen series may now, for clearer comprehension, be re-enumerated without the pentalogic terms:

1. Constituents of matter.
2. Essentials or manifestations (absolute).
3. Variables (relative).
4. Categories.
5. Particles.
6. Natural bodies.
7. States of the natural bodies.
8. Animal principles.
9. Systems of organs.
10. Senses.
11. Modes of appeal to the senses.
12. Feeling impressions.
13. Faculties.
14. Elements of a judgment of sensation.
15. " " " " perception.
16. " " " " intellection.

As already remarked, there are many interrelations among the series, and it may be next inquired what are some of the most important of these. All after the first are connected in one way or another with that as the basis of the entire system, but the exact hierarchical dependence of the several series is not worked out. The constituents of matter—number, space, motion, time, and judgment—all belong to everything and are always concomitant in the sense that nothing can lack any of them and have existence. [This is many times repeated, and yet there are passages, as near the bottom of page 13, from which it may be inferred that judgment only inheres in animate bodies.] The essentials, however—unity, extension, speed, persistence, and consciousness—are simply the manifestations of things and constitute the *substrates* of the next series, viz., the variables—plurality, position, path, change and choice. That is, unity is the substrate of plurality, extension is the substrate of position, and so on through the series.

The categories, or classific properties—kinds, forms, forces, causations, and concepts—also correspond, term for term, with the constituents, and several attempts are made to show their interrelations with the other series, but these can best be discussed a little later. The five species of particles—ethereal, stellar, terrestrial, vegetal and animal—are arranged in an ascending series, such that each term after the first contains all that is contained in the preceding term and something in addition, a *differentia* of its own. This differentia in every case is related to the corresponding term of the primary series, *i. e.*, the constituents. Particles are organized, and each class is more highly organized than the preceding class in that the next higher constituent is embraced in the organization. In ethereal particles, which, he says, are probably ultimate, numbers alone are organized. In the stars numbers and spaces are organized.

In geonomic bodies numbers, spaces, and motions are organized. In plants numbers, spaces, motions, and times are organized. In animals numbers, spaces, motions, times, and judgments are organized. All this seems to a layman to contradict the definition of the five constituents as necessary concomitants of one another, which would predicate them all even of the first term, or ethereal particles, but the author could probably explain the apparent discrepancy. He has not done so in his book.

He sometimes distinguishes between particles and bodies, and when he does so the bodies are composed of particles, but in his discussion of the natural bodies he expressly excludes the first term of the series of particles, the ethereal, and begins with the second, giving us celestial, terrestrial, vegetal, animal, and social bodies, this last being added apparently to make the necessary five. These bodies are what he calls 'incorporated,' and the order of the terms is an ascending order in the mode or degree of incorporation. This depends upon the character of the respective particles. The terms used describe this as follows:

1. Celestial bodies have molecular particles.
2. Terrestrial bodies have petrologic particles.
3. Vegetal bodies have inorganic particles.
4. Animal bodies have vegetal particles.
5. Social bodies have ideal particles.

He does not use these words in all cases and his terminology is here mixed and more or less confusing, but the above seems to be a fair statement of his meaning.

If we continue to neglect the first class, ethereal bodies, and to begin with the second, celestial bodies, the corresponding states will be: (1) fluid; (2) solid; (3) vital; (4) motile; (5) social. Major Powel, never uses the word *social* nor the word *collective*, although he clearly understands this stage of development. His classification of the sciences, or scientific hierarchy, is as follows: (1) etheronomy; (2) astronomy; (3) geonomy; (4) phytonomy; (5) zoonomy; (6) demonomy.* Why he did not reduce this to five by combining phytonomy and zoonomy under the term *bionomy* (since from the standpoint of biology there is no distinction between them) is rather surprising, but explainable. We are here concerned only with the last term, *demonomy*, which he prefers to socionomy, and throughout expresses the conception of collectivity by derivatives from the Greek word δῆμος, using the adjective *demotic*, and even extending it to animal societies, colonies, etc., to which it obviously does not apply.

Passing over the animal principles, or functions, and their respective organs, whose bare enumeration above must suffice, we come to the *senses*. Here it is important to point out that the senses are simply the organs of the categories in their numerical order, thus:

1. Taste (including smell) is the organ of kind.
2. Touch is the organ of form.
3. The muscular sense is the organ of force.
4. Hearing is the organ of causation.
5. Sight is the organ of conception.

Major Powell does not say quite all of this in terms, but it can be safely inferred from the discussion on page 279.

When we come to the *faculties* we have another example of architectonic symmetry. We perceive that the faculties are simply cognitions of the categories, term for term:

1. Sensation is cognition of kind.
2. Perception is cognition of form.
3. Apprehension is cognition of force.
4. Reflection is cognition of causation.
5. Ideation is cognition of conception.

The special treatment of the cosmic series need not be carried farther, but it is of interest to note a few of the more general correlations that may be, with sufficient pains and effort, worked out of different

* Compare the proposed classification given in the *American Journal of Sociology* for July, 1896, Vol. II., p. 82.

passages in the book. In the chapter on Intellections, after all the faculties have been dealt with, the author makes a number of wide sweeps across the whole field to show the numerous and complicated associations that arise among the various series. No tabular exhibits are offered, and the reader is asked to carry in his mind all that has gone before and to put things together for himself. There are many gaps in the terminology which he must supply, and several new series come out that appear not to have been dealt with before. A careful digest of this chapter, and especially of the matter on pages 302 and 303, seem to justify the following table of correlations. The five points of view are: (1) classification; (2) morphology; (3) dynamics; (4) evolution; (5) intellection. If by morphology he means about the same as *homology*, these correspond to five of his chapters, viz., Chapters IX, X, XI, XIII and XVIII. The pentalogies are as follows:

	Associations considered in	I. *Essentials.*	II. *Constituents.*	III. *Categories.*	IV. *Processes.*	V. *Products.*
1.	Classification:	Units.	Numbers.	Kinds.	Series.	Classes.
2.	Morphology:	Extensions.	Spaces.	Forms	Metamorphoses.	Organisms.
3.	Dynamics:	Speeds.	Motions.	Forces.	Energies or Powers.	Cooperations.
4.	Evolution:	Persistences.	Times.	Causations.	Metageneses.	Developments.
5.	Intellection:	Sensations.	Perceptions.	Apprehensions,	Reflections.	Ideations.

It will be perceived that the first three of these columns of associations correspond to series 2, 1 and 3, respectively, viz., essentials, constituents, and categories, except the fifth and last term in each case, where sensation is substituted for consciousness, perception for judgment, and apprehensions for concepts. It will be further observed that the five associations considered in intellection are neither more nor less than the five faculties of intellection. We have, however, in this presentation, two series of principles that have not been previously considered among the pentalogic properties. These are seen in the two last columns. Some of the terms have been dealt with in previous chapters. The last terms of these series are the two highest faculties, reflection and ideation. Metamorphosis and metagenesis are treated in Chapter V as processes or properties of geonomic bodies, along with other apparently coordinate processes, such as *metalogisis* (an etymologically impossible word) and *metaphysisis* (for which *metaphysis* would have done as well and been correct); but these do not appear in the present connection. Cooperation is the subject of Chapter XII, and development does not so greatly differ from evolution, which is the thing with which it is said to be associated, and is the subject of Chapter XIII. These two new series seem to belong immediately after the categories. The first may be called *processes:* (1) series; (2) metamorphoses; (3) energies or powers; (4) metageneses; (5) reflections. The second may, perhaps, be called *products* or resultant conditions: (1) classes; (2) organisms; (3) cooperations; (4) developments; (5) ideations.

In his final summary (p. 413) the author throws some further light upon his general conception of these interrelated principles. He says that the constituents 'develop into' the categories, and that in so doing both the essentials and the variables 'become' something else, which gives rise to two other new series, here introduced for the first time in any systematic way, although, as in the cases last considered, many of the terms have been discussed, and several of them are the same in form at least as the terms of other series,

but seem here to have entirely different connotations. From his language at this point the following tabular arrangement seems justified:

Constituents.		*Categories.*	*Essentials.*		*Varieties.*		
1. As number develops into		class	unity	becomes kind	and plurality	series	
2. As space	" "	form	extension	" figure	" position	structure	
3. As motion	" "	force	speed	" velocity	" path	inertia	
4. As time	" "	causation	persistence	" state	" change	event	
5. As judgment	" "	conception	consciousness	" recollection	" choice	inference.	

No names are given to the series represented by the fourth and sixth columns of this table. The first, third and fifth columns are those respectively of the constituents, the essentials and the variables. The second column would correspond to the categories had he not transferred the first term, kind, to the fourth column, and put 'class' in its place. Perhaps the reverse was intended, and this would seem every way more logical. Making this change we would have as one of the new series: (1) class; (2) figure; (3) velocity; (4) state; (5) recollection, and as the other: (1) series; (2) structure; (3) inertia; (4) event; (5) inference.

Twenty of these cosmic series of philosophic principles have now been enumerated. Others could probably be worked out of the text even as it stands, and the author is doubtless conscious of many more. It may be well to repeat that all these correlations are stated in the form of simple discussions and the tabulation has been made from these. Gaps are often left that must be supplied from remote parts of the book, and in a few cases terms are wanting and have had to be selected from the obvious meaning of the context. The author will, therefore, probably criticise these condensations or perhaps repudiate many of them altogether. The only apology that can be made is that this seemed the only way of putting the contents of the book into a form which could be readily grasped, and if it does not correctly represent the scheme it shows at least that the scheme cannot be understood in its present form. Even should this presentation be accepted in its main aspects it seems doubtful whether it will convey a clear idea to all minds. The terminology is so different from any hitherto employed that attention is constantly arrested on the words at the expense of the meaning. The practice of neoterism has been aptly compared to putting cannon balls inside of bales of cotton whereby their force and effectiveness are destroyed. The strongest writers are not those who use the greatest number of new words, and such a style as Huxley's abundantly proves that the English language, clumsy genetic product as it is, is capable of conveying the deepest scientific and philosophic truth and of expressing the highest and finest shades of thought. The golden rule is never to introduce a new word when an old one will serve the purpose. Major Powell's method reverses this, and he seems never to use a word that has a popular acceptance if he can find a synonym, however rare, or can coin a new term. His use of *demotic* for social, already pointed out, is simply one example in a hundred that might be named. More confusing still, perhaps, is his employment of old words in new senses, as, for example, his use of *apprehension* as a mental faculty, with its opposite *misapprehension*, both of which are in common use with definite though highly derivative significations. His category *kind*, in place of the Kantian *quality*, conveys to the average mind scarcely any idea at all.

We know what his answer to all this

would be, as he never tires of repeating it, viz., that the bane of all thinking is the use of the same word in different senses, whereby the ideas are confused by the sounds of the words. But must we make a new language to obviate this? Is it not due to the muddle-headedness of those who use the words? And will not order come out of this chaos when people learn to think clearly irrrespective of words? It may be compared to the agitation about phonetics. Our language has only 26 letters, but over 40 sounds, and yet many of these letters have several sounds. The spelling reformers say this is illogical. There should be just as many letters as sounds, and each letter should have one sound and one only. All this is true, and no one disputes it. But it is a condition and not a theory that confronts us, and it is found that our alphabet, with all its admitted defects, is capable of forming all the words of the language. Both the forms and the meanings of words are products of evolution and have had their history and genesis, and this evolution is constantly going on far more rapidly than the radical reformers suspect in the direction of rationality and logicality. It is, indeed, observed that attempts at hasty reform in orthography tend to arrest natural development and fossilize language, as witness the practice of dropping the syllable *al* in all adjectives in *ical*, which interferes with an obvious natural differentiation in the meaning of the short and long forms, clearly seen in the difference already acquired between such words as *historic* and *historical*, *politic* and *political*, *microscopic* and *microscopical* (what, for example, would a microscopic society be?).

The natural impulse is to ignore the deficiencies that one sees in a work of this nature and take up the enumeration of the many sterling qualities that it so manifestly possesses, but aside from the fact that this would be quite useless to the reader, since he will see them for himself, one is here confronted with so many actual difficulties in the way of the comprehension of the scheme that it seems necessary to devote whatever space may be left after this attempt at exposition to the consideration of a few at least of these difficulties. There is certainly one salient feature of the work that demands a passing notice. It claims to be 'the Philosophy of Science,' as opposed to 'Idealism,' on the one hand, and 'Materialism,' on the other, and a large part of it is devoted to soundly belaboring both these spurious systems, but especially what the author calls *metaphysics*, which rests upon idealism. The arch-enemy of Truth and chief source of Error is the philosophy which reduces the universe to a subjective state of the thinking or knowing mind. What is elsewhere called 'epistemology,' and is defined as 'the theory of knowledge,' proves uniformly to be a theory of no-knowledge, or a proof that the mind can know nothing but its own states. Major Powell calls this book a treatise on epistemology (which is always written 'epistomology,' as if it had to do with the digestive rather than the cogitative apparatus). But, unlike the current epistemology, its aim is to show that there is an objective, knowable world, the world with which science so effectively deals. All this is well, and no scientific man can object to it. But how does he succeed in this? When, as at the threshold, he approaches the nature of matter he is baffled as completely as the school boy, or as the other savants who have grappled with this problem. He seems to think, however, that he has found a way out of the difficulty. Between the thesis and the antithesis of the second Kantian antinomy he thinks he has found a Hegelian synthesis. This compromise or reconciliation consists in maintaining, as the term implies, that the five 'constituents' *constitute* matter. These constituents, as

we have seen, are number, space, motion, time and judgment. They must all exist in every particle, but besides and beyond them there is nothing. They *are* matter. Sometimes (*e. g.*, on p. 119) he calls these the 'properties of matter.' At other times he seems to talk as though it were rather the five 'essentials' or 'manifestations' (unity, extension, speed, persistence, consciousness) that really 'constitute the particle' (p. 183). But at any rate there is nothing but these properties or manifestations, and when he speaks of 'substrates' he calls the essentials the substrates of the corresponding variables (plurality, position, path, change, choice), and does not mean any real substrate of which any one or all of these attributes can be predicated. Now, to the ordinary mind, or naïve intellect, such things as space, time, motion, or as extension and speed (rate of motion), seem to be wholly immaterial. Some of them, as space and time, are mere conditions under which things exist. Motion we must agree with him in regarding as a state in which all matter always exists. Extension is a property that matter *possesses*. But when Major Powell refers to space he says he does not mean 'void space,' which he says is a pseud-idea. Yet most persons can clearly conceive of void space. He must refer to the matter that is in space. This is simply a question of language. When he speaks of time he says he does not mean 'void time, but the time of states and events' (p. 253). But any one can 'think away' the whole universe of matter and both space and time will remain. He says there is no such thing as void space, and many passages indicate that he accepts the *plenum*. Although this is inconsistent with motion, and even with number, except unity, it will seem to many that if matter is made up of such intangible constituents as space, time, extension, speed, and judgment it makes very little difference whether the universe is *full* of them or not. Like the deathless Shades of Walhalla, hack and hew them as you may, they will instantly regain their forms and return to the combat.

By thus constructing the material universe out of five immaterial elements Major Powell seems to think that he has made his peace with the idealists and won the right to turn upon the materialists. It cannot be denied that he has evolved a system as thoroughly ideal as that of Berkeley, and about the only difference between it and the Berkeleyan idealism is that it consists of five nothings instead of one. For the last of the Powellian nothings, judgment, consciousness, etc., is the whole of the Berkeleyan nothing, mind, and the Hegelian *Nichts*, thought. But are not consciousness, mind, thought, real things and important things? Undoubtedly, and so are justice, honor, truth, freedom, yet no one thinks of making these the constituents of matter and the contents of the material universe. All these numberless terms of elevated and refined thought and sentiment stand for *relations* subsisting among material things, but which are themselves necessarily immaterial, as much so as distance or direction. The number and kinds of relations are innumerable. By a little convenient expansion the term may be made to include space, time, motion, extension, velocity, persistence, resistance, judgment, consciousness, feeling, thought, mind, love, sympathy, virtue, justice, truth, liberty, peace, ambition, character—all the higher and more evolved conceptions of intellectual and emotional beings. But if any one prefers to call them properties, attributes, or even qualities, there need be no objection; they may be any of these things, but they are not matter nor the constituents of matter. Major Powell says that the metaphysicians 'reify' mere properties or attributes. He has reified abstract relations and constructed a phantom world out of nothing.

There is one other favorite idea in this book which it is difficult to resist touching upon, however lightly. It is the doctrine of *hylozoism*, which the author approaches at first haltingly and doubtingly, but which before the close assumes the form of a full-fledged dogma without the acceptance of which it is almost admitted the whole structure falls to the ground. Really there was no occasion for the initial timidity, as the doctrine is backed up by a long line of the best thinkers of all ages. In fact, it is one of those conceptions which cannot be escaped by the mind if only it goes on to the logical term in its reasoning, and it has never been gainsaid in any legitimate argumentation. There need, therefore, be no quarrel as to the notion itself that the highest attribute of nature, call it mind, soul, spirit, thought, or what you may, resides also in the lowest and simplest form of existence. No true philosopher will or can deny this proposition. The 'fallacies,' to use Major Powell's regular word for the errors of human reasoning, all occur in the mode of approaching this great truth. It is so in the present case. His fallacy lurks at the outset in the fifth and last term of the first three or four series of cosmic principles—in the terms judgment, consciousness, concept, choice, etc.—terms which connote psychic processes not introduced in the course of evolution until the cosmic stage had been passed and the organic stage had been ushered in. The fallacy is most manifest in the discussion of the terms 'affinity' and 'choice.' Here our author becomes thoroughly metaphysical. On pages 40 and 41 he says: "We have now discovered that there is an additional property of the inanimate particle when it is incorporated, and that this is affinity. All we know of affinity is that it is the choice of one particle for another as its associate or as their mutual choice. Here we are introduced to the multitudinous phenomena of affinity which can be explained only as choice." On pages 188 and 189 he further says: "The primal law of evolution seems to be psychic. We shall call it the law of affinity and define it as choice of particles to associate in bodies." Finally, on page 267, he asserts that "the ultimate particles of inanimate bodies have self-activity in so far as they manifest choice or affinity." Now this is not 'reification,' which belongs to the metaphysical stage of thought in Comte's celebrated *trois états;* it is 'imputation,' which belongs to the first or fetishistic phase of the theological stage, which, as Major Powell has elsewhere so ably shown, characterizes the thinking of the primordial savage. To the glorious company of Chuar, Spencer and Hegel, Powell must surely be added!

The whole idea of choice or affinity is anthropomorphic. It is to be compared with the popular idea of attraction, or gravitation as produced by one body drawing another through void space; an idea, by the way, which Major Powell justly assails as essentially metaphysical, involving the *actio in distans*, and demanding a belief in some sort of magic. There is no difference between the attraction of bodies and the affinities of atoms, so far as this principle is concerned. To call it 'psychic' is an anachronism. To say that the action of a magnet or an attracting body, or the behavior of chemical substances toward one another, is judgment, or consciousness, or choice, except metaphorically, is to ignore the vast series of steps in evolution which separate the chemical atom from protoplasm and span the chasm between the inorganic and the organic worlds. Hylozoism simply asserts that the elements and raw materials are there, even at the bottom of the scale, but it does not say that a bank of clay is a house of brick, or that a block of marble is a Venus of Milo. The worst feature of this doctrine, which pervades the work and

affects the whole scheme, is that it is quite unnecessary and superfluous. If, as the law of the conservation of energy demonstrates, all matter exists in a state of motion which is as unchangeable and indestructible as matter itself, is its one essential attribute, what more is required? Is not this the true 'self-activity,' the true hylozoism? Everything else follows from this. Every higher manifestation is the result of aggregation, of compounding and recompounding—in a word, of organization, first chemical, then biotic, then psychic. All differences are differences of degree, and the universe is one.

The last question to be asked is: Why pentalogic? Is the universe really a quincunx? Or has it been forced to take this form? We all know how strong the love of symmetry is in man, and too great symmetry in a treatise claiming to be scientific stamps it as artificial if nothing more. It has been said that nature makes only individuals and man make species, genera, families. The real world will not fit into our square or round or oval frames. The mind strains to make it fit. The search for analogies has been universal. The old cosmologies largely go by numbers—by threes, or fours, or fives, or sevens, or twelves. Reasons for this are always at hand—the number of fates, of points to the compass, of fingers on the hand, of days in the week, of tribes of Israel, of apostles, etc. There has never been any difficulty in making a philosophical system conform to any of these charmed numbers. Instead, therefore, of strengthening his argument by referring (p. 112) to the well-known origin of the decimal system in the number of digits, and declaring that 'the universe is pentalogic,' Major Powell has thereby greatly weakened it by an analogy devoid of the least causal connection. Every biologist knows that it was an accident that in the phylogenetic development of the higher animals, from the many-boned fins of fishes through the multidigitate *Dipneusta* to the five-toed Batrachians, the reduction of digits happened to be arrested at this stage. Really, though, it never was arrested, but went on through the cloven-footed ungulates, until in the horse the number was reduced to one; so that the horse is the most highly developed animal, as Professor Cope and Dean Swift agreed in asserting. But this theological argument is further demolished by the superiority of other than pentalogic systems, the duodecimal, and especially the octonal. If four instead of five had been the magic number no one can calculate the economy it would have wrought in human affairs.

The direct study of nature reveals everywhere irregularity, heterogeneity, amorphism, chaos; and however laudable the effort to reduce this anarchy to law and this chaos to cosmos, any attempt in this direction which goes beyond the limit set by concrete facts is, by minds trained to the scientific habit, dismissed at once as not science, whatever else it may be.

It seems a pity that a book which is obviously the product of such prolonged and profound philosophical meditation by a mind so well stored with scientific knowledge and direct experience with the real world should be handicapped in the manner here pointed out. The above specifications in this regard are not meant for criticisms. They are made rather to prepare the reader for what he may expect in the hope that he may ignore them as far as possible and persevere to the end, assuring him that, read in the right spirit, this book will furnish food for reflection and new views of science and philosophy. Meanwhile we commend to the author the two following passages from his book:

"For some purposes of discussion a schematization may be of more or less value, but it easily degenerates into illogical

classification, especially when it becomes the foundation of a philosophy." (Pp. 119–120.)

"The true method of classification is not by invention, but by discovery." (P. 113.)

LESTER F. WARD.

INCONSIDERATE LEGISLATION ON BIRDS.

THE following bill has passed the House, and, as amended by Senator Hoar, has met with the approval of the Senate. If the amended bill meets with the approval of the House Conferees it will probably become a law:

An Act to Extend the Powers and Duties of the Commission of Fish and Fisheries to Include Game Birds and Other Wild Birds Useful to Man:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that the United States Commission of Fish and Fisheries shall hereafter be known and designated as the United States Commission of Fish, Fisheries and Birds. The duties and powers of said commission are hereby enlarged so as to include the propagation, distribution, transportation, introduction and restoration of game birds and other wild birds useful to man. For such purposes they may purchase, or cause to be captured, such game birds and other wild birds as they may require therefor, subject, however, to the laws of the various States and Territories in which they may conduct such operations.

The object and purpose of this Act is to aid in the restoration of such birds in those parts of the United States adapted thereto where the same have become scarce or extinct, and also to aid in the introduction of new and valuable varieties or species of American or foreign birds in localities where they have not heretofore existed.

Said Commission shall from time to time collect and publish useful information as to the propagation, uses and preservation of such birds.

And the said Commission shall make and publish all needful rules and regulations for carrying out the purposes of this Act, and shall expend for said purposes such sums as Congress may appropriate therefor.

The Amendments are as follows:

That the importation into the United States of birds, feathers or parts of birds for ornamental purposes be and the same is hereby prohibited: *Provided, however*, That nothing herein contained shall be construed as prohibiting the importation of birds for museums, zoological gardens, or scientific collections, or the importation of living birds or of feathers taken from living birds without injury to the bird. The Secretary of the Treasury is hereby authorized to make regulations for carrying into effect the provisions of this section.

That the transportation of birds, feathers or parts of birds, to be used or sold from any State or Territory of the United States is hereby prohibited. Whoever shall violate the provisions of this section shall, upon conviction in the district where the offense shall have been committed, be punished for each such offense by a fine of $50.

That the sale, keeping or offering for sale, within any Territory of the United States, or within the District of Columbia, of birds, feathers or parts of birds for ornamental purposes, except such as are excepted in the first section of this Act, be and the same is hereby prohibited. Whoever shall violate the provisions of this section shall, upon conviction, be punished for such offense by a fine of $50.

In view of the high grade of ornithological work which the Department of Agriculture has already performed, and of the eminently scientific character of its personnel, it seems a great pity that work so clearly of an agricultural nature should be given to the Fish Commission, a department which has neither the experiment stations, the men nor the means to effectively undertake such duties, and whose hatcheries are in localities so remote from sources of supply that the work can only be done, if at all, at a great sacrifice of time, money and energy.

The introduction of new species into a country is, in any case, a dangerous ex-