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ON EGG-STRUCTURE AND HEREDITY OF INSTINCTS.

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THE instinctive actions of animals are hereditary, and can only be transmitted through the sexual cells. The problem of heredity from the physiological standpoint is, in brief, as follows: How can an egg, a simple vesicle filled with a viscous liquid which contains some solid consituents, be the bearer of such complicated mechanisms as the hereditary instincts? Two views are possible *a priori*: either the simplicity and homogeneity of the egg is only an illusion, and in reality it contains an invisible mysterious structure, of a similiar degree of complexity to the adult animal; or the complicated mechanism of the instincts is the result of very simple circumstances which do not require any complicated structure for their transmission through the egg. All other possible suppositions are only compromises between the two possibilties. We shall here briefly present an argument in favor of the latter solution, which, we hope, will do away with some of the mystic aspects of heredity, and render a number of very complicated, albeit ingenious, theories redundant.

I.

The first view, which has been of late very ably expounded to the readers of *The Monist*, is held, among others, by Nageli and Weismann; not so much, however, for the sake of accounting for the heredity of instincts as for the explanation of the continuity of the forms in general. As the mysterious egg-structure which this theory presupposes is admittedly invisible, it is impossible to prove its non-existence. To the second view we are necessarily led when we attempt to analyse the instincts into their elements, which will deprive them of much that seemed very mysterious before. A few salient examples will be sufficient to throw a new light on the subject.

1. The larvæ of a certain butterfly (*Porthesia chrysorrhea*) hatch in Germany in the fall and hibernate in large numbers in a web on trees and shrubs. The warm spring sun drives the larvæ out of their nest, and they creep upward on the branches of the tree until they reach the highest points, where they find in the young buds their first food. As soon as they have eaten, they creep down on the branches until they find new buds or leaves which in the meantime have appeared in abundance. It

is apparent that the instinct of the caterpillars to creep upwards after they awake from their winter sleep saves their lives. If they were not guided by such an instinct, those that crept downwards would perish from lack of food. How can such an instinct be transmitted by a single cell?

Experiments which I made eight years ago prove that the young caterpillars of Porthesia, as long as they are starving, are oriented by the light, i.e., the light causes them to bring their plane of symmetry into the direction of the rays of light, and to turn their oral pole toward the source of light. This process is purely mechanical. The light produces in the skin of the animal a change (probably chemical), and this produces, through the central nervous system, changes in the tension of certain muscles. Suppose the light falls upon the right side of the animal. This would lead to an increase in the tension of the muscles which turn the head and body of the animal to the right. As soon as the head of the animal is turned to the source of light and its median plane is in the direction of the rays, the symmetrical points of the surface are cut by the rays of light at the same angle, and the chemical effect of the light is the same in each pair of symmetrical points of the surface of the animal. Correspondingly, the symmetrical muscles of both sides of the body are under equal tension, and there is no reason why the animal should deviate more towards one side than towards the other from the direction of the rays of light. Thus the animal goes towards the source of light. I may mention here, by the way, that this is also the mechanism by which the moth is forced into the flame. There is no such thing as an attraction of the moth by the light, but its fatal flight is only due to an orientation. We call those animals that are forced to turn their heads towards the source of light, and that consequently go towards the source of light, positively heliotropic.

Positive heliotropism of the young caterpillars of Porthesia leads them to the tips of the branches where they find their food. During the cold of winter they are rigid and immovable, the higher temperature of spring produces a chemical change in their bodies which causes them to move. The direction of motion, however, is dictated by the light. In the open air, where the light of the sky falls from all sides upon the animals, we may decompose each ray of light into a horizontal and vertical component. The horizontal components annihilate each other, and only the effect of the vertical component will remain. The animal, therefore, on account of its positive heliotropism, must creep upwards until it reaches the tip of a branch. Here it is held by the light. The chemical stimuli which are given to the animal by the young buds, determine, in a machine-like way, the feeding motions.

From these data we are able to answer the question, how much of a structure must be contained in the egg of Porthesia, in order to render possible the heredity of this curious instinct of the young caterpillars? The answer is, the egg must contain, first, a substance which is sensitive

to light. This is possible without any complicated structure, even if we assume that the egg is only a mixture of different unformed substances. But this is only one of the elements which determine the positive heliotropism. The second circumstance is, as we have seen, the bilateral symmetry of the animal. For the transmission of the instinct, this, too, must be determined by the egg. This makes it necessary that a difference of the ventral and dorsal, of the oral and aboral pole is already intimated in the ovum, or originates early during the development. An unequal distribution of the substances of the egg would suffice to bring about this peculiarity.

But we have seen that the same larvæ, as soon as they have eaten, leave the tips of the branches and creep downwards. Why does the light not hold them permanently at the highest point of the branches? My experiments showed that the caterpillars of the animals are heliotropic only as long as they are starving, while they lose their heliotropism as soon as their are fed. This is not the only observation of this kind, for I have found a series of facts which show that chemical changes influence the irritability of the animal towards the light. We may imagine that the taking up of food either leads to the destruction of the substances which are sensitive to light, or leads to changes which inhibit their action. Thus the analysis of the curious instincts of the caterpillars of Porthesia does away with all complications, which might very easily lead to the assumption of mysterious structures in the egg.

2. While in this case, the external circumstances lead the young offspring to the feeding places, there is a second class of instincts in which the female deposits its eggs at places where the hatching larvæ find their food. A simple example of this group of instincts is the deposition of the eggs of a common fly. They lay their eggs upon putrefying meat, or cheese, and these substances are material upon which the young larvæ of the fly feed. I have often made the experiment of putting pieces of fat and of meat from the same animal side by side in front of the window, but the female fly never made a mistake; the eggs were always deposited upon the meat and never upon the fat. Moreover, I tried to raise the young larvæ upon fat. As was to be expected with this kind of food they did not grow and soon died. It was possible to find out in these young larvæ the mechanics of this peculiar instinct of their mothers. The larvæ are oriented by certain chemical substances which emanate from a centre, and this orientation takes place in the same way as the orientation of the larvæ of Porthesia by the light. The rôle which the ray of light plays in the heliotropic experiments is played in these experiments by the lines along which the molecules are carried away from the centre of diffusion into the surrounding medium. The chemical effects of these molecules upon certain elements of the skin influence the tension of the muscles in somewhat the same way as the rays of light do in heliotropic animals. We call the orientation of an organism through diffusing molecules, chemotropism, and speak of positive

chemotropism if the animal is forced to bring its axis of symmetry into the direction of the lines of diffusion, and to turn its head towards the centre of diffusion. In this orientation again, each pair of symmetrical points of the surface of the animal is cut at the same angle by the lines of diffusion. It can easily be shown that the larvæ of the fly are positively chemotropic towards certain volatile substances, which are formed in putrefying meat and cheese, but which are not contained in fat. The substances in question therefore are volatile nitrogenous compounds. The young larvæ of the fly is guided by these substances to the centre of diffusion in the same way that the moth is guided into the flame. The female fly possesses the same positive chemotropism for these substances as the larvæ, and is therefore led to the meat. On the meat chemical stimuli seem to produce in the form of a reflex the deposition of the eggs. Neither experience nor conscious choice plays any rôle in these processes.

If we raise the question, what must be contained in the egg in order to transmit this instinct, we see that again two things are necessary. First, the presence of a substance, which either is influenced directly by the above-mentioned volatile compounds contained in putrid meat, or from which such changeable substances can originate. Secondly, conditions which lead to a bi-lateral symmetry of the embryo. But neither of these two conditions presupposes any mysterious structure in the egg, such as Nägeli, Weismann and others assume.

3. A third group of instincts is represented by the periodic migrations of animals. I select as an example the periodic depth migrations of sea animals. I should have preferred the more popular instance of bird migrations, if it were not for the fact that we can experimentally analyse the migrations of sea animals, whereas the migrations of birds have not yet been, and cannot very well be, submitted to experimental research. A number of sea animals begin to migrate upwards towards the surface of the ocean in the evening, while in the morning they begin to migrate downwards. But the remarkable circumstance is, that these forms never go deeper than four hundred metres. The latter circumstance points out the light as the moving force in these deep migrations. Water absorbs light and the thicker the layer of water the more light is absorbed. It has been found that at a depth of four hundred metres a photographic plate is no longer affected. The animals which live free at the surface of the ocean, as far as I have been able to examine them, are all positively heliotropic. Those among them which undergo daily the above-mentioned periodic migration into the depth, possess some peculiarities which can only be understood if we go a little deeper into the theory of animal heliotropism.

In addition to animals that are positively heliotropic, there are others that are negatively heliotropic: they bring their median plane also into the direction of the rays of light, but turn their *aboral* poles to the source of light. The difference between negatively and positively heliotropic

animals is determined by the following circumstance: If the light falls upon one side of a positively heliotropic animal, an *increase* takes place in the tension of those muscles which turn the head of the animal towards the source of light, while in negatively heliotropic animals under the influence of one-sided illumination a *decrease* of the tension of the same muscles takes place. The consequence is that these negatively heliotropic animals are forced to move in a straight line away from the source of light, while the positively heliotropic animals are forced to move towards the source of light. Groom and I have examined the heliotropism of the larva of a crustacean *Balanus perforatus*, of which it was known that it undergoes such a periodic depth migration. One of the results of our experiments was that these larvæ are sometimes negatively and sometimes positively heliotropic, and we succeeded in making them positively or negatively heliotropic at desire. In weak light, especially in gas light, which contains relatively few blue rays, they became and remained positively heliotropic; while, in strong light, they invariably became very soon negatively heliotropic. This determines the depth-migrations of these animals. If in the morning they are near the surface of the ocean, the strong light makes them negatively heliotropic, and forces them vertically downwards, as only the vertical component of the reflected light of the sky can orient these animals in the open sea. But as soon as they approach a depth of four hundred meters the light becomes so weak, that they now become positively heliotropic. Thus they are kept suspended during the day time at a certain depth, which, however, is less than four hundred metres. But as soon as it grows darker and the intensity of the light in the water begins to decrease more and more, they must on account of their positive heliotropism, ascend into constantly higher regions; until during the night, when the intensity of the light is weak, they are held at the surface of the sea. In the morning they again become negatively heliotropic, starting their downward career over again.

But there is also another depth migration of a larger period, which corresponds more to the migration of the birds. In the Bay of Naples, as Chun has found, certain animals remain during summer, even during the night, at a greater depth without ever coming to the surface. This is probably caused by the higher temperature which makes certain animals, even in weak light, negatively heliotropic, while the same animals, at a lower temperature, remain positively heliotropic, even in the strongest light. I found these reactions among others in larvæ of *Polygordius*.

We therefore see that the instinct of migration, as far as it appears in the periodic depth-migrations of marine animals, can be explained by the presence of a substance which is sensitive toward light but which undergoes certain modifications with the change of light or temperature; and we can easily understand that a simple cell like the egg can be the carrier of this substance or some other substance from which it originates.

4. A number of animals show habits which we might, perhaps, call protective instincts. Such animals hide in crevices or burrow. Thus they escape their enemies. For the heredity of this instinct equally simple circumstances suffice as for the heredity of the instincts characterised above. I have found that animals which force themselves into crevices do not do this in order to escape their enemies, but that these animals are forced to bring their bodies into contact with solid bodies. This kind of irritability is found in *Forficula*, in certain kinds of butterflies (*Amphipyra*), in larvæ of many insects and worms. If one puts two plates of glass one above the other and so near that they are only separated by a small space, the above-mentioned animals force themselves between the two plates. They even do that when the plates are exposed to the full sunlight, in which case they are, of course, not protected from their enemies. They do it, moreover, when one-half of the box in which they are is quite dark, but does not offer them any such contact-stimuli as the two plates of glass.

This apparent protective instinct is a tropism of a similar kind as heliotropism, with this difference only, that contact instead of light forms the cause of orientation. I called this class of phenomena orientation stereotropism. In a hydroid, Tubularia, the polyp is negatively stereotropic, that is to say, it bends away from a solid body with which it comes in contact, while the root is positively stereotropic.

This peculiar form of irritability appears to play a role in a process which is frequently quoted, viz., the founding of a new nest by ants. At the time of sexual maturity, the males and females of ants become very energetically positively heliotropic, and this heliotropism may possibly direct them in their wedding flight. They leave their nests and follow the direction of the rays of light in a swarm. Procreation takes place in the air. As soon as it becomes darker, stereotropism overcomes the influence of light, the animals fall down and creep into crevices where they are held by their positive stereotropism and where they now deposit their eggs.

How contact-stimuli can affect life-phenomena is less easily explained than in the case of light. Possibly the pressure or friction against solid bodies influences the chemical processes in the cells. It is possible, too, that capillary effects may play a role. In any case, purely metabolic conditions are sufficient to explain these instincts and to do away with mystical ideas concerning their transmission through the egg.

II.

Through the above-mentioned facts we have been led to the view that, as far as the instincts are concerned, there is no reason to suppose that the egg contains other mysterious complicated structures than such as might possibly be expressed in the formulæ of the chemist. As soon as we decompose the complicated instincts into their elements, we understand that a simple cell like the egg can be the bearer of complicated

instincts. The conditions in the egg which are required for this purpose are, to emphasize it once more, (1) polar differences in the chemical constitution in the egg substance, and (2) the presence of such substances in the egg as determine heliotropic, chemotropic, stereotropic, and similar phenomena of irritability.

But the egg is the bearer of another series of hereditary qualities, viz., of the animal's bodily system. Again we must raise the question how such a simple thing as the egg can be the carrier of circumstances which determine so complicated structures as are those of most animals. Again we have, *a priori*, the choice between two answers. Either the simplicity of the egg-structure is only an illusion, and we have in reality an invisible structure of the same degree of complexity in the egg as that of the adult organism; or, secondly, we do not require the mysterious structures for the transmission of such complicated mechanisms as seem to be necessary for the formation of organs, and comparatively simple conditions of the cellular substance in connection with external circumstances are sufficient to explain the mystery.

It is well known that the egg of a sea-urchin is at first a single spherical cell, which after fertilization breaks up into many correspondingly smaller cells, from which aggregation of small cells a hollow sphere originates filled with liquid, the so-called blastula. The wall of this hollow sphere is formed by the small cells of the egg. At this stage of development the larvæ are already able to swim around. A little later an increased growth takes place at one place of this hollow sphere, and the consequence is that this rapidly growing part is pushed into the interior of the hollow sphere. Thus the next embryonic phase is reached, the so-called gastrula stage. Finally, in certain phases of the gastrula, crystals of calcium salts are formed, and the skeleton originates, with the formation of which the embryo enters the so-called pluteus stage.

What must be contained in the egg in order to cause this succession of larval stages which finally lead to the adult form of the sea-urchin? If we analyze the conditions which lead to the origin of these successive stages, we see that circumstances of no less simplicity are sufficient as for the heredity of instincts. The blastula is determined through two circumstances: (1) through the fact that the spherical egg is surrounded by sea water, and (2) that the osmotic and metabolic qualities of the protoplasm of the egg are of such a nature that liquid is pressed from the water into the interior of the sphere. In addition, capillary forces between the cells probably play a role, too, in the arrangement of the wall of the blastula. Thus the cavity of the blastula is formed. Therefore the egg does not need any other qualities for the heredity of the blastula stage than certain chemical substances and the osmotic properties which are peculiar to almost all living protoplasms, and which we can imitate in the laboratory in artificial membranes.

The formation of the gastrula from the blastula presupposes that two different substances are present in the egg, which form the ectoderm and

the entoderm. These may be separated from the beginning, and this would harmonise with the assumption which we have made in regard to the instincts, viz., that the different poles of the animal are already intimated in the unicellular egg by a corresponding distribution of the different substances. But it is not even absolutely necessary that this separation exists already in the original egg-shell. It is quite possible that migrations of substances take place in the blastula through osmosis, which lead to a gathering of specific entodermal substances at a certain place in the blastula. Here the entoderm is formed and invagination into the cavity of the blastula takes place.

The formation of a skeleton is nothing but the precipitation of crystals of certain salts of calcium. The conditions for this are purely physical, and without doubt are determined through metabolism and osmotic processes. Through their action such an increase in the concentration of the intracellular or pericellular liquids is produced in certain places that these crystals must be formed. Thus again, as in the case of instinct, the analysis of the phenomena renders the assumption of mysteriously complicated structures in the egg unnecessary.

That this idea is correct can be proven by the following experiment: If one brings newly fertilised eggs of a Sea Urchin (*Arbacia*) into sea water which has been diluted by the addition of one hundred per cent. fresh water, the contents of the egg take up so much water that the membrane of the egg bursts. Part of the protoplasm flows out from the egg without becoming entirely separated from the protoplasm which remains in the egg. Both droplets of protoplasm outside as well as inside the egg assume a spherical shape. Thus the egg which normally has the shape of a sphere assumes the shape of a dumb bell. If these dumb-bell shaped eggs are brought back into normal sea water they develop. Very often, in fact in most cases, each of the two spheres of the dumb-bell will form a special blastula, so that such an egg gives rise to twins. The rest of the eggs form a single blastula, which in the beginning is dumb-bell shaped but which later on becomes spherical. The later development of the twins as well as the single blastula is in general a normal one. This result of the experiements corresponds with our proposition that the blastula is determined by the osmotic entering of liquids into the interior of the segmented egg. If the egg is dumb-bell shaped a secretion must take place into the centre of both spheres of the dumb-bell. If, in this case, the substance which connects the two spheres is not torn, we get two blastulæ and consequently twins. But if the hydrostatic pressure inside of the spheres or any other conditions bring about a communication between the liquid contents of the two hollow spheres, then only one blastula and only one embryo is formed. If the egg contained a mysterious structure which pre-determined the future embryo, we should expect that *one distorted* larva would originate from the egg transformed into a doube sphere, and not two or one perfect larvæ, as is generally the case.

Still another field of phenomena makes it impossible to attempt to lead back the hereditary forms to mysterious egg-structures of a highly complicated nature. I mean the phenomena of heteromorphosis. By heteromorphosis we mean the substitution of an organ by another one which is different morphologically and physiologically. Tubularia, a hydroid, consists of a stem which carries on one end a polyp or head, and on the other end a root or foot. If one cuts off the foot and surrounds the wound with sea water from all sides, a new head is formed instead of a foot. We thus have an animal which has a head on each end of its body. But if we bring the wound into contact with a solid body, such as the bottom of the aquarium, a foot is formed. If we cut a piece out of the stem, which is only the size of a polyp, and surround it by water from all sides, a head is formed at either end, but as there is no material left between the two heads, we thus obtain Janus heads, without stem and foot.

These two kinds of experiments may suffice to intimate that as soon as we begin to analyse the process of morphogenesis, we find it unnecessary and even faulty to assume a complicated structure in the egg in order to explain the continuity of forms.

Finally, I should like to emphasise one circumstance which repeats itself in the history of science and especially biology. Whenever we are not able to explain complicated phenomena, we are at first inclined to imagine that their cause must be similar complication to the phenomenon itself. Thus the idea of an invisible complicated egg-structure was adopted in order to explain the heredity of instincts and forms, and thus the idea of mysterious structures of ganglionic cells are still held by many in order to explain the mechanism of reflex phenomena and instinct. All these attempts fail for the reason that they try to explain complicated phenomena without having them analysed into their simpler constituents. As long as we consider instincts as units which cannot be decomposed, we must naturally imagine the heredity of these instincts under the mental picture of a mysterious clock-work contained in the egg. But as soon as we analyse them, we are confronted with a very simple phenomena which make the idea of a mysterious invisible structure as the cause of these instincts unnecessary.*

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ROBERT G. INGERSOLL.

BY ADELAIDE LOUISE SAMSON.

THE subject of this article, Robert G. Ingersoll, is a man of aggression, who literally is untrammeled by canon or tradition; there is much of bulldog pertinacity noticeable in the lines of his face, and something of daring in the courageous glance of his blue eyes.

To have the courage of one's opinions is always a commendable thing, but when one throws the gauntlet in the face of orthodox Christianity it savors somewhat of the heroic. For more than twenty years, and antedating the days of the higher criticism and liberal preaching, Ingersoll has been arrayed against the church; in some measure the present modification of conservative Christianity is due to his scathing wit and eloquence. His lectures, "The Gods," "The Mistakes of Moses," "Brains and the Bible," were even more daring than his private utterances, and were listened to eagerly, and also read by a large class of persons who could not come in contact with his magnetic personality. Despite differences in opinion, few questioned but that he enjoyed the fight immensely; he is a military man and enjoys the smell of powder, and even from the first opening of polemic hostilities he knew in a measure something of the consequences. Ingersoll is a strong believer in heredity, and he certainly inherits his fierce honesty of speech from his father, the Congregationalist pastor whose pulpit utterances were so astonishingly broad that they created much perturbation among his worthy listeners. As a child and a lad, Robert Ingersoll was habituated to the ostracism and antagonism that follow free utterance, and he was accustomed at his father's table to hear the truths of the Bible openly discussed and as frankly doubted.

As he stands upon the lecture platform, with an easy poise and upright figure, one is impressed beyond all else by the intense earnestness and honest purpose of the man. He believes implicitly in himself and that his work is a good work. Almost too much weight has been placed upon his sallies of wit and humor. These are but side thrusts: they are remembered because they appeal to the popular taste for a laugh. His real speech is solid and well weighed. It falls word by word with a quiet dignity that is almost solemn, culminating oftentimes in a magnificent burst of eloquence. It is somewhat curious that churches may be empty, but the distinguished Freethinker can manage to fill the largest hall or theatre from pit to dome at each lecture.

Ingersoll is essentially a home man, and in all the assaults his aggressiveness has called forth, his integrity as a man of unblemished reputation has never been

assailed. Those only who have had the privilege of meeting him in his home, as the genial host, as the family man surrounded by his wife, daughters and little grandchildren, can form a true idea of the innate gentleness and sunniness hidden under his public mask of brusqueness and combativeness.

There is no suggestion of fashionable twilight in the great red brick house: it stands upon the sunny side of Madison avenue, in the most fashionable quarter, and every window is thrown open to the light and the breeze. Even before Mr. Ingersoll reaches the drawing-room his loud, ringing voice is heard calling out a cheery welcome from the landing of the winding stairs, and half-way down he reaches out a big, strong hand to give his guest a hearty hand-shake. His many generous acts, his beneficence toward the poor, the many struggling art students whom he has befriended, are some of his widely-known kindnesses. The only explanation he gives is: "I love humanity. I believe in happiness, and I believe that happiness is contagious. My two daughters," he continues, "have never known sorrow, and these two little people are brimful of brightness."

The two little persons referred to are Mr. Ingersoll's grandchildren, Miss Eva and Master Bobbie. It was the baby Eva who inspired the superb homily on "Life," the most widely quoted of Mr. Ingersoll's writings, and one that may justly be conceded to be classical in its exquisite wording.

"I believe that children should have no more knowledge of sorrow than a bird or a flower," Mr. Ingersoll remarks, as the two little ones run off laughing and throwing kisses.

It is remarkable how often the words "I believe" are repeated by the man who is supposed to be the foremost representative in America of what is termed unbelief. His thorough honesty in the merest trifles is even more accentuated in personal conversation than on the platform. No matter in what direction the conversation drifts—art, literature, music, or the graver subjects of life, death, and immortality—he speaks with rugged emphasis; and a frank "I do not know; I do not understand," is quite characteristic of the same convincing frankness that may be called the backbone of his character.

"We should be honest with our ignorances" (he says) "of what awaits us after death. Whether it be annihilation or immortality we can speak with no certainty. But who will deny that during the course of a lifetime we pass through at least three transitions that are deaths of the old self? There is, for instance, the development and passing away of the period of growth; then there is—the saddest of all—the decadence of the season of fruition and death.

"Man can never tell at what hour he may have reached the pinnacle of his intellectual life, nor for how long or how short a time he may remain on these mountain heights, nor what his vigor and strength may be. It is reached by all, but the descent is inevitable. Our best work, our best deed, sounds the knell of death. Thence, little by little, we reach the death of memory, until at last,

like a withered leaf, we fall from the tree and return to mother earth. Shakespeare recognizes this truth in one of the glorious passages which his genius has created."

A volume of Shakespeare, Mr. Ingersoll's favorite text book, is never out of reading distance, and, without turning his head, he reaches toward a table near by for the quaint looking volume bound in brown cardboard and shabby from long usage. It is a treat to watch him lingeringly flutter the leaves and to note the feeling in his voice as he reads a choice bit here and there.

"The truly great," he remarks reminiscently, "are the great thinkers, those who give the world new thoughts."—*The Metropolitan.*

GUID AULD SCOTLAN'.

BY W. PICKARD, LONDON, ENG.

I HAVE been in Scotland. I do not mean that I just went into Scotland and sat down. I did very little sitting. I may say mine was an active visit and a merry one; and if any Agnostic wants a summer outing, I advise him or her to hie away to the Highlands, and take bawbees with him, and bring them back if he can. I left mine, and I believe in hands capable of retaining most of them. I am bound to say I like the Caledonian wilds and the people too—when not too utterly good and too utterly certain there are no virtues elsewhere.

They help themselves to your bawbees with such an air of satisfaction that you very nearly like it yourself. The train and boat officials are just jolly—just and jolly; obliging to a degree unheard of in England, and do not expect gratuities, and in many cases decline them when offered, and do it pleasantly—a thing almost unknown on this side of the Tweed. They not only give you any information they can, but will endeavor to obtain it for you, if not in their possession, and do it pleasantly.

The journey on the West Highland Railway from Glasgow to Fort William is one to haunt you for an age. You wind in and out among the everlasting hills in a way that is ineffable. One of our gushing girls kept on crying out, "Oh for some new words." She had beggared the English language, and Gaelic she did not know, and I doubt if even Greek would have satisfied her. She had to find vocal relief in an English scream. We were continuously calling each other from the windows on one side to those on the other. It had rained thirty-six hours, and was still at it, in true Scottish style, and the waterfalls were innumer-

able, every hill was alive with them. Water was hurrying and scurrying down over the old grey rocks in every direction, not dwelling on the order of its going, but just coming down anyhow and every how, headlong, in foaming, fretful fury, as if in mortal fear lest the English tourists would find the lochs below empty. The corridor carriages on this line lend themselves admirably to the humours of a party—when there are no other passengers—and the rush from window to window was in order, and as we had an Irish B.A. and a Scotch professor who had Burns by heart and knew a Haggis at sight, and an English M.D. at call, we bid dull care begone. The sinuosity of this particular railway line is bewildering and enables you to see more lochs, tarns, hills, etc., than really exist. You wind round a glen on the hillsides, your eyes are wandering all over, and you do not note that the particular homestead or tarn or wood is the same you passed some time ago, and have now to your right hand, instead of to your left; and it is highly probable we counted the same mountain twice or even thrice—a method of enumeration apt to swell the total unduly. In the matter of waterfalls and small tarns or lakes, a good few of them were got up specially by the rain-maker for us, and had dislocated themselves on the return journey, so that I do not venture to put our grand totals before you. The idea of placing a map of the whole line on every window blind is one English companies might copy with great advantage to travellers: when we wanted to know where we were, or what the next station was, or what was the name of a particular lake, we pulled a blind down and looked it out on the map. We put this down, unanimously, as "one to Scotland," but we saw many fresh water lakes not provided for, and concluded they were like Duck Lake in the Orpheus C. Ker papers, only visible after heavy rains.

I have read all about the Scotch giants and their doings, but my recollections of them are confused, and I do not remember which of them it was (probably Mac Something-or-other) who made room for the Atlantic Ocean by gathering up the earth and rocks into his capacious basket. I forget too, what he was going to build, but I understand the basket was rather too open, and masses of rock, etc., fell through the gaps at short intervals and formed the numerous bens hereabouts. On arriving at Fort William, the perspiring Anak found so much of his load had leaked out that he threw the remainder down in disgust and so formed Ben Nevis. I do not vouch for this history as being correct, but it looks a reasonable sort of explanation of things as they are in the locality, and provided there ever was a giant big enough with an adequate basket, I see no reason for disbelief. If Rob Roy Macgregor O ever handled that stone at the head of Loch Lomond, as we are informed in guide books that he did, and it weighs 700 tons or so, I see no reason why still further back in the Scotch mists of antiquity there should not have been a Mac Something-or-other as aforesaid; besides, I fancy I heard him snoring at Dunoon. It is true they said it was the

Cloch fog horn, but we are not bound to believe that, and the sound was precisely such as I should expect to issue from the muckle Mac in his first beauty sleep. At first, I confess, I thought it was the wailing of the Banshee for the muckle laird, or the great Argyle, or the Lord Provost, or some Scotch Graciousness, but as it kept on all the weary night I concluded that unless all Scotland was doomed, it was the Mac Something-or-other having a nightmare with the usual musical garnishings.

Anyone in search of the grand and picturesque in nature, can find it in abundance in Caledonia, stern and wild. For those who like sailing without having to turn inside out in the effort to transfer yesterday's dinner to the fishes, Dunoon is as near Paradise as any agnostic is likely to get. You can sail a thousand miles per week at little cost and less danger, and no *mal de mer* to murmur at. It is true our English M.D. once handed his half-crown dinner to the sea gulls before he had quite got it all down, but no one followed suit. It was very exasperating, of course, and the assurance that no Scotchman would have done such a thing did not soothe him.

As an instance of the Scotch grip, a woman on board the "Columba" having got her ticket, promptly fell overboard—possibly having parted with so much silver was too much for her. She was fished up quite insensible, but gripping her ticket like grim death. When her nationality came in question, I pointed this out to the skipper, and he replied, "Ah, sure eneuch she's Scotch."

Remarking to our hostess at table that Scotch Sabbatarianism was disturbing the Sabbath, she remarked, "Yes, we keep the Sabbath," and letting her eyelids drop, added, "and maist ither things we can grip." Saying I had left my top coat on an empty box on the pier, she remarked, "that is bad." I replied, "Oh, but the Scotch people do not steal," she instantly retorted, "But there's English aboot the noo."—*The Agnostic Journal.*

THE MEN THAT ARE TO BE.

"MOURN not for vanished ages,
With their great heroic men,
Who dwell in history's pages
And live in the poet's pen;
For the grandest times are before us,
And the world is yet to see
The noblest worth of this whole earth
In the men that are to be."

—*Ella Wheeler Wilcox.*

SUPERNORMAL PREVISION.

BY B. F. UNDERWOOD, CHICAGO, ILL.

MOST people are given to prophesying more or less. They sometimes hit the truth, and sometimes miss it. Occasionally the predictions are recorded; but generally, when repeated, they are recalled from memory and related often with artful, frequently with undesigned additions or omissions, to make them correspond with events which have occurred. When predictions fail, and the failure is evident, they drop into forgetfulness, except when they are skilfully modified or twisted out of their original meaning, and ingeniously applied to events never thought of by their authors. They prove failures generally, in proportion to their circumstantiality and particularity of statement.

Yet we all possess, in some degree, the power to foresee coming events, to penetrate the veil which separates the present from what shall be, to mingle with the forms of an unborn age. With people generally, this power is limited; but sagacious minds, who have made some group of physical phenomena or some field of mental activity a special subject of study, can often forecast the future in respect thereto with such precision that their judgment carries weight, and their opinion, for instance, in regard to the weather or the crops, or election, business prospects, or the chances of peace or war, is highly valued. The statesman, the philosopher, the far-seeing man-of-affairs, may have powers of prophetic vision which to the ordinary appear to transcend human sagacity.

When Lincoln, in one of his famous speeches, said, "This nation cannot remain permanently half-slave and half free," he spoke from knowledge that freedom and slavery were antagonistic, and that the complete triumph of free institutions involved the extinction of that system of bondage which arrogantly claimed the right to extend its area and influence. When Rousseau said, "We approach a revolution," he foresaw that the wretchedness and increasing discontent of the oppressed people of France would lead to violence and the probable overthrow of the corrupt government. Predictions like these merely show the power of reasoning from cause to effect. We can foresee events in proportion as we understand the relations of things. As the past is related to the present, so is the present related to the future by links of cause and effect, by antecedent and consequent. These links can be followed, in many cases, with certainty. An eclipse of the sun or moon can be predicted to a minute, even to a second. Whether the eclipse will be total, partial, or annular, what part of the sun or moon will be covered first, how long the eclipse will last, and from what parts of the world it will be visible,—all these facts can be accurately told years and centuries

ahead of the time of their occurrence. Such foreknowledge is acquired by observation and reasoning.

Is there a power of foreseeing what cannot be learned by observation and induction? Something apparently prophetic is seen in the instincts of animals. One generation anticipates the needs of the next. Under the mysterious influence of instinct the lower forms of life seem to show wonderful foresight in providing for the sustenance of offspring which they in some cases never see, as though to compensate for their not being allowed to have personal care of them. The instincts of some of the lower animals are, in regard to changes of the weather, more unerring than is the reasoned thought of man. They are sensitive to the influences which elude our search. The hedgehog fortifies its cave, with unfailing precision, against the coming storm; and the stormy petrels collect in the wake of a ship before a storm. The first suggestions of warnings of storms on our coasts were those of Dr. Merryweather, at the Exhibition of 1851, when he showed a living barometer, consisting of leeches, which rang little bells when a storm was impending. Certain plants, like the "poor man's weather glass," shut up their petals before a rain-storm. Not only flowers, but the leaves of plants, give warning of the approaching change.

Some persons are so sensitive to electrical and magnetic changes which precede a thunder-storm that they have foreknowledge of the storm when there is not a cloud visible in the sky. They do not know how they obtain this knowledge. In some way, they are affected by vibrations to which most people are not susceptible. Our conscious intelligence is not our entire mental life. Our discursive reason is not the only faculty by which we reach decisions. All who have carefully examined the powers of "mediums," or "psychics," or who are familiar with the results of psychical research, are satisfied that there are some supernormal means of obtaining knowledge. The experiments of Prof. William James, of Harvard University, of Prof. Oliver J. Lodge, of University College, Liverpool, and of Dr. Richard Hodgson, and others with Mrs. Piper, may be mentioned among those which prove, beyond doubt, the reality of this power. It is manifested in clairvoyance and telepathy and, apparently, in what is claimed to be quite well attested,—supernormal prevision, which, it is alleged, may be indistinct, vague, or may take the form of a clear conception and foresight of a definite future event, may relate to important events or to those of apparently trivial character, may be a mere apprehension or a conviction of certainty.

Cicero speaks of "that which does not take place from supposition, observation, or well-known signs, but arises from an inner activity of the mind in which men are enabled, by an unfettered advance of the soul, to foretell future events." The testimonies and illustrations in regard to this prophetic and premonitory power, both ancient and modern, are very numerous; and it is not uncommon to meet intelligent and trustworthy persons to-day who relate personal experiences implying

foresight beyond that of the reasoning mind. In some of these cases that have come within the writer's knowledge there was a circumstantiality in the statement of what was to occur and did occur which precluded the possibility of the correspondence between the prediction and the occurrence being a mere accident or coincidence.

Zschokke, in his autobiography, speaks of a "singular case of prophetic gift, which," he says, "I call my inward sight, but which has never been enigmatical to me. I am almost afraid to speak of this, not because I am afraid to be thought superstitious, but lest I should strengthen such feelings in others. And yet it may be an addition to our soul-experience, and therefore I will confess."

Prof. Sherer relates that a company at Stockholm put Swedenborg to the following test: "He should state which of the company should die first. Swedenborg did not refuse to answer this question; but, after some time, in which he appeared to be in a profound and silent meditation, he quite openly replied: "Olof Olofsohn will die to-morrow morning, at forty-five minutes past four o'clock." By this predictive declaration, which was pronounced by Swedenborg with all confidence, the company were placed in anxious expectation; and a gentleman, who was a friend of Olofsohn, resolved to go on the following morning, at the time mentioned by Swedenborg, to the house of Olofsohn, in order to see whether Swedenborg's prediction was fulfilled. On his way thither he met the well-known servant of Olofsohn, who told him that his master had suddenly put an end to his life."

A remarkable prediction to which credit has been given by modern writers of high character, is that of M. Cazotte in regard to the French Revolution. The principal record is that of La Harpe, a learned and upright man. The prediction was particular and circumstantial. Jung. Stilling says, "I can prove that the story is literally true in letter and in spirit." Countess Cenlis wrote, "I have heard it related a hundred times by M. La Harpe before the revolution, and always in the same form as I have read it in print, and as he himself caused it to be printed."

Lacretelle, in his "Histoire de la Revolution Francaise," says, "Many philosophers, if the singular recital of La Harpe is to be believed, had reason to remember Cazotte when death came upon them; for he had foretold how each one should die, and he predicted, also, his own sad end." This story of La Harpe is credited as true by Stilling, by Gregory in his letters on "Animal Magnetism," and by Atkinson and Martineau in their letters on "Man's Nature and Development."

The most careful investigators of the life of Jeanne D'Arc have failed to discover any trace of mental or bodily disease in the maid, "unless we call her premonitions a sign of disease." These premonitions have been called "the expression of military and political genius," which, acted upon, revived and reunited France. They were not manifestations of the maid's conscious mind. She could not believe that such a destiny was before her, and she resisted the influence which urged her on as long

as possible. "I am a girl," she said, "and have no skill to ride and fight. Rather would I have been torn to pieces by wild animals than have gone into France, but for the voices. For to fight is not *mon etat*, but to sit and spin beside my poor mother." Even to the last, according to the priest who confessed her, and stood by her on the pyre, "she averred the divine origin of her voices, and denied that they had decieved her."

Mrs. Mowatt Ritchie, in her autobiography, states that, when in the mesmeric trance into which she was thrown during her illness, she made accurate predictions as to the times when she would be well or ill.

Henry G. Atkinson, who was an investigator of mesmerism and kindred phenomena fifty years ago, and who used mesmerism as a therapeutic agent, wrote to Harriet Martineau as follows: "To the philosopher the spirit of prophecy, the growth of a blade of grass, and the ordinary perception of any object are all equally wonderful and deeply mysterious, beyond our faculty of conception, and out of the very nature of knowledge. That such exalted conditions do exist is now so clear a matter of history and daily occurrence that no one need trouble himself to convince those who persist in ignorance and doubt of what is so notorious. None know better than yourself how these clairvoyant powers have been manifested in a variety of forms, in all periods of history and with all nations. We know that future events are seen in dreams and trances, and by some apparently in the ordinary condition of their lives. We know that some can see distant objects without the use of the eye, and that others can see, so to speak, through opaque objects, reading what is written in a closed book, and even the thoughts which are passing in the mind of another. We know that many under mesmerism can describe any diseased condition in themselves and in others within the sphere of their vision; that they have an instinct of remedies, when a crisis will occur and the cure be effected."

Mr. Atkinson was a materialist, or he called himself such, but he recognized "the existence of faculties in man beyond sense experience and reason,—which faculties are chiefly called forth under abnormal conditions, but are seldom exhibited in a wholly pure state." Such experiments as are described and such facts as are narrated in Mr. Atkinson's letters, for a long time discredited by official orthodox science, are now familiar to well-informed readers, especially to those acquainted with hypnotic experiments in France and with the records of the English Society for Psychical Research.

Such experiences as I have mentioned, with which history and literature abound, and which, according to the testimony of thousands, are not uncommon to-day, would seem to indicate that there is a faculty, or power, of foreseeing supernormally, apparently distinct from the power of collecting facts and making them data for conclusions reached by inductive reason. It belongs evidently to our subliminal nature. Instead of inferring what will occur from what is observable, it perceives the event or becomes conscious that it is impending, in what way no psychic

has been able to explain. A lady of character and education, unknown to the public, who has occasionally had glimpses of the future of her life, as she positively states with the circumstances and proofs, writes: "I may say that it is entirely above and beyond my own control, and that I cannot command it at will; also that I have only been able to exercise it in connection with my own affairs. For some time before the power awakens, I feel very restless, nervous, or irritable Then the future event flashes into my mind with the vividness of lightning, and gradually fades away again, leaving me in the depths of low spirits."

The words of Herder seem to be warranted: "A few examples of foresight and presentiment have disclosed wonders of the treasures which lie hidden in the soul of man. That, for the most part, these phenomena are the result of disease and of disturbed equipoise of the faculties does not change the nature of the thing; for this disproportion was required to give freedom to the force and exhibit its amount." Perhaps as W. W. Story says, there are "penumbral powers and senses surrounding our plain and definite ones which we do not understand and which we have not investigated." Of course, the most painstaking care and caution are required in examining the evidence for statements made respecting any of these alleged supernormal phenomena. Credulity, marvellousness, and lack of discrimination are, beyond doubt, very marked among many who imagine that they have premonitions and other "occult" or exceptional experiences.

THE PERIL OF BECOMING A GODFATHER.

BY HADJI BEKTASH.

In the north-western part of Albania—of which Skodra, as it is called by the Albanians, or Scutari by strangers, is the capital—the people are broken into clans, very much as the people of Scotland were in the old days, and tribal feuds are common. Vendettas between families have been carried on, in many cases for centuries, and there was an instance a few years ago of one that had lasted three hundred years, and was only terminated by the death of the last surviving member of one of the families. In the vendettas all the members of a family may be included, but in the tribal feuds the women are respected; and during a visit I made some years ago to a part of central Albania the communications between the towns and villages of the neighboring country, the people of which were in feud, were kept up without interruption by the women, who went about without being molested. Affairs went on in this way for some time, and the men of the conflicting clans lay about the mountains, ready to fall on any of the other side that might be unlucky enough to come their way. As they understood

each other's tactics perfectly well, no actual fighting took place ; and at length, through the influence of the Vali, or Governor-General, a *bessa*—that is, a truce —was proclaimed, and peace was eventually restored. The part of Albania to which I alluded at the beginning, is further divided by religions. One part of the population is Moslem and the other Roman Catholic ; but, to say the truth, religion has very little influence on their savage nature, and the difference of faith does not prevent their being firm friends, nor is it always the cause of their enmities. They are quick to take offence, and ever ready to resent insult. With all this, they are a courteous and hospitable people to any one recommended to them, but are very suspicious of strangers.

During my travels in the East I made the acquaintance of a foreign consul who was a Catholic, and had held the post of Vice-Consul some years before in one of the Albanian towns. He was a man of genial character, and having a good deal of spare time on his hands, had studied the Albanian language, which is very difficult, being unlike any modern tongue. The people themselves are of the same race as the Illyrians of the time of the Roman imperial domination, and are supposed to be of Pelasgian origin. His knowledge of the language brought the consul into intimate relations with many of the chiefs of the clans in the district, and with one in particular he had formed an intimate friendship. The birth of a son in the chief's family gave him an opportunity of demonstrating his esteem for the consul, and he invited him to stand as godfather to the boy, to which the consul assented with pleasure. According to the custom of the people, the consul from that time out was regarded and treated as a member of the family, but he himself had no idea of how far-reaching this flattering relationship was. He, however, was not long in finding out. One day the chief of one of the neighboring clans paid him a friendly visit, and in the course of conversation explained to him that with the relationship of godfather to his friend's son he had also assumed his share of the enmity of another influential family, between which and his friend's there was an old vendetta, and finished by advising him to leave the country as soon as he could. The consul lost no time In acquainting his government with the awkward predicament in which he was, and he was removed to another post without delay. As he concluded his story, he said he there and then made a vow never to allow his friendship to lead him to stand godfather again without knowing in full all the responsibilities of the position.

THINGS MATERIAL AND THINGS INTELLECTUAL.

BY CHARLES C. CATTELL.

IT is a common practice among theologians of all denominations to speak of things natural and supernatural, of things material and spiritual, as though there was a great gulf fixed between them. It may be useful, therefore, to inquire if there is or is not any analogy between things thus divided? As philosophers and students in realities, it is clearly only our duty to make distinctions when we find nature does so. As we understand Professor Huxley's allusion in his introduction to "Some Controverted Questions," he seemed disposed to abandon the distinction between the natural and the spiritual so long and so profoundly maintained as essential to a true system of philosophy.

We are fully prepared to admit that the same terms may be used, as now, and may be long continued in use, so that we may make ourselves "understanded of the people." The operations of nature, external to man, will have to be still described in different terms to those used in describing the same operations in man himself. At the same time, we hold, as the true interpretation of things, that *Nature is One*. That is, we maintain that there are some similar laws operating in all our systems of philosophy—natural, moral, and political. This we hold to be a fundamental truth. This will be accepted by all who have arrived at the conclusion that all that is known is the Natural. As an illustration of our meaning, the point we are attempting to elucidate, we put it, that the forces or movements of our human nature are just as natural, invariable, and certain, as those observed in the material world, of which we form a part. Thus we read in the terms of natural philosophy, of resistance, reaction, affinity, and attraction; and of the similarity of the constituent elements of the universe. But why are *sentient* beings, which are but one phase of existence, *supposed* to be exempt from any or all of these characteristics? It cannot be conducive to the extension of a true knowledge of natural phenomena, to dissociate powers manifested in the elements in general, from similar powers manifested in the elements that constitute the special existence denominated man. Perhaps this somewhat abstruse question may be best studied by appeals to everyday observation and experience. It was once well said, that there are more people who could distinguish a good action than could furnish a definition of goodness. Take a familiar example from our national system of education. If teaching and training in our schools are not as fruitful and certain as that displayed in our gardens, we do but waste valuable time and public treasure on the infant human species. But is there any doubt on the subject? The results are obvious from our educational efforts among the new branches of human nature; and whole nations

are in evidence that men's thoughts and actions *can* be led in certain directions, as certainly as the branches of our ivy or wall fruit trees can be trained in a given direction. It is a very ancient simile, that as the twig is bent, so is the tree inclined; and it has the advantage of being true. But it is only in quite recent times that English legislation has paid any attention to the laws of *mind*, or discovered the importance of planting early, the seeds of honor, friendship, and heroism. The custom, from time immemorial, has been to find out every means of torturing or extirpating every human phenomenon which was the result of neglect or bad social arrangements, or the victim of unjust laws. What would be thought of a physician of the body who dealt with every disorder by inflicting corporal punishment, or by the decapitation of every patient? What of his wisdom? The analogy of things natural and human, body and soul, finds expression in the resemblances of spring, summer, autumn, and winter, to certain periods of human life and its varied conditions of existence. This has been the subject of poets and dramatists of all ages. Again, we find the analogy holds good in calms, storms, sunshine, and gloom, as the hopes and fears, joys and sorrows, prosperity or adversity are present in our chequered careers.

The convulsions of empires are as much the result of combination and disintegration as the tempests and mighty upheavals met with in the operations of nature. The perpetual war in the elements is not more marked than the political contests for power and supremacy in the State. The great political movements of mankind resemble and are governed by the same principle that attracts or impels the movements of all the particles of matter in proportion to their magnitudes. It seems hardly necessary to enforce the truth experienced by every man, that sentient beings are the subjects of affinity, attraction and repulsion, of hate as well as love. The diligent student and every physician may recognize the same laws in the government of the animal mechanism as the astronomer does in the mechanism of the solar system. But, whether they do so or not, we are fully persuaded that what we call the "laws of nature" operate everywhere; are as little under the control of man in his own system as those operating in the great system of the universe are under his control.

We are not alone in maintaining this view of the incessant activity of all matter found in the three kingdoms—animal, vegetal, and mineral. But we specially point to the great law of attraction which holds the world together, and without which we imagine all matter would disappear or cease to affect our senses. The same principle is clearly seen at work in society under the name self-interest, which holds it together, and furnishes a motive for the common defence of its corporate existence. Sit down and quietly try to imagine the absence of the one main link—confidence and trust—feeble and imperfect as it now is; what would happen if that one link was to disappear? The conclusion forced upon us is, that society would cease to be; general disruption would be the

inevitable issue if that link fled from among the children of men. The commercial world would collapse.

Sunshine and showers have not a more marked effect on the terrestial globe than intelligence, industry, and peace have in influencing the well being of social existence. Again, there are many natural illusions of light, heat, and cloud that are fairly matched in the dreams of youth, which result in prospects not expected. As we ascend to the azure blue sky of variegated clouds, we often find ourselves, at the summit of the hill, surrounded only by fogs and dismal prospects. Is there nothing like that in the experience of aspiring young men? The brilliant scene of the valley vanishes as we approach the higher regions where it appears to be duly fixed; but if there be some that never meet with such disillusions in life they are among the exceptionally happy mortals. Everywhere we find analogy more or less near between the outward and the inner worlds—of matter, life, passion, and thought; the result of universal and invariable laws; the consequences of previous causes becoming themselves causes; continuous change pervades all things, animate and inanimate, through limitless space.

Sympathy between things mental and physical is now generally recognized by students of human nature in cases of disease and aberrations of mind. It is also admitted by some that the causes of our moral actions may be traced to the state of the brain and other organs of the physical man, who has long hitherto been supposed to be the originator of all his actions—good, bad, and indifferent. This view we know is held to be very humiliating to certain lords of creation, whose spiritual natures transcend the laws of the universe, at least on paper! But whatever degradation may be felt, and however great the humiliation to the divine minds among us, the story may be—it is simply a dry matter of fact, that the human stomach acts as a barometer of changes in us, as certainly as the quicksilver in the tube indicates the pressure or temperature of the atmosphere. We find a similitude in the temperate regions of the earth with the observance of moderation in man in all things.

"The youth who bathes in pleasure's limpid streams
At well-judged intervals, feels all his soul
Nerv'd with recruited strength; but if too oft
He swims in sportive mazes through the flood,
He chills his languid virtue."

THE RISE AND PROGRESS OF PALÆONTOLOGY.

BY THE LATE PROF. THOMAS H. HUXLEY.

I WILL now sum up the results of this sketch of the rise and progress of palæontology. The whole fabric of palæontology is based upon two propositions. The first is, that fossils are the remains of animals and plants; and the second is, that the stratified rocks in which they are found are sedimentary deposits; and each of these propositions is founded upon the same axiom—that like effects imply like causes. If there is any cause competent to produce a fossil stem, or shell, or bone, except a living being, then palæontology has no foundation; if the stratification of the rocks is not the effect of such causes as at present produce stratification, we have no means of judging of the duration of past time, or of the order in which the forms of life have succeeded one another. But if these two propositions are granted, there is no escape, as it seems to me, from three very important conclusions. The first is, that living matter has existed upon the earth for a vast length of time, certainly for millions of years. The second is, that, during this lapse of time, the forms of living matter have undergone repeated changes, the effect of which has been that the animal and vegetable population, at any period of the earth's history, contains some species which did not exist at some antecedent period, and others which ceased to exist at some subsequent period. The third is that, in the case of many groups of mammalia and some of reptiles, in which one type can be followed through a considerable extent of geological time, the series of different forms by which the type is represented at successive intervals of this time, is exactly such as it would be if they had been produced by the gradual modification of the earliest forms of the series. These are facts of the history of the earth, guaranteed by as good evidence as any facts in civil history.

Hitherto, I have kept carefully clear of all the hypotheses to which men have at various times endeavored to fit the facts of palæontology, or by which they have endeavored to connect as many of those facts as they happen to be acquainted with. I do not think it would be a profitable employment of our time to discuss conceptions which doubtless have had their justification and even their use, but which are now obviously incompatible with the well-ascertained truths of palæontology. At present, these truths leave room for only two hypotheses. The first is, that, in the course of the history of the earth, innumerable species of animals and plants have come into existence, independently of one another, innumerable times. This, of course, implies either that spontaneous generation on the most astounding scale, and of animals such as horses and elephants, has been going on, as a natural process, through all the time recorded by the fossiliferous rocks; or it necessitates the belief in innu-

merable acts of creation repeated innumerable times. The other hypothesis is, that the successive species of animals and plants have arisen, the later by the gradual modification of the earlier. This is the hypothesis of Evolution; and the palæontological discoveries of the last decade are so completely in accordance with the requirements of this hypothesis, that if it had not existed, the palæontologist would have had to invent it.

I have always had a certain horror of presuming to set a limit upon the possibilities of things. Therefore I will not venture to say that it is impossible that the multitudinous species of animals and plants may have been produced, one separately from the other, by spontaneous generation; nor that it is impossible that they should have been independently originated by an endless succession of miraculous creative acts. But I must confess that both these hypotheses strike me as astoundingly improbable, so devoid of a shred of either scientific or traditional support, that, even if there were no other evidence than that of palæontology in its favor, I should feel compelled to adopt the hypothesis of Evolution. Happily, the future of palæontology is independent of all hypothetical considerations. Fifty years hence, whoever undertakes to record the progress of palæontology will note the present time as the epoch in which the law of succession of the forms of the higher animals was determined by the observation of palæontological facts. He will point out that, just as Steno and as Cuvier were enabled, from their knowledge of the empirical laws of co-existence of the parts of animals, to conclude from a part to the whole, so the knowledge of the law of succession of forms empowered their successors to conclude, from one or two terms of such a succession, to the whole series; and thus to divine the existence of forms of life, of which perhaps no trace remains, at epochs of inconceivable remoteness in the past.

ANOTHER THANATOPSIS.

THE following lines, entitled "Close to Ninety," were written by John Howard Bryant, only surviving brother of William Cullen Bryant, who resides at Princeton, Ill., on the occasion of his being elected an honorary member of a Bryant Literary Society at Bellefontaine, Ohio. Mr. Bryant is about ninety years old.

HERE now I stand, upon life's outer verge:
Close at my feet an ocean wide and deep,
Dark, sullen, silent, and without a surge,
Where earth's past myriads lie in dreamless sleep.
'Tis here I stand without a thrill of fear,
In loneliness allied to the sublime;
The broken links of love that bound me here
Lie shattered on this treacherous shoal of time.
Yet still I cling to friends who yet remain,
Still love the glorious scenes that round me lie,
Striving to stay the haste of years in vain,
As swifter yet the wingèd moments fly.
Idly, I seek the future to explore,
I partly know what is, but naught that is before.

PSYCHICAL RELIGION AND RAJA YOGA.

BY J. A. RISSER, TORONTO.

THERE is no doubt that we have entered upon a psychical era in science and philosophy. The phenomena of mesmerism for more than a hundred years appealed to scientific men for recognition without success. During the greater part of that time they were the playthings of fakirs and quacks; and only the last fifteen years have seen the main facts of hypnotism or mesmerism authenticated by scientific men. But investigations have not stopped at hypnotism, but now include researches into phenomena of so strange and startling a character, as to be quite as much beyond our belief as the phenomena of mesmerism were to the scientists of a century ago. Clairvoyance, clairaudience, alterations of personality, mind-reading, otherwise known under the terms of thought-transference or telepathy, and other curious mental phenomena, have attracted the attention of psychologists during the last few years. Professor Crookes, of Crookes'-tube and X-ray fame, recently delivered his presidential address before the Society for Psychical Research in England on "Thought Vibrations," which many newspapers and periodicals reviewed in rather a sensational way. Myers, Podmore and Gurney have published several books in which they sift the evidence that has come to the notice of the Society for Psychical Research in the last fifteen years on such subjects as thought-transference, clairvoyance, clairaudience, automatic writing, phantasms, etc. W. T. Stead has shown that he possesses the power or gift of automatic writing. Probably the experiences of Mr. and Mrs. B. F. Underwood in automatic writing are unique. Their book has been received with less scepticism than most books of this class, because of the well-known rationalistic bent of the authors. Ribot, the French psychologist, has devoted several years to the study of a curious but not very common form of mental derangement, which he calls "alterations of personality." Hudson's book on "The Law of Psychic Phenomena" has been the subject of much controversy. Prof. Sidgwick, of Cambridge University; Prof. Lodge, of Liverpool University; Prof. James, of Harvard University, and many others, are doing valuable work on these lines. So much from the scientific aspect of mental science.

WHAT IS PSYCHICAL RELIGION?

From the religious side also something has been done that has appealed to the popular mind with some success, as well as to the minds of a few who might be considered more competent to pass judgment. Many eminent men and women are aiming to base religion on the known psychic and moral facts recently gained. It is claimed that the patient and persistent discipline of the mental faculties on psychic lines will add

greatly to their power and strength. Also, that a like discipline of the moral faculties will add to the sensitiveness of the physical and mental organism, and so greatly increase the range of the physical senses and the mental faculties, as to mean practically the possession of a new sense or senses. If these claims are true, the problem to be solved is simply —how to mark out a course of discipline for the mental faculties that will yield the greatest permanent increase in mental power in the shortest time; similarly, to invent a course of discipline for the moral faculties that will produce the greatest permanent increase in the delicacy or sensitiveness of the material that is the basis of the bodily and mental powers.

THEOSOPHY AND ALLIED TEACHINGS.

The chief feature in the teachings of the Theosophical Society is directly on these lines. It is associated, however, with other doctrines, so strange and unfamiliar as to appear absurd. In the absence of further evidence, it will be hazardous to say in this case that things are what they seem to be, when experience has so often shown that appearances are deceptive. Inasmuch as Theosophists themselves say that it is not necessary to believe in these doctrines to become a Theosophist, they may be safely ignored, and the student may for our present purpose confine himself to the methods taught for gaining psychic control. Madame Blavatsky, Mrs. Annie Besant, and other Theosophists, claim to possess extraordinary powers and insight as a result of the practice of psychical discipline. Outside of the Theosophical Society, other authors have written books on somewhat different but related lines. "The Perfect Way," by Anna Kingsford and Edward Maitland, has been widely read. Dr. J. H. Dewey, of New York, after writing several books that have sold well, has been encouraged to found a school for the education, training, and unfoldment of the higher mental powers, which he names "The School of Rational Occultism and Mysticism." The Theosophists have also recently founded a "School for the Revival of the Lost Mysteries of Antiquity," near San Diego, California, for the study of the psychical activities and their practical application in education and discipline.

SYMBOLICAL OR SPIRITUAL LANGUAGE.

The ordinary western mind will meet with a difficulty in studying the books mentioned in the last paragraph, because they make frequent use of mystical or symbolical language, which he will be very apt to misinterpret or pronounce incomprehensible. In ancient times language was more imperfect than it is to-day. The words in use could express the thoughts of the common uninstructed people only. The educated man was a much greater rarity than he is to-day. The priests and the philosophers had a monopoly of education. They were few in number, but they were in possession of higher and more complex truths than the language of the people had words to express. Language was amply provided with words that stood for physical objects on the material plane, but lacked

words that stood for abstract ideas on the mental or spiritual plane. Hence the priests of ancient times strongly felt the need of words in which to express and record the higher abstract qualities and truths that were beyond the mental capacity of the people to understand. Out of this need a regular and consistent system of symbolical or spiritual language was gradually evolved. For example, the early priests and philosophers possessed the idea that corresponds to our word "knowledge" before the word or a similar word existed. Inasmuch as the word "light" in the physical sense bears the same relation to the material world as the idea represented by the word "knowledge" bears to the mental or spiritual world, the word light was naturally suggested to different minds as the one most suitable to stand for knowledge. This is the law of analogy or correspondences.

Again, before the existence of words that stood for abstract qualities or attributes, the picture of a physical object in hieroglyphics, or its corresponding word, was also used to stand for its most noticeable attribute, to the exclusion of all its other attributes; as lion for strong—as a lion, lamb for gentle—as a lamb. After this manner, a very complicated system of symbolical or spiritual expressions gradually grew up. Fables, parables, and allegories are simply chains of symbolical terms; and often what appears to be a plain historical narrative is also a vehicle for an intellectual or moral truth of a complicated character. All sacred books, including the Jewish and Christian scriptures, were written in ancient times, when the writers were forced to use expressions that contained a double meaning. Only the educated man who could grasp the meaning of the higher truths, and also understand the law of symbolical or spiritual language—he alone was in possession of both senses, and he alone could determine from the context the meaning intended by the writer. The uneducated man of the people would naturally interpret all such expressions in the literal or objective sense, which was the most obvious sense, and in fact the only one known to him, and most probably the wrong one.

The ancient writer, living in an age when language was nearer its primitive stage of development, was unquestionably justified in resorting to the use of symbolical language to help him out of a difficulty. But the modern writer has not the same justification, when his native tongue is rich in words that possess shades of meaning amply suited to his purpose. The modern writer ought, therefore, not to use symbolical expressions. By making use of the familiar words of his own language and dropping the obsolete forms of the past, he will make it much easier for the modern student to understand him, and thereby dispose of the main difficulty that now confronts the western mind in the study of this subject.

SWAMI VIVEKANANDA AND HIS BOOK.

A book has recently been published by Longmans & Co., of London,

that bases religion on the control of the internal nature, entitled, "Raja Yoga," by Swami Vivekananda. The author came from India to attend the World's Parliament of Religions, that met in Chicago during the World's Fair in 1893. He was introduced as a monk of the Brahmo-Somaj; and for the enthusiasm with which he was received he thanked his audience, as he said, "in the name of the most ancient order of monks in the world." He is a good English scholar and an eloquent and impressive speaker. He was induced to remain in the States during the next two and a half years, and the book consists mostly of lectures delivered in New York in the winter of 1895-6. The book is singularly free from the use of mystical and symbolical expressions. Complicated mental phenomena are explained in plain Anglo-Saxon, and if his meaning cannot be missed, belief does not always necessarily follow. As the author and his book have attracted much attention, the writer conceived the idea that a synopsis of "Raja Yoga" (Royal Science) would interest the readers of the DOMINION REVIEW. From this point, the views expressed will be those of Mr. Vivekananda—in part in his own language, and in part condensed by the present writer. Quotation marks will, therefore, be omitted.

RAJA YOGA AND MODERN SCIENCE.

For thousands of years, in India, mental and religious phenomena have been investigated, studied and generalized, the whole ground of the religious faculties of man, has been analyzed, and the practical result is the science of Raja Yoga, which is based mostly on the Vedas and the earlier commentaries. Raja Yoga does not, after the unpardonable manner of some modern scientists, deny the existence of facts which are difficult to explain. On the other hand, it gently, yet in no uncertain terms, tells the superstitious that miracles, and answers to prayers, and powers of faith, though true as facts, are not rendered comprehensible through the superstitious explanation that attributes them to the agency of a being or beings above the clouds. It declares that desires and wants are in man, that the power of supply is also in man; and that, wherever and whenever a desire, a want, a prayer has been fulfilled, the supply came from the infinite magazine, the universe, and not from any supernatural being. There is no supernatural, says the Yogi (one who studies and preaches the Yoga philosophy), but there are in nature gross manifestations and subtle manifestations. The gross can be easily perceived by the senses; not so the subtle. The practice of Raja Yoga will lead to the acquisition of the more subtle perceptions. The goal in view is the liberation of the soul through perfection. The pressure of circumstances has forced upon every one a greater or less measure of self-control; just to the extent that self-control has been gained, just to that extent is the person freed from the influence of his material surroundings, and perfect self-control is perfect freedom.

ALL RELIGIONS BASED ON EXPERIENCE.

In all religions that are based on a sacred book, we find one consensus of opinion—that the truths they teach are the result of the experience of certain persons. The Christian asks you to believe in his religion, to believe in Christ, and to believe in him as the incarnation of God; to believe in a God, in a soul, and in a better state of that soul. If I ask him for reasons, he says: "No, it is my belief." But if you go to the fountain-head of Christianity, you will find that it is based upon experience. Christ said he saw God; the disciples said they felt God, and so on. Similarly, in Buddhism, it is Buddha's experience. So with the Hindoos—in their books the writers or sages declare that they have experienced certain truths, and these they preach. Thus it is clear that all the religions of the world have been built upon direct experience. The teachers all saw God, they all saw their own souls, they saw their future, and what they saw they preached. In most of these religions, especially in modern times, a peculiar claim is put before us—that these experiences are impossible at the present day; that they were possible only with a few men who were the first founders of the religions that subsequently bore their names; that they have become obsolete; and that we must therefore now take religion on belief. All this the Yogi denies. If there has been one case of experience in the world in any particular branch of knowledge, it follows that this experience has been possible millions of times before, and will be repeated forever. Uniformity is the rigorous law of nature: what has once happened can always happen.

EACH MUST HAVE HIS OWN EXPERIENCE.

Religion is not only based upon the experience of ancient times, but no man to-day can be religious until he has the same perceptions himself. Yoga is the science that teaches us how to get these perceptions. It is useless to talk about religion until one has felt it. There has been more bloodshed in the name of God than for any other cause, and the reason is that people never went to the fountain-head; they were content only to give a mental assent to the customs of their forefathers, and wanted others to do the same. What right has a man to say he has a soul if he does not feel it, or that there is a God if he has not seen him? If there is a God, we must see him; if there is a soul, we must see it: otherwise it is better not to believe. It is better to be an outspoken Atheist than a hypocrite. The modern idea with the "learned" is that religion, and metaphysics, and all search after a Supreme Being is futile: and with the semi-educated the idea seems to be that these things really have no basis. We cannot blame them for holding such ideas, seeing that all the teaching these men get is simply to believe in an eternal rigmarole of words without any substance behind them. They are asked to live upon words. Can they do it? Man wants truth, wants to experience it for himself, to realize it, to feel it within his heart of hearts.

THE METHOD OF RAJA YOGA IS SCIENTIFIC.

Raja Yoga proposes to put before humanity a practical and scientifically worked-out method of reaching this truth. Every science must have its own method of investigation. If you want to become a chemist, and sit down and cry "Chemistry! chemistry!" it will never come to you. A certain method must be followed. You must go to the laboratory, take the different substances, compound them, experiment with them, and out of that will come a knowledge of chemistry. You might listen to a thousand sermons, but they would not make you religious till you first practised the method. The sages of all countries, of all ages, and of all religions declare that they have found some truth higher than that the senses can bring to us, and they challenge verification. They say to you: Take up the method and practise honestly, and then if you do not find this higher truth, you will have the right to say there is no truth in the claim.

CONCENTRATION OF THE MENTAL POWERS.

It is easier to concentrate the mind on external things. The mind naturally goes outwards. Most of us have nearly lost the faculty of observing the internal mechanism and its operations. To turn the mind inside, stop it from going outside, and then to concentrate all its powers and throw them upon the mind itself, in order that it may know its own nature, analyse itself, is very hard work. Yet mental concentration is the only way to success. The astronomer concentrates all the energies of his mind, and projects them through his telescope upon the skies; and the stars, the sun, and the moon give up their secrets to him. Nature is ready to give up her secrets if we only know how to knock, to give her the necessary blow—and the strength of the blow depends upon concentration. The more concentrated the human mind is, the more power is brought to bear on one point—and that is the secret. In the case of religion, psychology, or metaphysics, the subject and object are one. The object is internal, the mind itself is the object, and it is necessary to study the mind itself, mind studying mind. I am talking to you; at the same time I am standing aside, as it were, a second party, and knowing and hearing what I am saying. You work and think at the same time, another portion of your mind stands by and sees what you are thinking. As the darkest places reveal their secrets before the penetrating rays of the sun, so will the concentrated powers of the mind penetrate its own innermost secrets. Thus will we come to the basis of belief, the real genuine religion. We will perceive for ourselves whether we have souls, whether life is of five minutes or of eternity, whether there is a God in the universe, or none. It will all be revealed to us. This is what Raja Yoga proposes to teach.

BELIEVE NOTHING UNTIL YOU HAVE THE EXPERIENCE.

We are not asked the question, What is your religion? Are you Deists

or Atheists, Christians, Jews, or Buddhists? We are human beings, that is sufficient. Every human being has the right and the power to seek for religion; every human being has the right to ask the reason why, and to have the question answered by himself, if he only takes the trouble. No faith or belief is necessary. Believe nothing until you find it out for yourself. This study takes a long time and constant practice. A part of this practice is physical, but the main part is mental. As we go along we shall find how intimately the mind is connected with the body. With the majority of mankind, the mind is under the control of the body. In many instances, the power of control is very little higher than that of the lower animals. To get that control over body and mind we must take certain physical helps, and when the body is sufficiently controlled, then we can attempt the manipulation of the mind. One who has learned how to manipulate the internal forces has attained to that fine state of perception in which he can perceive all the internal operations of the mind and body. We shall perceive how each sensation is travelling, and how the mind is receiving it, how it is going to the determinative faculty, and how this gives it to the soul.

THE EXERCISES FOR PRACTICE AND DISCIPLINE.

Certain regulations as to food are necessary: we must use that food which brings us the purest mind. All the forces that are working in this body have been produced out of food. We have, therefore, to take care what sort of food we eat at the beginning, and when we have gained enough strength, when our practice is well advanced, we need not be so careful in this respect. While the plant is growing, it must be hedged round, lest it be injured; but when it becomes a tree, the hedges are taken away: it is strong enough to withstand all assaults.

As each science requires certain preparations, as each science has its own method, until we follow that method we can never understand that science; so in Raja Yoga. For the attainment of the extraordinary powers to which reference has been made, several methods which yield the same result are mentioned. The exercises for study and practice which, according to the experience of Yoga philosophers, are pronounced the best are clearly described, together with the physical reasons upon which they are based. These exercises are divided into eight stages. The first and second are purely moral; the third is physical; the fourth is partly physical and partly mental; and the remaining four are mental. A description of these exercises, arranged by stages, will be published in these pages next month.

THE STORY OF THE GREAT INDIAN MUTINY.

BY E. W. L.

VII.

COLONEL CHUTE commanded a force known as the Peshawur Column. This force was ordered to march to three forts on or near the Indus occupied by the 64th B.N.I. and some other native troops called Khelat-i-Gilzies. The order was to disarm these native forces. The men of the 64th, stationed in the first fort, Aboozai, offered no resistance, and were at once disarmed. Colonel Chute then proceeded to Shubkudder, the second fort. Before he reached the place a strange incident occurred. Captain Mundy, in command of this fort, was in his own room when he heard an unusual uproar. Seizing a revolver, he hurried to the scene of the disturbance. This is what he saw and heard : An armed Gilzie, having knocked down the sentry over the powder-magazine, was shouting to his comrades and urging them to join him in the general uprising. "We have no time to lose," he cried out, "if we wish to save this place from the clutches of the Feringhee suars. Nicholson is coming, and he will blow us all away from big guns!" Captain Mundy was about to dash forward and shoot the fellow, when he was seized by a crowd of excited Gilzies. "No, sahib, you shall not go near that man!" Naturally enough, Mundy imagined that there *was* a "general uprising;" and the gallant captain prepared to sell his life dearly. But before the sale began, an event occurred which induced him to alter his intention. A jemadar (a native commissioned officer), engaged in the peaceful task of cooking his own dinner, left his pots and his pans and ran to get his musket. The mutineer, divining his intention, shot the jemadar dead. In 1857, breech-loaders and repeaters were unknown; muskets and rifles were loaded from the muzzle, and the operation required time. In a duel between a loaded revolver and an unloaded musket, the odds were greatly in favor of the revolver. The friendly Gilzies released their captain, and Mundy rushed upon the traitorous Sepoy. Twice the captain's revolver missed fire; and meanwhile the mutineer was calmly reloading. Mundy, realizing his danger, called out to some of the magazine guard to shoot the mutineer. The order was promptly obeyed; and four bullets avenged the jemadar's death. Captain Mundy immediately had the regimental roll called, and every man answered to his name. There was no sympathy with the mutineer; the Gilzies were trusted. And when at length the mutiny was over, General Cotton, in published orders, thanked the Gilzies for their devotion to the government and for their gallant bearing on many a hard-fought field. As for the Gilzies, they declared, with tears in their eyes, that

Captain Mundy, by his energy and decision on the day when the jemadar was murdered, had saved the good name of the regiment. Colonel Chute marched into Shubkudder the next day. The Sepoys of the 64th B.N.I., occupying that fort and the one at Michnee, near by, were disarmed at once.

The brave fellows at the head of the Punjab Government decided on a bold policy: from the men who had most stubbornly fought against British rule recruits were drawn. From the disbanded regiments the Sikhs were taken and re-enlisted. This policy was warmly endorsed by the Sikh chiefs. One old chieftain came forward, his venerable face livid with rage, and, spitting on the ground in token of his detestation of the Delhi and Meerut massacres, exclaimed: "We have our faults; and no doubt the *Sahib lōg* accuse us of many misdeeds. But who can charge us with ever hurting a helpless woman or a defenceless child? No, not for a rajah's ransom would we stain our good name with such atrocities!"

Now it was the turn of the 9th B.N.I. to mutiny. The regiment, in detachments, was stationed at towns between Agra and Delhi. On dates beginning with the 20th and ending with the 24th May, these men mutinied and marched to the great rendevous of the mutineers—Delhi. The British flag was held bravely aloft by Mr. Patterson Sanders, a Zemindar. He managed to get up a small squadron of cavalry, and rendered good service by protecting Europeans, harassing the enemy and watching the movements of the mutineers. At Agra, too, through many a dire vicissitude, the British flag floated, and remained floating until the Mutiny was quelled. But, with these exceptions, British rule had ceased to exist throughout an immense tract of country south of Delhi. This isolated the British force in the Punjab; the men who commanded this force were acting, as it were, in the dark. What was going on in Calcutta, and what measures were there being taken, they could only guess at more or less shrewdly. Ever steadfast to duty, they acted their part bravely; but before they could strike a blow at Delhi they had to stamp out every spark of mutiny in the North-west.

As May was drawing to its close, the flames of the mutiny flashed forth from many a cantonment. Most of these outbreaks were accompanied by the cold-blooded murder of all the Europeans in the place; in a few cases the Sepoys spared the white people. But this did not always mean safety to those who were spared. Working with the Sepoys were the Adullamites;—that is, among the natives,—"every one in distress, and every one that was in debt, and every one that was discontented, gathered themselves" to slay and pillage in the wake of the Sepoys. What the Sepoys spared the Adullamites did not spare. And the story of some of those who escaped the fury of the wolves, but were hunted by jackals, is intensely interesting, but melancholy in the extreme.

Those who have a good map of India and are interested in the mutiny would

do well to consult their chart. The blood-red track of the outbreak "ran eastward from Delhi, through the Doab into Behar, Rohilcund, Oude and Central India." It was a fight of the many with a few, that was raging throughout these districts. Against every European there was arrayed a band of from sixty to one hundred Sepoys; and gallantly did the few carry on the war. In all this wide tract of country Agra and Lucknow were the only cities of refuge for the hunted Europeans. And these cities offered to the distressed a refuge linked with hunger, hardships and hourly dangers.

Following the chronological order laid down by Cassell's history, we here start with the native sappers stationed at Roorkee. These men were ordered on May 16 to march to Meerut. They obeyed the order by shooting their commanding officer, Captain Fraser, and making their way to Delhi. The 9th B.N.I. mutinied, as we have seen. Their outbreak at Allyghur was due to the execution of a spy. As usual when punishment is administered, that portion of the regiment at Allyghur was paraded to witness the carrying out of the order. The spy was hanged, and all the Sepoys apparently approved the action of the commanding officer. Suddenly one of them called out, "Behold a martyr to our religion! Are we such cowardly dogs that we dare not avenge his death?" With one accord all the companies there present broke into open revolt. They marched into Delhi, after having looted Allyghur and set all convicts free. One thing can be laid to the credit of the 9th B.N.I.; they did no murder. The other companies of the 9th soon joined their comrades at Delhi. At Myrpoorie an officer bore himself gallantly. Lieutenant de Kantzow, seeing that his men were about to mutiny, alone and unaided stood up and pleaded with them. It was in vain; some of the Sepoys held up their muskets: "Shoot, you cowardly brutes," he cried out disdainfully, as he folded his arms across his breast; "it's brave work for a dozen or so to fire at an unarmed man!" The Sepoys sneaked off to loot the treasury. But de Kantzow was quicker than they; the Sepoys found the treasury protected by the gaol guard, de Kantzow in command. Partly by threats and partly by arguments, the Sepoys were induced to forego the pleasure of looting the treasury. The daring lieutenant received the well-deserved thanks of Lord Canning, the Governor General; and, what was far better, an independent command.

(To be continued.)

Mrs. Jackson—Dat's sebenteen lies yo's tole me toe-day, all diffrunt. Yo' am a reg'lar rapskillion.

'Rastus Jackson—W-whad am a rapskillion, mammy?

Mrs. Jackson—A rapskillion am a young 'un dat's got his fadder's blood in him—dat's whad a rapskillion am.—*Judge.*

THE OLD IVIED CHURCH.

BY F. J. GOULD, LONDON, ENG.

ON each side of the road the trees overhang and form a delightful archway of green lace, supported by curiously twisted boughs. Yonder I catch a glimpse of a farmhouse with gleaming white walls. All is quiet save for the flutter of pigeons in and out of the cots near the roof. Just before reaching the farmhouse I observe a path that leads from the left downwards. Soft grass forms a carpet. A little brook tinkles on one side. I descend the path with silent footfall. A butterfly dances through the light and shade. The scent of new-mown hay is wafted from a neighboring meadow. A tree felled by the wayside invites to rest. I sit down and look around. Behind me a hill rises and a series of rustic steps lead upward to a neat villa at the summit. In front several very tall trees soar toward the eternal blue. Suddenly I become aware of a church standing half-concealed by the trees. The lofty square tower is completely veiled in elegant ivy. The little buildings which contain the nave and the chancel seem like tiny cottages. The limpid spring ripples through the churchyard. This tiny picturesque church lies in a hollow below the level of the high-road. If, perchance, some Welsh reader should see these columns in far-off Canada, he may recognize my portraiture of the church of Gumfreston in Pembrokeshire.

I rise and pass through the churchyard gate, and approach the porch, and look in. The shadow is somewhat deep, and I can only just discern in the corner a small stone basin fixed against the wall. It is a stoup or holy-water basin,—a relic of the ancient times when the faith of Rome held sway over the British isles.

Then I return to the fallen tree, and reflect.

I am an Agnostic, and never hear, as Christians do, the voice of God speaking in the rippling wave or the rustling tree. Never do I fear the malice of evil spirits among the tombs. For me the wings of angels never fan the air or hover over the couch at night. The Bible is a book rich in historic lore and poetic significance; but to me it whispers no message from the skies. The texts on the gravestones yonder speak the credulous thoughts of the Middle Ages. They convey to me no assurance of a life in a Zion-of-the-air.

Yet this old church will stand for many a long year more. And if the nipping frosts loosen its stones, and the gales from the Atlantic shake its hoary battlements, I trust that loving hands will restore its masonry, and preserve its simple beauty, and replace the torn ivy.

In those days Christianity will have dissolved. No incense will float upwards to the crystal throne. Prayers will make no murmur in the cool aisles of the sacred house. No lips will kiss the dead Christ of the

crucifix. And still I hope the people of the hamlet will meet here in the bright noon and at the crimson sunset; and still the music of mattins and evensong will ring sweetly through this leafy dell; and still the voice of the preacher will sound its solemn call.

Just as the old stoup in the porch stands as a reminiscence of a long-past creed, so this church itself will tell the villager of the dead gospel which his forefathers believed. We tread gently round the green graves of Gumfreston. So also we may speak reverently of the dreams and dogmas of the generations that have gone before us. Nevertheless, reverence will not lessen our resolution to abandon for ever a religion which no longer ministers to deep human needs.

When, some centuries hence, the passing wayfarer, after gathering honeysuckle in the pleasant country road which to-day I have trodden in peace and cheerfulness, shall descend the grassy path and linger by the porch, he will hear the preacher uttering a gospel which to-day is but struggling to its first faint expression. The preacher will tell of man and his wondrous evolution through the tragedies and achievements of a long succession of ages; he will tell of the triumphs of human skill over so many fatal powers of nature; he will describe the passage of the nations from the feudalism of castle and priesthood to the higher stage of industry and social co-operation; he will bid these simple villagers rejoice to think that they in this distant corner of romantic Wales are yet members of the vast federation of the world over which one flag waves and one government rules; and he will call upon each man, each woman to carry out, in love and truth, the duties of the daily life, that so each individual effort may add to the great flame of the world's charity.

And thus will the Christian churches be transformed, and embody a new and better ideal.

Mrs. Bottome on Gibraltar and British Rule.

MRS. BOTTOME, who is President of the King's Daughters, travelled extensively last year in the East. Her letters were so interesting and so attractively written, that they have been collected into book form. Of Gibraltar and the effects of British rule she says:

"For the first time I stood on Spanish soil and saw the contrast between a British and a Spanish town, and I could not but feel as if I would like to have England own everything on the footstool, excepting, of course, the United States. Say what you will about the British Lion putting its paw on everything, I notice where that paw is there is civilization. We were in Spain for a few minutes only (and were glad hurriedly to leave), and saw only the wretched little town of Lima, where the bull-fights are given on Sunday and fete days. The utter wretchedness of the place, the extreme poverty and filth made us say, 'Take us back to British possessions.' The Spanish may dream that the rock is only temporarily under the British flag; but no one who steps on Spanish soil, it seems to me, and then goes back to where the British flag floats, will fail to say, 'Long may it wave.'"

From Our Own Observatory.

The Toronto Meeting of the British Association.

After the Jubilee, the meeting of the scientists has been Toronto's greatest advertisement. The men who came to Toronto from Britain and the States to compare notes of their latest thoughts and investigations into Nature's secrets will take home with them many pleasant memories of a beautiful city and its genial and cultured citizens. Few of them will have witnessed many more brilliant and enthusiastic events than the final banquet at which farewell was said to the departing guests; and no one could listen to the earnest words of all the speakers in favor of international friendship and co-operation without a feeling of hope that the more sober and cultured classes on both sides of the line will take a lesson from their scientific representatives, and openly express their better thoughts, not leaving their country's affairs in the hands of the unscrupulous and dangerous professional politicians and jingoes.

An Imperial Bureau of Ethnology.

The suggestion made by the new President, Sir John Evans, in regard to the establishment of a Bureau of Ethnology is a valuable one, and should gain the support, not only of scientific students, but of every advocate of just and humane government. There can be no question that gross and cruel wrongs have been perpetrated by all the so-called civilized nations in their dealings with the inferior and more innocent races; and if better knowledge of the habits and customs and mental condition of these races could be obtained, many a bitter wrong, injurious to both rulers and ruled, would be prevented. It is unquestionable that a vast proportion of the missionary business is maintained simply as a result of our ignorance of the real status and needs of distant peoples; and more truthful reports than can be expected from missionaries would, we believe, result in an immense benefit to the whole world. It might give a happy augury for the success of other schemes of Federation that have been discussed, if a plan of a purely humanitarian and scientific character such as this could be organized so as to embrace not only Britain and her colonies, but the United States also.

The Dominion Senate.

The *St. Thomas Journal* recently quoted this extract from a speech by John Bright dealing with the clauses in the Canadian Confederation Act creating the Dominion Senate:

"I venture to say that the clause enabling the Governor-General and his Cabinet to put seventy-two men in that Council for life inserts into the whole system the germ of a malady which will spread, and which before very long will require an alteration of this Act and of the Constitution of this new Confederation. I am satisfied that we run a great danger of making this Act work ill almost from the beginning."

In our view, a body such as the English House of Lords, of which the Canadian Senate is a feeble imitation, is a constant menace to representative institutions. A stable and progressive Government needs a clear distinction between the two branches into which it should be divided—the Legislative and the Executive. All persons belonging in any way to the former branch should be elected

or removed by a popular vote. The executive officials—those who simply carry out the orders and rules enacted by the legislative bodies—should be permanent and removable only upon cause shown before a competent court. It is only by the adoption of these principles that some of the worst features of the Governments of both Canada and the States can be remedied. To appoint an irremovable legislative body is to prepare for a dead-lock or a negation of the popular will—a stultification of self-government, only consonant with the feudal system from which we are supposed to have emerged.

An Example for Canadian Cities.

The Sheffield corporation (England) took over the street railways of the city just a year ago. The financial result shows an increase of $40,000 in the receipts, and the corporation at once propose to introduce electric traction. Why did not Toronto, Montreal, and other Canadian cities act similarly when they had the opportunity? Because the moral sense of the mass of the people has not reached such a high standard here as in Britain, and the citizens are fearful of trusting their own officials because they are aware of their own failings. When they reach a higher level, they will have more faith in their fellow men, because they will have more faith in themselves.

A Notable Event—A Woman's Jubilee Banquet.

Among the events that marked the late Jubilee festivities, one of the most notable was the dinner given by a hundred well-known women, held in the Grafton Galleries. The idea was to note the progress made by women during the last sixty years, and each lady was allowed to invite one distinguished man. The dinner was a pronounced success. Only two toasts were proposed—"The Queen" and "Our guests." Mrs. Steele proposed the former, and raised a laugh by addressing the company as "gentlemen and ladies;" the latter was proposed by Lady Henry Somerset. The women to whose initiative this dinner owed its inception have done well in boldly taking such a course. The objections to ladies taking part in public banquets and other functions hitherto confined to the male sex were, of course, founded upon out-of-date notions of moral and social life,—notions that have largely disappeared, and should be totally swept away as soon as possible. They are the remnants of days when the public dinner was often the occasion for a disgusting display of drunkenness and libidinous talk, and when it would have been impossible for a decent woman to have been present. But such days have almost passed, and the Women's Jubilee Dinner rings their death-knell. We hope the women, in this as in other directions, will imitate the example set them on this occasion; and, instead of waiting to be invited to dinners and entertainments organized by their male friends, will "take the bull by the horns," and arrange their own meetings. There seems to be no good reason why women should not hold public dinners.

Bannister, the comedian, was presented to a proud old Scotch dame. "Who are the Bannisters?" she asked peevishly. "I do not recollect meeting with them before." "Madam," replied the actor gravely, "we are closely connected with the Stairs." "Ah! there is a good and ancient family!" cried madam. "Mr. Bannister, I am delighted to make your acquaintance!"—*Household Words.*

"Well," said the deacon, "I sold old Bill to-day."

"Who to?" asked his wife.

"Jim Allenbaugh. Got $50 fer 'im."

"Fifty dollars! I don't see how your conscience ever let you let anybody pay that much for a balky horse that ain't worth more'n $15."

"Well," said the deacon, thoughtfully, "I don't believe I could have done it only I know that Jim will take him out on one of his Sunday fishin' trips, an' old Bill will balk and Jim will hev a chance to set fer three or four hours meditatin' on the sin of Sabbath breakin'."

Clara—Why so melancholy? Belle—Oh! I had the worst shock this afternoon that I ever experienced. You know those flowers I was going to take down to the gaol to that poor man who murdered all his first cousins? Well, I got into the wrong cell, and gave them to a big, blear-eyed brute, who was there for robbing a banana-stand.—*Puck.*

Avoiding a Delicate Matter. Assistant Tailor (of Pizen Creek tailor shop, in whisper to proprietor)— Say, shall I ask the parson if he wants a flash pocket in those new trousers? Proprietor (*sotto voce*, tactfully)—He likely wants one, Bill; but he's temperance, an' he might get touchy if you asked him that. Ask him if he wants a pistol pocket in 'em.—*Judge.*

Bobby—Is oxygen what the oxen breathe all day?
Daddy—Of course, and what everything else breathes.
Bobby—And is nitrogen what everyone breathes at night?
(Daddy gave it up).

"A professor at one of the universities," says *The Christian at Work*, "is the subject of a queer anecdote. Last winter he was married, and went to housekeeping outside town. This spring he thought he would add a few hens to his stock; he always had a dog. He set a couple of hens, and in good time had two large broods of chickens. He was very proud of them, but in a week or so the fowls began to die. The professor called in a neighbor to look at the chickens and offer advice. They were certainly a dilapidated lot of chickens that the neighbor viewed. They were thin and apparently without ambition.

"'What do you feed them?' asked the neighbor after a brief survey.

"'Feed them?' responded the professor, as though he didn't hear. 'Why, I don't feed them anything, I thought the old hens had enough milk for them.'"

Master—Well, Tommy, you were not present yesterday. Were you detained at home in consequence of the inclemency of the weather?

Tommy—No, sir; 'cause of the rain.—*Tit-bits.*

She—Oh, Jack! do you know Mr. Gibon punctuated his tire yesterday?
He—You mean punctured, my dear.
She—Well, anyway, he came to a full stop.

Mrs. Kniver—Mary, whatever are the children quarrelling about?
Mary—It's only in fun, mem. They do be playing they're married.