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MODERN SCIENCE AND ANARCHISM

By Peter Kropotkin

(Continued.)

To predict what direction science will take in its further development is, evidently, impossible. As long as men of science depend upon the rich and the governments, so long will they of necessity remain subject to influence from this quarter; and this, of course, can again arrest for a time the development of science. But one thing is certain: in the form that science is now assuming there is no longer any need of the hypothesis which Laplace considered useless, or of the metaphysical "words" which Goethe ridiculed. The book of nature, the book of organic life, and that of human development, can already be read without resorting to the power of a creator, a mystical "vital force," an immortal soul, Hegel's trilogy, or the endowment of abstract symbols with real life. Mechanical phenomena, in their ever-increasing complexity, suffice for the explanation of nature and the whole of organic and social life. There is much, very much, in the world that is still unknown to us--much that is dark and incomprehensible; and of such unexplained gaps new ones will always be disclosed as soon as the old ones have been filled up. Butwe do not know of , and do not see the possibility of discovering, any domain in which the phenomena observed in the fall of a stone, or in the impact of two billiard balls, or in a chemical reaction--that is, mechanical phenomena--should prove inadequate to the necessary explanations.

III.

It was natural that, as soon as science had attained such generalizations, the need of a synthetic philosophy should be felt; a philosophy which, no longer discussing "the essence of things," "first causes," the "aim of life," and similar symbolic expressions, and repudiating all sorts of anthropomorphism (the endowment of natural phenomena with human characteristics), should be a digest and unification of all our knowledge; a philosophy which, proceeding from the simple to the complex, would furnish a key to the understanding of all nature, in its entirety, and, through that, indicate to us the lines of further research and the means of discovering new, yet unknown, correlations (so-called laws), while at the same time it would inspire us with confidence in the correctness of our conclusions, however much they may differ from current superstitions. ---- Such attempts at a constructive synthetic philosophy were made several times during the nineteenth century, the chief of them being those of Auguste Comte and of Herbert Spencer. On these two we shall have to dwell. The need of such a philosophy as this was admitted already in the eighteenth century--by the philosopher and economist Turgot and, subsequently, even more clearly by Saint-Simon. As has been stated above, the encyclopaedists, and likewise Voltaire in his "Philosophical Dictionary, " had already begun to construct it. In a more rigorous, scientific form which would satisfy the requirements of the exact sciences, it was now undertaken by Auguste Comte. It is well known that Comte acquitted himself very ably of his task so far as the exact sciences were concerned. He was quite right in including the science of life (Biology) and that of human societies (Sociology) in the circle of sciences compassed by his positive philosophy; and his philosophy has had a great influence upon all scientists and philosophers of the nineteenth century. But why was it that this great philosopher proved so weak the moment he took up, in his "Positive Politics," the study of social institutions, especially those of modern times? This is the question which most admirers of Comte have asked themselves. How could such a broad and strong mind come to the religion which Comte preached in the closing years of his life? Littre and Mill, it is well known, refused even to recognize Comte's "Politics" as part of his philosophy; they considered it the product of a weakened mind; while others utterly failed in their endeavors to discover a unity of method in the two works.1 And yet the contradiction between the two parts of Comte's philosophy is in the highest degree characteristic and throws a bright light upon the problems of our own time. When Comte had finished his "Course of Positive Philosophy," lie undoubtedly must have perceived that he had not yet touched upon the most important point--namely, the origin in man of the moral principle and the influence of this principle upon human life. He was bound to account for the origin of this principle, to explain it by the same phenomena by which he had explained life in general, and to show why man feels the necessity of obeying his moral sense, or, at least, of reckoning with it. But for this he was lacking in knowledge (at the time

he wrote this was quite natural) as well as in boldness. So, in lieu of the God of all religions, whom man must worship and to whom he must appeal in order to be virtuous, he placed Humanity, writ large. To this new idol he ordered us to pray, that we might develop in ourselves the moral concept. But once this step had been takenonce it was found necessary to pay homage to something standing outside of and higher than the individual in order to retain man on the moral path-all the rest followed naturally. Even the ritualism of Comte's religion moulded itself very naturally upon the model of all the preceding positive religions. Once Conde would not admit that everything that is moral in man grew out of observation of nature and from the very conditions of men living in societies,-this step was necessary. He did not see that the moral sentiment in man is as deeply rooted as all the rest of his physical constitution inherited by him from his slow evolution; that the moral concept in man had made its first appearance in the animal societies which existed long before man had appeared upon earth; and that, consequently, whatever may be the inclinations of separate individuals, this concept must persist in mankind as long as the human species does not begin to deteriorate,--the anti-moral activity of separate men inevitably calling forth a counter-activity on the part of those who surround them, just as action causes reaction in the physical world. Comte did not understand this, and therefore he was compelled to invent a new idol-Humanity-in order that it should constantly recall man to the moral path. Like Saint-Simon, Fourier, and almost all his other contemporaries, Comte thus paid his tribute to the Christian education be had received. Without a struggle of the evil principles with the good--in which the two should be equally matched--and without man's application in prayer to the good principle and its apostles on earth for maintaining him in the virtuous path, Christianity cannot be conceived. And Comte, dominated from childhood by this Christian idea, reverted to it as soon as he found himself face to face with the question of morality and the means of fortifying it in the heart of man.

IV.

But it must not be forgotten that Comte wrote his Positivist Philosophy long before the years 1856-1862, which, as stated above, suddenly widened the horizon of science and the world-concept of every educated man. The works which appeared in these five or six years have wrought so complete a change in the views on nature, on life in general, and on the life of human societies, that it has no parallel in the whole history of science for the past two thousand years. That which had been but vaguely understood--sometimes only guessed at by the encyclopoedists, and that which the best minds in the first half of the nineteenth century had so much difficulty in explaining, appeared now in the full armor of science; and it presented itself so thoroughly investigated through the inductive-deductive method that every other method was at once adjudged imperfect, false and--unnecessary. Let us, then, dwell a little longer upon the results obtained in these years, that we may better appreciate the next attempt at a synthetic philosophy, which was made by Herbert Spencer. Grove, Clausius, Helmholtz, Joule, and a whole group of physicists and astronomers,--as also Kirchhoff, who discovered the spectroscopic analysis and gave us the means of determining the composition of the most distant stars,--these, in rapid succession at the end of the fifties, proved the unity of nature throughout the inorganic world. To talk of certain mysterious, imponderable fluids-calorific, magnetic, electrical--at once became impossible. It was shown that the mechanical motion of molecules which takes place in the waves of the sea or in the vibrations of a bell or a tuning fork, was adequate to the explanation of all the phenomena of heat, light, electricity and magnetism; that we can measure them and weigh their energy. More than this: that in the heavenly bodies most remote from us the same vibration of molecules takes place, with the same effects. Nay, the mass movements of the heavenly bodies themselves, which run through space according to the laws of universal gravitation, represent, in all likelihood, nothing else than the resultants of these vibrations of light and electricity, transmitted for billions and trillions of miles through interstellar space. The same calorific and electrical vibrations of molecules of matter proved also adequate to explain all chemical phenomena. And then, the very life of plants and animals, in its infinitely varied manifestations, has been found to be nothing else than a continually going on exchange of molecules in that wide range of very complex, and hence unstable and easily decomposed, chemical cornpounds from which are built the tissues of every living being,

Then, already during those years it was understood--and for the past ten years it has been still more firmly established-that the life of the cells of the nervous system and their property of transmitting vibrations from one to the other, afforded a

mechanical explanation of the nervous life of animals. Owing to these investigations, we can now understand, without leaving the domain of purely physiological observations, how impressions and images are produced and retained in the brain, how their mutual effects result in the association of ideas (every new impression awakening impressions previously stored tip), and hence also--in thought. Of course, very much still remains to be done and to be discovered in this vast domain; science, scarcely freed yet from the metaphysics which so long hampered it, is only now beginning to explore the wide field of physical psychology. But the start has already been made, and a solid foundation is laid for further labors. The old-fashioned classification of phenomena into two sets, which the German philosopher Kant endeavored to establish,--one concerned with investigations "in time and space" (theworld of physical phenomena) and the other "in time only" (the world of spiritual phenomena),--now falls of itself. And to the question once asked by the Russian physiologist, Setchenov: "By whom and how should psychology be studied?" science has already given the answer: "By physiologists, and by the physiological method." And, indeed, the recent labors of the physiologists have already succeeded in shedding incomparably more light than all the intricate discussions of the metaphysicists, upon the mechanism of thought; the awakening of impressions, their retention and transmission. In this, its cheif stronghold, metaphysics was thus worsted. The field in which it considered itself invincible has now been taken possession of by natural science and materialist philosophy, and these two are promoting the growth of knowledge in this direction faster than centuries of metaphysical speculation have done. ----- In these same years another important step was made. Darwin's book on "The Origin of Species" appeared and eclipsed all the rest. Already in the last century Buffon (apparently even Linnaeus), and on the threshold of the nineteenth century Lamarck, had ventured to maintain that the existing species of plants and animals are not fixed forms; that they are variable and vary continually even now. The very fact of family likeness which exists between groups of forms-Lamarck pointed out-is a proof of their common descent from a common ancestry. Thus, for example, the various forms of meadow buttercups, water buttercups, and all other buttercups which we see on our meadows and swamps, must have been produced by the action of environment upon descendants from one common type of ancestors. Likewise, the present species of wolves, dogs, jackals and foxes did not exist in a remote past, but there was in their stead one kind of animals out of which, under various conditions, the wolves, the dogs, the jackals and the foxes have gradually evolved. But in the eighteenth century such heresies as these had to be uttered with great circumspection. The Church

was still very powerful then, and for such heretical views the naturalist had to reckon with prison, torture, or the lunatic asylum. The "heretics" consequently were cautious in their expressions. Now, however, Darwin and A. R. Wallace could boldly maintain so great a heresy. Darwin even ventured to declare that man, too, had originated, in the same way of slow physiological evolution, from some lower forms of ape-like animals; that his "immortal spirit" and his "moral soul" are as much a product of evolution as the mind and the moral habits of the ant or the chimpanzee. We know what storms then broke out upon Darwin and, especially, upon his bold and gifted disciple, Huxley, who sharply emphasized just those conclusions from Darwin's work which were most dreaded by the clergy. It was a fierce battle, but, owing to the support of the masses of the public, the victory was won, nevertheless, by the Darwinians; and the result was that an entirely new and extremely important science-Biology, the science of life in all its manifestations-has grown up under our very eyes during the last forty years. At the same time Darwin's work furnished a new key to the understanding of all sorts of phenomena-physical, vital, and social. It opened up a new road for their investigation. The idea of a continuous development (evolution) and a continual adaptation to changing environment, found a much wider application than the origin of species. It was applied to the study of all nature, as well as to men and their social institutions, and it disclosed in these branches entirely unknown horizons, giving explanations of facts which hitherto had seemed quite inexplicable. Owing to the impulse given by Darwin's work to all natural sciences, Biology was created, which, in Herbert Spencer's hands, soon explained to us how the countless forms of living beings inhabiting the earth may have developed, and enabled Haeckel to make the first attempt at formulating a genealogy of all animals, man included. In the same way a solid foundation for the history of the development of man's customs, manners, beliefs and institutions was laid down--a history the want of which was strongly felt by the eighteenth century philosophers and by Auguste Comte. At the present time this history can be written without resorting to either the formulae of Hegelean metaphysics or to "innate ideas" and "inspiration from without"--without any of those dead formulae behind which, concealed by words as by clouds, was always hidden the same ancient ignorance and the same superstition. Owing, on the one hand, to the labors of the naturalists, and, on the other, to those of Henry Maine and his followers, who applied the same inductive method to the study of primitive customs and laws that have grown out of them, it became possible in recent years to place the history of the origin and development of human institutions upon as firm a basis as that of the development of any form of plants or animals. It would, of course, be extremely unfair to

forget the enormous work that was done earlier-already in the thirties-towards the working out of the history of institutions by the school of Augustin Thierry in France, by that of Maurer and the "Germanists" in Germany, and in Russia, somewhat later, by Kostomarov, Belyaev and others. In fact, the principle of evolution had been applied to the study of manners and institutions, and also to languages, from the time of the encyclopaedists. But to obtain correct, scientific deductions from all this mass of work became possible only when the scientists could look upon the established facts in the same way as the naturalist regards the continuous development of the organs of a plant or of a new species. The metaphysical formulae have helped, in their time, to make certain approximate generalizations. Especially did they stimulate the slumbering thought, disturbing it by their vague hints as to the unity of life in nature. At a time when the inductive generalizations of the encyclopaedists and their English predecessors were almost forgotten (in the first half of the nineteenth century), and when it required--some civic courage to speak of the unity of physical and spiritual nature-the obscure metaphysics still upheld the tendency toward generalization. But those generalizations were established either by means of the dialectic method or by means of a semi-conscious induction, and, therefore, were always characterized by a hopeless indefiniteness. The former kind of generalizations was deduced by means of really fallacious syllogisms--similar to those by which in ancient times certain Greeks used to prove that the planets must move in circles "because the circle is the most perfect curve"; and the meagerness of the premises would then be concealed by misty words, and, worse still, by an obscure and clumsy exposition. As to the semi-conscious inductionís which were made here and there, they were based upon a very limited circle of observations-similar to the broad but unwarranted generalization of Weissmann, which have recently created some sensation. Then, as the induction was unconscious, the generalizations were put forth in the shape of hard and fast laws, while in reality they were but simple supposition s--hypotheses, or beginnings only of generalizations, which, far from being "laws," required yet the very first verification by observation. Finally, all these broad deductions, expressed as they were in most abstract forms-as, for instance, the Hegelcan "thesis, antithesis, and synthesis,"--left full play for the individual to come to the most varied and often opposite practical conclusions, so that they could give birth, for instance, to Bakunin's revolutionary enthusiasm and to the Dresden Revolution, to the revolutionary Jacobinism of Marx and to the recognition of the "reasonableness of what exists," which reconciled so many Germans to the reaction then existing-to say nothing of the recent vagaries of the so-called Russian Marxists.

V

Since Anthropology--the history of man's physiological development and of his religious, political ideals, and economic institutions-came to be studied exactly as all other natural sciences are studied, it was found possible, not only to shed a new light upon this history, but to divest it for ever of the metaphysics which had hindered this study in exactly the same way as the Biblical teachings had hindered the study of Geology. It would seem, therefore, that when the construction of a synthetic philosophy was undertaken by Herbert Spencer, he should have been able, armed as lie was with all the latest conquests of science, to build it without falling into the errors made by Comte in his "Positive Politics." And yet Spencer's synthetic philosophy, though it undoubtedly represents an enormous step in advance (complete as it is without religion and religious rites), still contains in its sociological part mistakes as gross as are found in the former work. The fact is that, having reached in his analysis the psychology of societies, Spencer did not remain true to his rigorously scientific method, and failed to accept all the conclusions to which it had led him. Thus, for example, Spencer admits that the land ought not to become the property of individuals, who, in consequence of their right to raise rents, would hinder others from extracting front the soil all that could be extracted from it under improved methods of cultivation; or would even simply keep it out of use in the expectation that its market price will be raised by the labor of others. An arrangement such as this he considers inexpedient and full of dangers for society. But, while admitting this in the case of the land, be did not venture to extend this conclusion to all other forms of accumulated wealth--for example, to mines, harbors, and factories. Or, again, while protesting against the interference of government in the life of society, and giving to one of his books a title which is equivalent to a revolutionary programme, "The Individual vs. The State," he, little by little, tinder the pretext of the defensive activity of the State, ended by reconstructing the State in its entirety, such as it is to-day, only slightly limiting its attributes. These and other inconsistencies are probably accounted for by the fact that the sociological part of Spencer's philosophy was formulated in his mind (under the influence of the English, radical movement) much earlier than its natural--scientific part-namely, before 1851, when the anthropological investigation of human institutions was in its rudimentary stage. In consequence of this, Spencer like Comte, did not take up the investigation of these institutions by themselves,

without preconceived conclusions. Moreover, as soon as he came in his work to social philosophy--to Sociology-lie began to make use of a new method, a most unreliable one-the method of analogies-which he, of course, never resorted to in the study of physical phenomena. This new method permitted him to justify a whole series of preconceived theories. Consequently, we do not possess as yet a philosophy constructed in both its parts-natural sciences and sociology -with the aid of the same scientific method. Then, Spencer, it must also be added, is the man least suited for the study of primitive institutions. In this respect he is distinguished even among the English, who generally do not enter readily into foreign modes of life and thought. "We are a people of Roman law, and the Irish are common-law people: therefore we do not understand each other," a very intelligent Englishman once remarked to me. The history of the Englishmen's relations with the "lower races" is full of like misunderstandings. And we see them in Spencer's writings at every step. He is quite incapable of understanding the customs and ways of thinking of the savage, the "blood revenge" of the Icelandic saga, or the stormy life, filled with struggles, of the mediaeval cities. The moral ideas of these stages of civilization are absolutely strange to him; and he sees in them only "savagery," "despotism," and "cruelty." Finally-what is still more important-Spencer, like Huxley and many others, utterly misunderstood the meaning of "the struggle for existence." He saw in it, not only a struggle between different species of animals (wolves devouring rabbits, birds feeding on insects, etc.), but also a desperate struggle for food, for living-room, among the different members within every species--a struggle which, in reality, does not assume anything like the proportions he imagined. How far Darwin himself was to blame for this misunderstanding of the real meaning of the struggle for existence, we cannot discuss here. But certain it is that when, twelve years after "The Origin of Species," Darwin published his "Descent of Man," he already understood struggle for life in a different sense. "Those communities," he wrote in the latter work, "which included the greatest number of the most sympathetic members would flourish best and rear the greatest number of offspring." The chapter devoted by Darwin to this subject could have formed the basis of an entirely different and most wholesome view of nature and of the development of human societies (the significance of which Goethe had already foreseen). But it passed unnoticed. Only in 1879 do we find, in a lecture by the Russian zoologist Kessler, a clear understanding of mutual aid and the struggle for life. "For the progressive development of a species," Kessler pointed out, citing several examples, "the law of mutual aid is of far greater importance than the law of mutual struggle." Soon after this Louis Buchner published his book "Love," in which he showed the importance of sympathy among animals for the development of moral concepts; but, in introducing the idea of love and sympathy instead of simple sociability, he needlessly limited the sphere of his investigations. To prove and further to develop Kessler's excellent idea, extending it to man, was an easy step. If we turn our minds to a close observation of nature and to an unprejudiced history of human institutions, we soon discover that Mutual Aid really appears, not only as the most powerful weapon in the struggle for existence against the hostile forces of nature and all other enemies, but also as the chief factor of progressive evolution. To the weakest animals it assures longevity (and hence an accumulation of mental experience), the possibility of rearing its progeny, and intellectual progress. And those animal species among which Mutual Aid is practiced most, not only succeed best in getting their livelihood, but also stand at the head of their respective class (of insects, birds, mammals) as regards the superiority of their physical and mental development. This fundamental fact of nature Spencer did not perceive. The struggle for existence within every species, the "free fight" for every morsel of food, Tennyson's "Nature, red in tooth and claw with ravine"--he accepted as a fact requiring no proof, as an axiom. Only in recent years did he begin in some degree to understand the meaning of mutual aid in the animal world, and to collect notes and make experiments in this direction. But even then he still thought of primitive man as of a beast who lived only by snatching, with tooth and claw, the last morsel of food from the mouth of his fellowmen. Of course, having based the sociological part of his philosophy on so false a premise, Spencer was no longer able to build tip the sociological part of his synthetic philosophy without falling into a series of errors.

(To be Continued.)

Footnotes

1 None that know the author's fairness of mind will be likely to accuse him of partiality in the scathing criticism he here makes of the Apostle of Positivism. Lest any reader be inclined to do so, however, it may not be amiss to cite on this point

the opinion of a critic unquestionably conservative and. presumably, impartial-an opinion I came upon by mere chance while engaged on this translation. Scattered through pages 560 to 563 of Falckenberg's "History of Modern Philosophy" (Henry Holt & Co., New York, 1893), I find the following estimate of Comte and his uneven work: "The extraordinary character of which [Comte's philosophy] has given occasion to his critics to make a complete division between the second, ,subjective or sentimental period of his thinking, in which the philosopher is said to be transformed into the high priest of a new religion, and the first, the positivistic period. . . . Beneath the surface of the most sober inquiry mystical and dictatorial tendencies pulsate in Comte from the beginning. . . . The historical influence exercised by Comte through his later writings is extremely small in comparison with that of his chief work. . . . Comte's school divided into two groupsthe apostates, who reject the subjective phase and hold fast to the earlier doctrine, and the faithful. "-Translator.