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SOME CURRENT THEORIES OF EMERGENT EVOLUTION

by

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Chapter I.

The Place Of Emergent Evolution
In The History Of Modern Evolution.

The general idea of evolution is not a new one. The notion that the world has passed through a process of change has been speculated upon by philosophers since the time of the Milesian school with the attempts of its philosophers to explain the world as an evolution from water, the indeterminate, and air. Since then various theories have been advanced. Emergent evolution, with which this thesis is concerned, represents one of the latest phases in the history of the idea of evolution, and it is my purpose in this essay to show the significance of and to evaluate this latest stage in the evolution of evolution. In order to do this I shall, in the first part of the thesis, discuss some of the more important theories of evolution which may be classified as "emergent." Then, in the concluding part of the work, I shall compare and contrast them and attempt to evaluate the general theory of emergent evolution.

Before, however, entering upon a discussion of special theories of emergent evolution, it is necessary

to give some account of the place of the general idea in the history of modern evolution.

Although the evolutionists dealt with in this essay have many differences of opinion, they seem to be in agreement on one point at least. All agree that the mechanical aspect of evolution has been over-emphasised. I say overemphasised, because some at least of them are willing to admit that there is an important mechanical element in evolution. Both Mr. C. L. Morgan and J. C. Smuts give importance to the mechanical side of evolution, but both take pains to assure us a wholly mechanistic interpretation of evolution can never be adequate. Such an interpretation can give no account of true novelty, and it is the fact of novelty in evolution which emergent evolution attempts to explain. Since, then, the general idea of emergent evolution is, in a sense, a reaction against mechanism, it will be necessary in order to appreciate its place in the history of evolution, to examine briefly the tendency which gave rise to it.

The two chief proponents of the theory of evolution in the nineteenth century,--or at any rate

in the latter part of that century,--were Darwin and Spencer. Now, though neither of these men held a purely mechanistic view of evolution their influence tended to add weight to the mechanistic view. Darwin was concerned chiefly with evolution as applied to the organic world. He did not attempt to formulate an all inclusive scheme of evolution such as that of Spencer. Since, however, it was he who first gave adequate proof of evolution in the organic world, his views have had a profound influence on subsequent speculation. Darwin's theory of evolution was not, as I have suggested, wholly mechanistic. He was willing to grant the possible importance of the use and disuse theory of Lamarck in evolution and thus by implication to give some recognition to the factor of individual will. It was, however, this non-mechanistic element which was rejected by the group of his followers known as the "neo-darwinians." As Mr. 1. William McDougall has pointed out they stressed rather the principles of "natural selection" and "chance variation" thus holding to the view that evolution has in it no element of progress in the wide sense, that all the various forms of life resulted simply from their chance fitness to conditions. Thus, though Darwin himself

1. "Modern Materialism And Emergent Evolution."
William McDougall.
P. 109.

was no rabid mechanist, his influence tended to strengthen the mechanistic view.

The philosophy of evolution of Herbert Spencer also tended to strengthen the mechanistic interpretation of evolution. It is true, of course, that he gave more importance to Lamarck's principle of use and disuse as a factor in the evolutionary process than did Darwin, nevertheless, his fundamental conception of evolution was mechanistic. His theory, which was an attempt to explain the whole universe in the light of evolution, depended ultimately upon the factors of matter and motion. This conception was expressed by Spencer in his description of evolution as: ^{1.} "An integration of matter and concomitant dissipation of motion, during which the matter passes from an indefinite incoherent homogeneity to a definite coherent heterogeneity, and during which the retained motion undergoes a parallel transformation." Such a law implies that all stages of evolution may finally be explained in terms of physical concepts.

It is, then, against a too mechanistic interpretation of evolution that the men whom I have classified

1. "Encyclopaedia Britannica," 1911 edition, Vol. 25, page 635.

as emergent evolutionists react. Each is attempting to formulate a theory which will remedy the defect of the older one, a theory which will give due emphasis to the novel in the evolutionary process. Mr. R. W. Sellars in expressing this wish says: ¹ "The older naturalism ignored novelty and evolutionary synthesis. An adequate naturalism must not make this mistake." Mr. C. Lloyd Morgan shows his consciousness of the contrast between the old and the new theories when he says: ² "-----if nothing new emerge-----if there be only regrouping of pre-existing events and nothing more-----then there is no emergent evolution." J. C. Smuts also finds it impossible to explain evolution as a mechanical process, especially in the higher stages.

It would seem then that the present bias toward some sort of emergent evolution has arisen as a reaction to the inadequacy of older evolutionism. The place of emergent evolution in the evolution of evolution is that of a reaction against an extreme view. It was, it would seem, inevitable. As early in the nineteenth century as the time of G. H. Lewes and J. S. Mill, according to

1. "Evolutionary Naturalism," 1922.
By R. W. Sellars,
p. 17.
2. "Emergent Evolution," 1928.
By C. Lloyd Morgan,
P. 1.

Mr. Morgan, the emergent aspects of evolution were recognised, and it is to these philosophers that he seems to trace the origin of the idea. It was not, however, as I have remarked, until recently that the conception of evolution as a process of emergence has become widespread.

Chapter II.

The Theory Of Emergent Evolution

As Developed By Mr. C. Lloyd Morgan.

The theory of evolution propounded by Mr. C.L. Morgan is not an attempt to formulate a wholly new scheme of evolution which owes nothing to the more orthodox theory. It is rather an attempt to utilise the valuable elements of the older theory and at the same time to introduce a new concept into evolution, which will deal with a neglected aspect of that process. This neglected feature, the element of emergence, in evolution, is, therefore, as the title of his work suggests, the chief point of emphasis in his theory. In the limited space of this chapter I cannot, of course, give a detailed account of his scheme. I shall discuss, however, what I regard as the salient points of his work.

As I have said the main point of emphasis in Mr. Morgan's theory is the concept of emergence. Any value which his theory has as a contribution to evolutionism depends upon the acceptance of the notion of emergence.

If this concept of emergence is rejected, as it has been by some critics, then Mr. Morgan's work will have failed in its chief purpose. Hence, it is necessary to interpret and criticise this concept first.

Throughout the progress of evolution there have emerged various levels of development each of which exhibits characteristic qualities unlike those of preceding levels. These characteristic qualities represent the emergent element in evolution. They have been called emergent chiefly because of the element of "unpredictable" novelty which they present in contrast with the mechanical aspect of the evolutionary process. Mr. Morgan in stressing this contrast points out that, although a scientist may be able to predict the weights of certain chemical compositions, he cannot in the first instance predict their qualities. Here the "unpredictable" novel qualities resulting from the combination of certain elements represent the emergent aspect, while its foreseen weight represents the mechanical aspect.

This emergent aspect pervades the whole of evolution. With the coming of every higher entity there

are emergently new qualities. Emergence is observable in what might be termed the minor levels of emergence as well as in the major ones. Within the inorganic stage there are atoms, molecules, etc. Again, within the organic realm the process of evolution is most clearly seen, while the mental level also exhibits progressively higher stages. Each higher stage in the scale of evolution has characteristically new elements, which make it unique and differentiate it qualitatively from what has gone before, thus exhibiting the emergent tendency. To sum up, then, the concept of emergence depends for its validity upon the recognition of new and "unpredictable" elements in each higher stage of evolution.

In considering the idea of emergence one is naturally led to ask in what sense the emergent qualities are "unpredictable." The general idea of emergent evolution has been criticised on the ground that the word "emergent" is merely a euphemistic disguise to hide our ignorance of the mechanical process in its entirety. Mr. T. H. Morgan in alluding to C. L. Morgan's

insistence on the "unpredictable" element says: 1. "To assert that science will never be able to make this sort of prediction is to assume a grave responsibility even for a philosopher." It has been maintained that the unpredictability emphasised by Mr. C. Lloyd Morgan merely indicates our ignorance of the mechanical processes of nature. Consequently with increased scientific knowledge we shall eventually be able to predict what now seems unpredictable. Emergent evolution, therefore, it is held, contributes nothing really new to the study of evolution. It is a futile attempt to deal non-mechanistically with an aspect of the evolutionary process for which a mechanistic theory will ultimately prove adequate.

This criticism, it seems to me, is based on a false view of Mr. Morgan's conception of unpredictability. It is true that the element of emergence in evolution might have nothing of the "unpredictable" in it to an omniscient mind, and it is also true that having once observed an instance of emergence, we may predict the result with similar pre-conditions. Nevertheless, there

1. "The Scientific Basis Of Evolution,"
Copyright 1932.
By Thomas Hunt Morgan p. 232-3

is an element of novelty in the first appearance which justifies its being called "unpredictable." To understand the author's conception of the emergently new it must be remembered that to him an instance of emergence is not merely a new combination of old elements. In the emergently new things terms take on new meanings and new kinds of relatedness come into being. Hence, his concept of emergence has positive value and is not merely a name for a mystery.

Another fundamental concept of this theory and one upon which that of emergence depends is that of relatedness. All instances of emergence result from new sorts of relatedness. The word relatedness as used by the author is a comprehensive term. In discussing this aspect of his theory he says: ^{1.}"I shall speak of the whole situation as the relatedness which comprises both terms-in-relation and the relation-of-terms." To grasp properly his conception of any entity it is necessary to understand the special interpretation which he gives to the words "term," and "relation" and the relationship existing between them. In his opinion

1. "Emergent Evolution," 1928 edition.
By G. Lloyd Morgan,
P. 69.

the relationship between the terms and relations of an entity is a reciprocal one. The meaning of the term is determined by its relationship. To him a thing may represent a number of terms depending on the light in which it is regarded. He tells us that the same man may be husband, tenant, etc., depending on the relationships with which he is associated in the mind. From this it is obvious that the term varies with its relations. Similarly the relation is determined by the way in which the term is regarded. For, though the terms and relations of an entity are separated for the purposes of analysis, they are in reality never so separated, each depending on the other.

Where there is a case of emergence a new kind of relatedness comes into being. Terms take on new meanings and are involved in new relationships thus giving the entity which they form new qualities and properties. That is, the relationships within the entity are new, while its relationship with other entities is changed. Such a change in which the very

constitution of an entity is changed represents the advent of what the author has called "effective relatedness." The new relatedness has an influence on further events within the entity.

This principle of relatedness is, of course, explanatory of emergence only in the most general sense. It does not explain away the novelty of emergence. To say that higher stages of evolution arise because of the coming into being of higher forms of relatedness is not to remove the characteristic element of the emergent aspect of evolution. We may apply the general term relatedness to the process which lies back of emergence, but we are still unable to predict or explain specifically a concrete case of emergence.

So far I have discussed the concepts of emergence and of relatedness. These serve to describe in a general way part of the process of evolution, but they offer no explanation of the "go" of evolution. Mr. Morgan has, however, dealt with this aspect of the evolutionary problem. He has offered what he

believes to be a reasonable account of the moving force of evolution. In his view the progress of evolution depends upon God. In order to appreciate the place of God in his scheme it is necessary to understand the special meaning which he has given to that word.

Before attempting to outline the author's conception of God it should be remarked that God is in his mind to be classified as acknowledgment. ^{1.}"Now by acknowledgment," says Mr. Morgan, "I mean acceptance of that which is, as I think, not susceptible of logical proof or disproof, on the ground that such acceptance gives consistency to a scheme otherwise incomplete." Hence God is, like independent matter, and universal psycho-physical correlation, an essential assumption which can neither be proved nor disproved.

God is of supreme importance in this theory of evolution inasmuch as he supplies at once the "go", the power of direction, and the end of the evolutionary process. It is God who is the developing force of evolution. Without God there could be no evolution. It is this divine being who prevents evolution from

1. "Emergent Evolution," 1923 Edition,
By C. Lloyd Morgan,
P. 116.

being an aimless process. For emergent evolution involves the notion of progress thus opposing the mechanistic view which does not seem to require it.

When our author says that God supplies the "go" of the universe, he does not imply that some external divine being gives the initial energy, so to speak, to the world and then stands aside to watch his toy work. God, to Mr. Morgan, is immanent in all things. He suffuses all parts of the universe and energises them.

Mr. Morgan's conception of God as the directive force in the universe is hard to grasp. The author is not a determinist at least in the ordinary sense of the word. He seems to hold that an individual has freedom of choice and action, but at the same time all things are, as I have said, suffused by Divine activity and are consequently influenced by it. God, it would seem, bears somewhat the same relation to the individual as does the holistic principle of J. C. Smuts to individual wholes. He directs in a general sense, but at the same time makes allowance for the freedom of the individual.

As the divine being operates in the universe it tends towards a goal. It must be thought of as at once working towards that goal and implying it in itself. Evolution, therefore, in order to do this must be progressive, that is it must not be merely a process of adaptation, but a definite forward movement. Hence, there must be evolved progressively higher forms of relatedness.

In the last pages of "Life Mind And Spirit" Mr. Morgan says that he will not argue with those who describe him as a mystic. In considering his conception of God the implications of this statement should be borne in mind. If we are to accept the author's view of the divine being there must be a large element of faith in that acceptance. I lack that faith and I find it difficult to unify the various attributes ascribed by Mr. Morgan to God. I do not mean that the various functions attributed by him to God are not being performed, but the word God as he uses it seems to me to be a misnomer.

Another essential acknowledgment of this

scheme of evolution is that of "universal psycho-physical correlation." By "psycho-physical correlation" is implied the inseparability of the two attributes, the psychical and the physical. There is no physical entity which is not at once psychical. This psycho-physical correlation runs through all ascending levels of evolution. In defining this sort of correlation Mr. Morgan has denied that it is either psycho-physical parallelism or interactionism. In his opinion there is no causal relation between the physical and the psychical attributes, but he believes they are universally concomitant. Without the psychical attribute there could be no emergence of reflective mind, for mind seems to be in the author's view an evolvement of the psychical attribute. It has, however, been urged by J. C. Smuts in commenting on Mr. Morgan's theory that this universal correlation of the psychical attribute with the physical has defeated the very idea of emergence. He maintains that such a theory is not one of emergence but one of unfoldment. He says: ¹. "Besides, Professor Lloyd Morgan makes the psychical factor

1. "Holism And Evolution," 1926.
By Gen. The Right Hon. J. C. Smuts,
P. 321.

the correlate at all stages of the physical factor, thus in effect getting back to the Spinozistic position that all bodies, even inorganic matter, are animata in their several degrees. This view seems to be a reversion to the preformation type of evolution and to be destructive of all real effective "emergence."

I do not think this particular criticism is justified. The fact that mind is derived from some lower form of the psychical side does not, in my opinion, invalidate the idea of emergence any more than the fact of emergence is invalidated by the assertion that higher forms of the physical result from the synthesis of two physical elements.

Mr. William McDougall in his book,² "Modern Materialism And Emergent Evolution," has raised the question of the relation between the psychical and the physical in dealing with this aspect of the theory. He finds it impossible to reconcile Mr. Morgan's assertion that there is no causal connection between the two with the notion that at the higher levels there is some sort of influential relation existing between them.

2. "Modern Materialism And Emergent Evolution,"
By William McDougall.
P. 243.

He asks how, when there is no causal relation between the psychical and the physical, they can influence each other as they seem to. I think the explanation for Mr. Morgan's position is to be found in his conception of the fundamental unity of the psychical and the physical. They are different sides of the one reality. The relation between them, it seems to me, might be likened to that between the positive and negative poles of a magnetic needle. When Mr. McDougall speaks of the interaction of the psychical and the physical attributes at the higher levels, it seems to me that he has disregarded the idea of fundamental unity. Aspects do not interact. The relation between them is more than causal.

The psycho-physical unity here discussed represents the stuff of the world. At certain levels of evolution one aspect is stressed more than another, but they are always developing harmoniously. With the coming of more complicated forms of relatedness new levels emerge. There are, of course many stages of emergence, but the author has dealt more especially with certain major levels. Among these he has dealt

with the emergence of the organic from the inorganic and of mind which seems to represent the most difficult stages of transition in all comprehensive schemes of evolution.

In considering the emergence of the organic Mr. Morgan does not attempt to outline a chain of minute steps of evolution between that and the inorganic. Rather, like J. C. Smuts, he points out that the apparent break in the evolutionary process here is constantly being lessened by science. At the same time he reminds us that even though science may never create life this fact does not disprove his theory. He says: 1. "No living being has been produced under laboratory conditions or has been seen to arise de novo and not ab ovo. There is as yet no plain tale evidence of the passage from the not living to the living. Does it follow that there never has been such a plain tale -- perhaps under conditions in the past history of our planet which cannot be reproduced in the laboratory? Surely an assertion that it has not taken place is insecurely based, and should be replaced by the more

1. "Life Mind And Spirit," 1925,
By C. Lloyd Morgan,
P. 77.

modest statement that we do not know, and, it may be that, from the irretrievable pastness of the event, we can never know." Thus the author, though admitting that experimental proof of his assumption may be impossible, contends, nevertheless, that it is a reasonable one. His contention on this point is, I think, a justifiable one. When one takes into consideration the fact that the inorganic as he has conceived it though emphasising the physical aspect, is still a psycho-physical unity, the transition loses much of its abruptness. It is true that we cannot reduce life to inorganic terms, but the central thought of his theory is the emergence of new sorts of relatedness producing entities which are qualitatively different from lower forms. When one comes to deal with mind as characterised in the theory of emergent evolution the psychical attribute takes on the greater emphasis. This is not to imply that mind is separated from the physical. With the coming into being of mind there come into being concomitantly new forms of relatedness in the physical side of the entity.

Enjoyment and reference, the new psychical characteristics, depend on physical influence. Thus in mind the physical and psychical aspects are still inseparable.

In both "Emergent Evolution," and "Life Mind And Spirit" Mr. Morgan has outlined a theory of reference. He has, as Professor McDougall has pointed out, changed his view of the origin of reference in the later book. In it there is supposed to be some sort of reference with the first sensations of a newly born animal. This type of reference, non-cognitive reference, was denied to first sensations in "Emergent Evolution." In the first book reference seems to depend on revival. However, in "Life Mind And Spirit" revival characterises the second stage of reference, that of cognitive reference. It is true that on this point the author has contradicted himself. Even a philosopher, however, has the right to change his mind. His later version, which is the one I shall consider, seems to me to be more consistent than his first; for by making a form of reference concomitant

with sensation it emphasises the real continuity of the evolutionary process. Although mind has characteristically new qualities, it is, nevertheless, closely bound up with life.

There are, broadly speaking, three forms of reference. The lowest is noncognitive reference which is concomitant with sensation. The next stage of reference is that of cognitive reference. It depends on experience where the element of revival comes into play, and instances of noncognitive reference are synthesised into coherent groups. This form of reference exists in the minds of higher animals and very young children. In speaking of the third and highest form of reference Mr. Morgan says: ^{1.} "The top level is that of reflective reference in our rational thought where events are planned out and interpreted under suitable generalisations." These, then, represent the ascending types of reference involved in the emergence of mind.

Besides reference the mind is also characterised by enjoyment. Enjoyment as used by this author

1. "Life Mind And Spirit," 1925,
By C. Lloyd Morgan,
P. 132.

seems to be a general mental feeling. It may be either pleasurable or painful. This quality of enjoyment seems to be in evidence at all levels of reference. It represents a kind of background as it were which, though depending on other qualities, is not identical with any of them. It, of course, like reference, is inseparably connected with the physical system which serves as a centre of influence from other systems.

In the preceding paragraphs I have discussed what I believe to be the fundamental principles and assumptions of Mr. C. Lloyd Morgan's theory of emergent evolution. Now it is necessary to evaluate the theory as a whole. Although I disagree with the author on certain questions such as that of God, I think his theory has been a valuable contribution to the study of evolution. It is true that the idea of emergence did not originate with Mr. Morgan, as he has reminded us. Nevertheless, his attempt to construct a comprehensive and consistent scheme of evolution which should give due stress to the emergent

aspect has served to offset an overmechanistic interpretation of the evolutionary process, and to give positive emphasis to a neglected aspect.

Chapter III.

Holism As A Form Of Emergent Evolution.

As I have pointed out at the beginning of this thesis the importance of the emergent aspect of evolution has been recognized by a number of men recently. General J. C. Smuts working independently of Mr. C. L. Morgan on the problem of evolution has in his book, "Holism And Evolution," given considerable prominence to this feature of the evolutionary process. Although he has not given the name "emergent evolution" to it, he has, as he points out, dealt with it in his discussion of creativeness. This creativeness is, as he maintains, only a part of his scheme of evolution. It is, however, so intimately bound up with his scheme as a whole, that, in order to deal with it adequately, it will be necessary to touch upon some of the most fundamental aspects of his theory.

Despite the fact that, as was remarked in the preceding chapter, Smuts denies true emergence to

Morgan's theory, the concepts of the two men as to what emergence itself is seem to be essentially similar. Each, though admitting the importance of the mechanical element in the evolutionary process, demands something more. Each has found the mechanistic interpretation with its inevitable determinism to be inadequate. They have seen in the evolutionary process an element of novelty, of positive newness, which requires the formulation of a new concept for its treatment. Mr. Morgan has called this the emergent element of evolution, while Smuts has presented the same concept in the creative aspect of Holism. When I say that these philosophers recognize the emergent element in evolution, I do not wish to imply that their schemes of evolution are wholly alike. I wish rather to stress the fact that, however each conceives the general explanation of the evolutionary process, both reject a wholly mechanistic view, and assert the emergence of the really new. Thus, the author of "Holism And Evolution" says: ¹ "Evolution is not merely a process

1. "Holism And Evolution," 1926
 By Gen. The Right Hon. J. C. Smuts
 Chapter V, P. 89.

of change, of regrouping of the old into new forms; it is creative, its new forms are not merely fashioned out of the old materials; it creates both new materials and new forms from the synthesis of the new with the old materials." This quotation will, I think, serve to show the rapport between the concepts of emergence of these two men.

The holistic scheme of evolution is based upon the theory that there is a fundamental urge in the universe towards the formation of wholes. This urge must be regarded as immanent in the very stuff of the universe, and not something working from without. It displays itself in the formation of increasingly more complex and closely knit wholes. In the formation of these wholes at whatever stage of the evolutionary process, the holistic principle endows the entities in which it is exhibited with the functions of self-regulation and creativeness. These two chief functions of the whole are important from the point of view of emergent evolution inasmuch as they

together supply the ground of the emergent aspect of holism. The very concept of the whole implies a measure of individuality and individuality in turn implies self-regulation. This is not to say that wholes as our author conceives them do not influence one another. On the contrary, through the medium of their fields they are able to influence each other. Nevertheless, the concept of the whole differs from that of homogeneity in its character of individuality or centralness. I have stressed the individuality of the whole with its proportionate measure of self-control because the self-regulation of the whole is indispensable to the theory of creativeness evolved by our author. It is his thesis that the co-operative-ness of the parts of the whole which distinguish the dynamic whole, makes it possible for the whole to transmute external stimuli into responses which are determined not by the character of the stimuli but by the character of the responding whole. Now without self-regulation such transformation of external

influence would be impossible. Consequently, there could be no real freedom of the whole and no real creativeness. For a whole to produce the novel it must not be bound by universal mechanical causation. This is not to deny the importance of causality, but rather to emphasise the importance of the individuality of wholes. Certainly the whole is affected by external stimuli, and causality within the entity contributes to its creativeness, but, at the same time by virtue of its wholeness, its individuality, it is enabled to respond not simply mechanically but in conformity with its own nature. Smuts in urging this power of transformation of the whole points to the fact that in the higher levels of evolution where synthesis is more complete, the power of self-determined response becomes progressively greater. This question of the transformation and utilisation of a stimulus by a whole is of paramount importance, because it makes possible individually free action which in our author's scheme is essential to the emergence of the novel.

The creative element in the evolutionary

process depends, therefore, ultimately upon this power of the whole to react self-determinately to an external stimulus. Now it might be said that wholes are not really self-determinate. It might be urged that since the whole is a result of evolution its nature as an individual is fixed and that, therefore, it has only a kind of pseudo-freedom. It seems to me that the very concept of the whole has as one of its chief characteristics the notion of independence. Now it is true that, as Smuts takes pains to point out, wholes are interconnected by fields and are related to the past. Nevertheless, the justification of applying to them the term whole rests on this idea of unity or individuality. We cannot apply the word "whole" without implying it. If we ask why there should be a tendency in the universe towards the formation of wholes our author cannot answer us. He has deduced the fact that there is such a principle. If we accept its existence, we must accept also the fact that wholes in the nature of things have individuality and real freedom. It should be remarked, however, that

wholes as products of the evolutionary process though having a measure of freedom, are not irresponsible. They combine individual freedom with order in the wide sense.

The emergence of the new in evolution results, therefore, from the creativeness of the whole. To say that this is so is not, however, to explain specifically the emergence of the new. In this respect holism bears resemblance to the theory of Mr. Morgan inasmuch as each contains an explanation in general terms of the emergence of the novel, but only in the most general terms. When our author deals with the transition from matter to life, he does not offer a really specific explanation of the process, unless one interprets the tension theory, which I shall discuss later, as specific. He introduces, it is true, a new concept of matter and life which he maintains will do away with the severe distinction between the physical and the living resulting from the old concepts. But, even when he has done so and reduced the gap between life

and matter as far as he is able, life is still an emergent. Life represents the emergence of a higher level having novel characteristics not existing in matter and which cannot be reduced to terms of matter, even of the matter of Smuts. Hence, though our author explains the coming of the organic in a general way as a more intense form of synthesis, it has, I think, the characteristics of an emergent.

In order to give a more adequate description of the emergent aspect of holism I shall in the next few paragraphs discuss briefly the chief levels of evolution from the point of view of emergence.

Smuts takes as proven the fact of evolution and lays it down that life and mind have emerged from the physical. Now, as he has said, with the older concepts of matter life and mind as utterly unlike there could be no such evolution. Consequently, he concludes that these concepts must be revised, and he proceeds to do so. The outcome of his consideration of the physical is that it is not inert as in the old concept. Matter seems, indeed, to be energy

regulated by structure. His new concept of matter and its possibilities is well summarised in the following quotation:^{1.} "Matter is thus a structure of energy units revolving with immense velocities in Space-Time, and the various elements arise from the number and arrangements of the units in an atom; as these can be varied, the transmutation of elements becomes possible, as in Radioactivity." This view of matter as dynamic serves, our author believes, to make more plausible the hypothesis of the emergence of life and mind from it. At the same time that he argues for the emergence of these from matter he stresses the fact that life and mind are not to be thought of as implicit in matter in the ordinary sense. Life and mind are, as I interpret the theory, to be thought of as evolved forms of the one fundamental reality of which matter is a form. The development from matter to mind is continuous in the wide sense. This is not a denial of the advent of real novelty. However, each progressively higher stage of evolution though exhibiting novelty depends nevertheless upon

1. "Holism And Evolution," 1926
By Gen. The Right Hon. J. C. Smuts
Chapter III, P. 35.

the lower levels as in Mr. Morgan's scheme of evolution.

Smuts' treatment of the emergence of life from matter is not clear to me. In one passage he implies that the actual steps of the process are still a mystery. In another passage, however, he tells us that life owes its origin to tension brought about by a disturbance of the equilibrium in the world of matter. Now it is true that he has ascribed the progressive character of the evolutionary process to a kind of vague lack of equilibrium in the universe. It seems to me that this is not sufficient to explain the emergence of the living. If he means that the tension made possible the bringing into action of the greater power of selectivity characterising the organic, I have no criticism to make of his consistency. In other words, if his meaning is that tension gave scope to the latent selectivity of life or co-operated with it so to speak. But if the implication is that the strain which makes possible the activity of the selectiveness of life is responsible for that selectiveness, I cannot harmonise the two suggestions.

According to Holism the fundamentals of mind and life come into play at the same time. Mind does not, of course, reach its full development until life has progressed considerably. Our author, however, thinks the reaction to tension of which I have spoken in the preceding paragraph is the ultimate source of consciousness and control which mark mind. In this stage there is no real consciousness, it is true, but consciousness is traced by Smuts to the sense of comfort and discomfort induced by varying tension.

Mind is an organ of the vital whole and not itself an independent whole. Its present form was not achieved until after an extremely rapid development of the individualistic aspect of the whole synthesised with a greater power of regulation. It gives the living creature greater power of self-regulation and therefore greater individual freedom.

The next stage of the evolutionary process is exhibited in the emergence of personality. The concept of personality held by the author of "Holism And Evolution" is difficult to define precisely.

It represents a closer synthesis of matter, life, and mind in the individual, a closer union between these elements plus an element of novelty. Some idea of the make up of the personality may be gained when our author concludes a rather lengthy definition of it by describing it as ^{1.}"-----a creative synthesis in which the earlier series of material, organic and psychical wholes are incorporated with a fresh accession or emergence of Holism, and thus a new unique whole of a higher order than any of its predecessors arises." Personality is not necessarily, of course, the final stage of evolution of man. It is simply the latest.

In this chapter I have not summarised completely the book, "Holism And Evolution." I have, of course, dealt with some of the most fundamental aspects of the holistic scheme in order to place the creative element in its proper setting. It has been, however, my purpose to stress chiefly this element of creativeness, which in this scheme represents the emergent aspect. I have tried to emphasise the similarity of the views of Mr. Morgan and General Smuts on

1. "Holism And Evolution," 1926.
By Gen. The Right Hon. J. C. Smuts,
Chapter X, P. 263.

this point. That is to say, on the necessity of accepting an emergent element in the evolutionary process.

This similarity of concept is rendered more significant by the fact that the two men have different views as to the fundamental stuff of the universe, one holding the psychical and the physical to be universally concomitant, while the other regards the psychical as a late product of evolution. Thus holism further stresses the inadequacy of the mechanistic theory of evolution and urges the necessity of giving place to an element of real novelty in evolutionism.

Chapter IV.

Emergence In "Evolutionary Naturalism."

In the present chapter I shall deal with the theory of evolution of Mr. R. W. Sellars, which has been developed in his book, "Evolutionary Naturalism." In his theory Mr. Sellars has considered the problem of novelty, which expresses the emergent aspect of the evolutionary process. Our author's theory is, as the title of his book suggests, naturalistic, but the word "naturalistic" as used here is not synonymous with "mechanistic." Mr. Sellars has essayed to devise a theory of evolution, which is not cramped by mechanism, and which stresses duly the truly novel. In doing so he has necessarily had to work out a scheme which would avoid the inflexibility of what he has termed "older naturalism." In order to accomplish this end he has evolved a scheme in which new views of the source of change and of the nature of matter have been set forth, and in which the importance of synthesis has been recognized. By introducing these

ideas into his theory he has attempted to make the emergence of the novel in a naturalistic interpretation of evolution plausible. In commenting generally in this opening paragraph it should be remarked that the process described in "Evolutionary Naturalism" does not seem to be purposive in the broad sense. Our author, though admitting that the world seems to have progressed in one direction for a considerable time, rejects, as I interpret him, the idea of progress towards any goal. ¹"Evolution," he says, "is but another term for change or the variable character of specific things. We must rid the term of any finalism--." One should not, however, be led to assume from this quotation that evolution is chaotic, that there is no co-operation in the universe. There is order in it, but there is also freedom. Indeed, the author has laid great stress upon the compatibility of the ideas of order and freedom in the universe; for his interpretation of evolution demands both.

In the form of naturalism which Mr. Sellars is concerned to amend, the mechanistic interpretation

1. "Evolutionary Naturalism," 1922.
By R. W. Sellars,
Chapter XIII, Page 261.

was supposed to explain the whole process of evolution in the world. Matter was thought to be something quite inert, which received change from outside. All entities under this system might be reduced to terms of this sort of matter plus externally imposed change. It has been Mr. Sellars' aim, it seems to me, to retain the notion of the evolutionary process taking place in the physical medium, but at the same time to suggest a new concept of that physical medium. Thus his system though remaining naturalistic in the broad sense avoids the limitations of the mechanistic form of naturalism.

Mr. Sellars' use of the word "naturalism" in the title of his work has been criticised. It has been suggested that in rejecting those elements which he has discarded, he has forfeited the right to call his system naturalism. Mr. G. H. Sabine expresses this thought in his review of "Evolutionary Naturalism" in the "Philosophical review." He says, ¹ "But it is rather puzzling to find any good reason for calling it naturalism, since it rejects precisely what

1. "The Philosophical Review," Vol. 32, No. 1, G. H. Sabine, Page 94.

was most characteristic of naturalism in its traditional forms." If one regards naturalism as practically synonymous with mechanism this criticism is justified. Mr. Sellars tells us, however, at the outset of his work that the word "naturalism" in his usage will differ from the orthodox use of the word. He has, as Mr. Sabine has said rejected some traditional elements in the meaning of the word. He has not, however, found it necessary to introduce into his scheme anything supernatural, and the medium of evolution throughout his theory is physical. There is no psychical element in his scheme which is alien to the physical, no dualism. Mind as he conceives it is a development of the physical and is not to be thought of as belonging to an alien realm. This criticism of his use of the word "naturalism" is not of special importance. My purpose in discussing it is to emphasise the general character of "Evolutionary Naturalism."

Under the mechanistic interpretation of the universe one usually thinks of change as being something

injected into things from the outside. Things in themselves are not regarded as having the capacity for change. In Evolutionary naturalism, however, the immanence of change is recognised. Things are thought of as being centres of change as it were. Consequently, the idea of externally imposed change is replaced by that of inherent change. Since this change is inherent in things, their actions are to some extent free. I use the qualifying phrase "to some extent" because, as I have said, in the scheme of Mr. Sellars caprice is precluded. The parts of the universe are so interrelated that complete freedom of action seems to be impossible. One must think of entities or syntheses as being centres of organisation which, though in a measure free, are, nevertheless, by virtue of their "genetic continuity" with the whole universe interactive. Moreover, though the immanence of change in a whole gives it freedom to act in character with its own nature, the fact of the necessity of its acting in this way further precludes caprice. Hence interaction and self-conformity stand as checks

to caprice, while the inherent elements of change in individual things makes possible freedom.

Although immanence of change is an essential point in this theory, it is not all that is involved in the emergence of the novel. One must also consider the synthesis involved in it. Although we do not observe the actual existents which make up the universe, we can infer the process of synthesis which takes place in their development. Our author appeals to recent scientific development to uphold his statement that the actual terms of things change their nature and thus create new relations resulting in novel syntheses. In this connection he says,¹ "It is for the scientist to tell us of the nature of real connections; and he is beginning to assert that many of these involve the change of the terms as they previously existed. This is the so-called creative synthesis upon which the evolutionary naturalist builds so largely as against the Eleatic Atomist."

On the whole Mr. Sellars' treatment of the change of the terms and relations of a thing involved

1. "Evolutionary Naturalism," 1922,
By R. W. Sellars,
Chapter X, Pages 214-5.

in the emergence of the new seems to have much in common with Mr. C. L. Morgan's emergence of higher forms of relatedness. He seems, however, to lay greater emphasis upon the term than does the latter. It is the term in which the change originates so to speak. Relations must be thought of as being dependent upon the nature of the term in this theory. Mr. Morgan, on the other hand, emphasises the importance of relations as determining the nature of the term. In either case, however change of one factor in a thing involves change of the other in the development of the new.

It is obvious that a scheme of evolution involving elements such as those discussed in the preceding paragraphs cannot remain consistent and retain the mechanistic view of matter. Mr. Sellars has, therefore, like General Smuts, replaced this concept with one which he regards as more valid, truer to the actual existent called matter. Our author's recognition of the limitations of the older concept of matter and his belief in the potentialities of what he regards as the real matter may be gathered from

his assertion that, ^{1.}"Inorganic matter is a far more active subtle and responsive stuff than the brickbat atomists of the past supposed. It lends itself to mobile integrations which under the hand of time may lead to tremendous novelties." With a concept of matter such as this the emergence of the higher stages of evolution from it is made much more plausible. The immanence of change within it suggests possibilities of development not present in the matter of the mechanist.

In the foregoing paragraphs I have dealt with the essentials of the process of evolution, as I see them, in this scheme, and I have tried to give some idea of the medium in which they are manifested. Our author's concept of matter, his view of the immanence of change, and his emphasis upon synthesis are in themselves valuable in the interpretation of evolution. The theory of evolutionary naturalism seems to me, however, to contradict itself in a certain respect. I have already mentioned the fact that Mr. Sellars has no place in his theory of evolution for the idea of

1. "Evolutionary Naturalism," 1922,
By R. W. Sellars,
Chapter XIII, Page 263.

progress held by Mr. C. L. Morgan. He suggests that the apparent progress observable in the process is only accidental, thus implying that evolution is change without even general direction. But, in developing his thesis he asserts that there is in the evolutionary process what he terms "genetic continuity." This phrase expresses the dependence of the most novel synthesis upon what has gone before. Every newly evolved thing is, in spite of its novel elements, continuous with the total movement. If there is "genetic continuity" it would, in my opinion, preclude the idea of accidental progress, for it would determine in a general way the direction of the evolutionary process. I am not suggesting that, because of this form of continuity the whole of evolution is determinate. Nevertheless, if there is mutual influence between the parts of the universe, the implication of "genetic continuity" is that there is a general trend in evolution, and it is this implication which I cannot reconcile with accidental progress.

Mr. Sellars has not dealt with the various

stages of evolution as concretely as has General Smuts. In a preceding paragraph I have described his concept of matter. All higher stages of evolution represent developments from matter. By means of the complementary factors of change and synthesis life and mind are evolved. Thus the "genetic continuity" of the evolutionary process is maintained. Mr. William McDougall¹ regards the fact that Mr. Sellars has not dealt more specifically with the actual coming into being of life and mind as a defect in our author's exposition of his theory of novelty in evolution. This criticism has, of course, some justification. At the same time, however, it should be remembered that Mr. Sellars has set down the fundamental principles which operate in the process of evolution, and which are to be used in the interpretation of the emergence of the various stages of development.

Having dealt with the important aspects of Evolutionary naturalism in the foregoing pages I shall now attempt, in conclusion, a general estimate of its merits and defects. There are in this theory certain

1. "Modern Materialism And Emergent Evolution",
William McDougall,
P. 265.

elements which appear in the works of Mr. Morgan and Mr. Smuts. In them we find the immanence of activity and the importance of change recognised. These elements are of value in the new interpretation of evolution which they make possible. I have already discussed Mr. Sellars' view of progress as accidental. As I have pointed out this idea seems to be contradicted by the implications of certain features of his scheme. The value of his work lies, then, in his insistence upon the recognition of certain elements in the evolutionary process rather than in his theory as a whole.

Chapter V.

Mr. E. Noble's Conception Of Evolution.

In the chapter just concluded I dealt with a theory of evolution in which the notion of progress was not required, yet one which took cognizance of the emergent aspect of evolution. In this chapter I shall deal with a scheme which also recognizes emergence in evolution, but which finds the evolutionary process to be purposive. The theory of "Purposive Evolution" presents the evolutionary process as one in which the fundamental nature of the primary stuff of the universe, ether, renders the developmental process called evolution necessarily purposive. This ether represents the basic stuff of the universe. All developments of evolution arise from it, and are governed by its fundamental characters. Consequently in order to interpret any aspect of evolution properly it is necessary to know the nature of this medium. I shall, therefore, as in previous chapters, have to

give a brief outline of the principles of this evolutionary system. Since these principles represent characters of ether, it will be well to begin with a discussion of ether itself.

Since all stages in evolution owe their origin to ether, since they are formed ultimately of ether, and since their development is governed by the nature of ether, ether itself is necessarily difficult to define precisely. Nevertheless the conception of ether which I have gathered from Mr. Noble's book is that of a medium which has certain fairly definite characteristics. In the first place, ether must be thought of as being the all-pervading stuff of the universe. Secondly, it is, in its pure form so to speak composed of homogeneous units. Some idea of the nature of these units may be gained from the fact that Mr. Noble has applied to them the term "power units." Thus he emphasises the dynamic nature of the ultimate units from which all things are derived. This emphasis upon the power or energy aspect of ether is extremely important, since the whole of the evolu-

tionary process, according to this theory, is made possible by it. It is this basic power which is responsible for all change in development. These characteristics of universality and of power are not, of course, the only characteristics of ether. I have grouped them in one paragraph, because they serve to give a general idea of the nature of ether. In subsequent paragraphs I shall consider various other characteristics of it which are involved in the evolutionary process.

There are inherent in the ether units two factors making possible evolution as we know it. There is first the tendency towards differentiation. As I interpret Mr. Noble's theory this tendency displays itself in the formation of systems which are in a state of disequilibrium. There is also, however, operating at the same time a factor which is constantly working to bring about stability and likeness. Our author in describing the action of these fundamental factors remarks,¹ "What we see is a universe of power first differentiating itself into

1. "Purposive Evolution,"
By E. Noble,
Chapter XLVIII, Page 519.

material unlikenesses that represent conditions of differential stress, then impelling its products into the configurations which represent equalized stress." These are the two factors which make possible progress. They represent the fundamental antagonism in the nature of things, which Mr. Noble finds to be necessary to real co-operation. It is through their action that the evolutionary process is able to proceed. Either working alone could not produce the orderly development which our author finds in evolution.

In considering every stage of evolution, inorganic, organic, mental, and social, one must constantly bear in mind these factors, for they are operative throughout all evolution. The constant tendency towards the neutralization of stress is shown in the rounded shape of sea pebbles, Mr. Noble tells us. In the inorganic world the effort to lessen stress is shown in the constant aim to promote self-maintenance, and is back of all action. In society our author finds exemplified the same trend in the harmonising of the interests of individuals in larger wholes such as nations.

I stress this tendency, because it is so closely involved with purposiveness and self-maintenance. The operation of this tendency away from states of differential stress towards more stable forms, which because of their greater stability have greater power of endurance, is another aspect, as it were, of the tendency to self-maintenance.

Mr. Noble has given considerable attention to another fundamental character of the evolutionary process, that of universal intelligence. The word "intelligence" as he uses it seems to differ somewhat from the ordinary use of the word. When one thinks of the word, one ordinarily associates it with the idea of consciousness, but intelligence in his view does not require consciousness. To him there is intelligence operating in all phases of evolution. The order observable in the inorganic, and such developments in the organic realm as the orderly growth of a body he considers to be manifestations of this fundamental intelligence. Moreover, not only does it govern order, but it seems

also to supply energy. Considered from this latter point of view it seems to be synonymous with the fundamental power of which I have spoken in a preceding paragraph. Thus it must be regarded as a fundamental character of the universe, and must not be thought to arise only with consciousness.

To say that intelligence does not require consciousness is not to say, however, that human intelligence with which consciousness is associated is of a fundamentally different kind. Human intelligence is fundamentally the same as the universal intelligence. Its function is to aid the human being in self-maintenance, to enable him to govern himself in accord with the essential nature of the universe in which he lives.

The concept of intelligence as universal seems to me to be on the whole superfluous. In the meaning which our author has attached to the word there are combined the ideas of power and of order.

Now it is true that Mr. Noble speaks of intelligence as being an aspect of the fundamental power and not a

separate sort of power, and therefore has not disrupted his fundamental scheme. One is prone to ask, however, why the dynamic nature of intelligence is so stressed. I do not see Mr. Noble's purpose in making the distinction between power in general and intelligence as dynamic.

Again, cosmic intelligence considered as representing the order of the universe as a whole adds nothing of value to his scheme. The character of purposiveness manifested in all aspects of the universe implies, in my opinion, orderly development. Thus it is difficult for me to understand why our author has introduced the concept of intelligence to explain an order, which is sufficiently accounted for by the fundamental purposiveness of the universe. The point which I am making in these criticisms is that universal intelligence seems, as I have said, to be superfluous. The notions of power and order contained in it are not antagonistic to the theory as a whole, but why they should be given the name of cosmic intelligence is difficult to understand.

Up to this point I have been dealing with certain general aspects of the theory of evolution set forth in Mr. Noble's book which makes possible emergence of the new. I shall now deal more specifically with the emergent aspect of the evolutionary process, and try to show its general character and how it has been manifested.

The principle upon which the emergence of new qualities is based in this scheme seems to have much in common with that of Mr. C. Lloyd Morgan. The latter has, as I have pointed out in an earlier chapter, found a general explanation for the process of emergence in the coming into being of higher forms of relatedness, emergently new qualities because of new relationships formed through synthesis. These emergents are contrasted by Mr. Morgan with resultants which come about through mere accumulation or addition. The following quotation from Mr. Noble's book illustrates a similar contrast,¹ "If the science of chemistry has taught anything and the plain facts of biology are of avail they show beyond peradventure

1. "Purposive Evolution,"
By E. Noble,
Chapter VI, Page 54.

that it is rather the rule than the exception for new qualities and forms to appear as the result not of mere arithmetical accumulation of characters already present in the combining units but of new relations set up by such accumulation." Here is paralleled the distinction which Mr. Morgan has stressed in the early part of his book. Moreover, this passage serves to emphasise the part of new sorts of relation in the emergence of new qualities.

Having discussed the general principle of emergence it would be well at this point to consider the place of mechanism in this theory. I have throughout this thesis emphasised the fact that a wholly mechanistic interpretation of evolution is opposed to the idea of emergence. I have, however, remarked on the fact that both Mr. Morgan and General Smuts, though insisting on the emergent aspect of the evolutionary process, recognize, nevertheless, the presence of a mechanical element in the process. The latter in dealing with this element has declared it to be what might be termed a crude form of holism. Mr. Noble appears to hold an

analogous view. He too recognizes a mechanistic aspect of evolution, but it is only an aspect. It represents only a phase in the operations of the fundamental principles of evolution. Thus we must not attempt to interpret evolution in terms of mechanism, and attempt to read it into every aspect of the process; we ought rather to interpret the mechanistic aspect in terms of the scheme as a whole. It should be regarded as a manifestation of the operations of principles which are themselves not mechanistic. In this way it may be made compatible with emergence.

Another problem which deserves attention at this point is that of continuity. The fact of the emergence of new qualities does not, in this scheme, preclude the idea of continuity. There is continuity in the sense that each new development is made possible by what has gone before. Mr. Noble has in chapter XXVII a sentence which seems to me to express the idea of continuity present in evolution. ^{1.} "The progressive variation," says our author, "subsumes and requires the whole

1. "Purposive Evolution,"
By E. Noble,
Chapter XXVII, Page 291.

hierarchy of such variations in the past." This statement appears in a discussion of human progress, but I think the idea of continuity expressed in it may be applied to all stages of evolution.

The first level to be evolved in the progress of evolution is that of matter. It emerges as a result of the operation of the tendency towards differential stress inherent in the ether. However in the inorganic as in all other stages of evolution the tendency away from differential stress and towards the production of stability is at work. The operation of these factors in matter tends towards the production of loose forms of synthesis. I use the word "loose" in order to make a distinction between the syntheses of this level and those of the organic level. This distinction is, however, only one of degree of synthesis. It is true that Mr. Noble finds so great a difference between the organic and the inorganic as to apply different varieties of causation to each. But this difference is of degree, not of kind. I stress this question of synthesis in matter, because one might be led by our author's use of

the term "inorganic causation" to imagine that synthesis is absent in this level. Certainly the wholes of the inorganic have not the unity of action characterizing those of higher levels, but they have, nevertheless, a loose kind of unity.

With the emergence of life there come into being closely knit syntheses. In them the part loses its independence. Its actions are then governed by the nature of the living thing as a whole. These living wholes because of their organic nature re-act to stimuli as unities. The motivation which determines the character of their responses is the urge to self-maintenance. Every act of every living unity is, as I understand Mr. Noble's scheme, calculated to promote the self-maintenance of the entity. The important thing to note, however, in this conception of the emergence of life is that to which I referred at the beginning of this paragraph, the advent of highly unified wholes. These wholes represent a change in relatedness so great as to produce a vast new level of evolution, the organic. In discussing the emergence of the organic

I quote the following passage, which, I believe, will serve to characterise the general process, as our author conceives it, ^{1.} "What each of the molecules shall do is henceforth determined by what all of them must do; the single properties of the units, in a word, are transmuted, or merged, into a collective property, the property of life." Here then we have the factor of relationship playing the important part in the emergence of life. Thus by its emphasis on this factor this theory is linked with those previously discussed.

Before one can deal with the question of the place of mind in this theory of evolution, one must take into consideration the nature of the cosmic intelligence described by Mr. Noble. The nature of this intelligence has already been discussed. It will be well, however, to emphasise the fact again that the cosmic intelligence as our author conceives it is of so comprehensive a nature as to manifest itself in the inorganic as well as in the organic. It seems indeed to have been one of the characters of the

1. "Purposive Evolution,"
By E. Noble,
Chapter XXXI, Page 339.

original stuff of the universe, or at any rate to have emerged almost at the commencement of the evolutionary process. At any rate intelligence is certainly not confined to conscious beings. Therefore, if mind is to be regarded as being synonymous with intelligence, the emergence of mind certainly preceded the emergence of the organic level. A certain statement in the book might be interpreted as giving mind this meaning, but I think on the whole mind is to be distinguished from cosmic intelligence. Mind, it is true, requires this intelligence, but it involves more. Mind is a directing centre in the living individual which gives free play to the purposive tendency. Mind as intelligence plus consciousness enables a man to do that which he otherwise could not accomplish. Intelligence, it is true, does not require consciousness to function, but consciousness adds to the scope as it were of the operations of intelligence. In this way the mind of the living creature aids in the maintenance of self. It gives

a more positive character to the activity of adjustment of the living being which would otherwise be lacking.

When one considers the theory of evolution set forth in Mr. Noble's book, there arises a question with regard to the nature of ether. In reading the book I have been unable to discover our author's view on the question of the homogeneity of ether. Certainly the units which compose ether are to be regarded as homogeneous. But the question of the homogeneity of the total - so to speak, is the one upon which I am not clear. I have raised this point, because, as Mr. ^{1.} A. E. Taylor has pointed out, evolution from a completely homogeneous universe is inconceivable. There must be an element of contrast somewhere--some differentiation before the process can be appreciated. It is for this reason that it is important to know Mr. Noble's idea of the state of the original stuff of evolution. If his meaning is that evolution has proceeded from a completely homogeneous universe, it is difficult to grasp his conception of the process.

1. "Evolution In The Light Of Modern Knowledge",
A Collective Work,
Chapter XII, "Philosophy,"
By A. E. Taylor.

On the other hand, if his meaning is that there is room for difference in the ether, his assumption of the origin of the evolutionary process in the ether may be defended.

Another point upon which this theory of evolution is open to criticism is the concept of cosmic intelligence. Since, however, this aspect of the scheme has been considered in previous paragraphs, it will be unnecessary to repeat the criticism in this concluding part of the chapter. The nature of the emergent aspect of the scheme has also been discussed, but, since it is the chief point of emphasis to be made in the theory, it should be reiterated at this stage that its importance is recognized by our author. He has, as has been indicated, found an element of true novelty in evolution in the emergence of new qualities or characters which were not present in the separate elements combined in the new synthesis. These new qualities are, however, only such as are consistent with the general character of the universe. Their novelty does not negate

continuity, nor interfere with what might be termed the logic of the cosmos. In this harmonising of emergence with the nature of the universe as a whole Mr. Noble is in agreement with Mr. C. Lloyd Morgan, who, in spite of his insistence upon the unpredictable character of the emergent element in evolution, has assured us of its logical position in the pattern of the whole of things. In concluding this chapter I shall quote the words of Mr. G. P. Conger who, though he finds much to criticise in Mr. Noble's book, has this to say in commendation, ¹ "I welcome particularly the repeated statements that various structures and processes throughout the cosmos exhibit significant resemblances;" and "the well taken point that science cannot hope to elucidate the organism from the organism alone, but must think of it in cosmic terms;"

1. "The Journal Of Philosophy,"
George P. Conger,
Vol. 24, No. 9, Page 243.

Chapter VI.

A Comparison And Evaluation Of
The Theories Here Discussed.

In the foregoing chapters I have examined four schemes of evolution each of which has a place for the emergent aspect of the evolutionary process. This aspect of the process of development called evolution has not, it is true, been equally emphasised in the various books discussed. In Mr. C. Lloyd Morgan's theory it is, of course, the chief point of emphasis, whereas General Smuts, though finding the concept of creativeness in evolution essential to his theory, stresses it less, as does Mr. E. Noble. It is to be noted, however, that all four authors considered in previous chapters recognize the emergence of the qualitatively new in the process of evolution. None has, however, made the claim that emergence alone is sufficient to explain the process. In the theory of each, emergence is an

element rather than the whole. Consequently, in sketching them it has been necessary to show emergence in perspective so to speak. Other elements in evolution have been dealt with in order to show how the emergent element is involved in the process as a whole. In attempting, therefore, to compare and evaluate the various theories dealt with in this thesis it will be necessary to touch upon certain fundamental aspects of the process of evolution which are involved in emergence.

The emergent element and, indeed, the whole process of evolution implies some form of energy or power operating in the evolving medium. Without this energy evolution would be inconceivable. Without it no new syntheses or new kinds of relatedness could be evolved. Thus it is involved in the very process of emergence. With this fact in mind I have in preceding chapters given accounts of the conceptions of the power, energy, or source of change of the various authors treated. Their views on this question show both agreement and disagreement, therefore, it will

be advisable in this last chapter to compare and contrast them. There is, I think, one point of agreement among the philosophers whose schemes have been dealt with; all agree that the driving power or energy exhibited by the evolving medium is not imposed from without. Mr. Morgan's God which, in his theory, supplies the "go" of evolution is to be thought of as immanent in the very stuff that evolves. All evolution is thus a manifestation of the immanent presence of God. I have in the chapter on Mr. Morgan's theory criticised his use of the word God to describe this immanent power, but the point which I am emphasising here is that, whether we choose to call it God or merely power, this driving force of evolution is inherent in the evolving medium. Again, I think it may be said that General Smuts also holds the view that the energy of the evolutionary process is inherent in that which is evolving. Certainly his concept of matter is that of something in which activity is immanent. Hence, since the higher stages in the evolutionary scale are evolved from this active

matter, it is reasonable to suppose that the medium of evolution of which they are manifestations is inherently energetic. Mr. R. W. Sellars has also asserted that the source of change is to be found in the very constitution of the evolving matter. In his view entities do not receive change from outside, but exhibit change as an inherent characteristic. The theory of evolution propounded by Mr. E. Noble likewise, it seems to me, implies immanence of power. As I have shown in chapter five his theory finds the origin of evolution in a fundamental stuff of which power is characteristic. These authors agree, then, that evolution is not the manifestation of the operation of an externally imposed force upon dead matter. It is, on the contrary, the result of an inherent power, energy, or source of change in the very stuff that evolves. With such a view of power or energy it is possible to escape the determinism of a mechanistic theory of evolution, and to recognize real individual freedom.

The question of the nature of the power or

drive behind the evolutionary process is closely connected with the problem of progress. One asks whether the process called evolution can be described as progress or whether it is merely change. Is the apparent development of evolution truly progressive, or is it only the appearance of progress that we see in it? On this question there is some disagreement among the philosophers whose theories I have outlined. Three of them seem to hold that there is more in evolution than change, while the fourth does not find the concept of progress necessary to his theory of evolution. Mr. C. Lloyd Morgan's view is that God, as he conceives that being, provides the progressive character of evolution. God to him supplies both the energy of evolution and the goal towards which that process is tending. General Smuts also appears to find the evolutionary process progressive. His view of evolution as having a direction involves the notion that tension induces changes in one way rather than another. It is true that evolution to him is a

manifestation of the holistic principle, but the fact that this principle evolves progressively higher forms of synthesis seems to be due to a fundamental character of the universe as a whole. The title of Mr. E. Noble's book indicates that author's view that there is a form of progress in evolution. In spite of the fact, however, that he gives so much emphasis to the purposive character of the universe, he suggests the possibility that there may be a kind of rhythm in the universe. He suggests that periods of integration may be followed by periods of disintegration, which are in turn succeeded by periods of re-integration. Mr. R. W. Sellars does not attempt to find progress in evolution. He believes, as I have pointed out in the chapter on his theory, that the progressive character which we seem to see in evolution is only accidental. Evolution has no goal. In discussing this aspect of Mr. Sellars' theory of evolution I have remarked on the fact that, if, as I interpret his scheme, evolution is to be thought of as being directionless, it is difficult to

reconcile this notion with that of "genetic continuity." This sort of continuity implies, in my opinion, direction, and such direction implies progress. We may not, of course, know the precise goal of the evolutionary process, but, does not the fact that evolution has "genetic continuity" suggest that there is more than mere change in the process? Evolution is not the whole of reality, but it must conform to the nature of the whole of things. Consequently, if there is direction in evolution, there is implied some goal. Thus it appears that Mr. Sellars' notion of "genetic continuity" carries with it the implication of progress.

The emergent evolutionists discussed in the above paragraph seem, then, to favour the assumption of some form of progress in evolution. One of them, of course, declares the idea of progress to be unnecessary to the conception of evolution. Even his scheme, however, may be interpreted as implying at least direction in evolution. It is possible also that some might argue to the effect that Mr. E. Noble's scheme is not truly

progressive inasmuch as he has suggested that evolution is rhythmic. This seems, however, to be a suggestion rather than an assertion, and, moreover, assuming it to be true, the idea of progress is not excluded. The phases of the rhythm would represent a form of progress. Thus the idea of progress is present in some form in all four schemes of evolution.

In considering generally the views of the power aspect of evolution set forth by Messrs. Morgan, Smuts, Sellars, and Noble the important fact to be emphasised is their view of the immanence of energy in the evolving medium. This insistence that energy is inherent in that which evolves is their chief contribution to this phase of the discussion of the evolutionary process. The idea of the inherence of energy may not, of course, be a new one, but it is of great importance in these theories of emergent evolution, because it supplies a reasonable basis for individual freedom.

Having considered the problem of the place of the driving force in evolution, it is necessary to

consider another aspect of the process. This thesis is primarily concerned with the emergent aspect of evolution, and it is with this phase of the process that I shall next deal.

At the outset of the discussion of this aspect of the evolutionary process the fact should be re-emphasised that all four philosophers with whose theories the preceding chapters have been concerned agree upon one point. They agree that there is emergence in evolution. Some have not, of course, used the term emergence to describe the aspect to which it refers, but each has recognised the advent of new qualities. In considering the process involved in the emergence of these new qualities the four philosophers, though generally in agreement, have approached the question from different points of view. In the following paragraphs an attempt will be made to compare their explanations of the process of emergence, and points of agreement will be discussed.

In making a survey of the various explanations of the process of emergence it will be advisable

to group the authors, not because of any fundamental differences of conception of the process, but because of the varying amount of emphasis upon certain factors involved. Therefore, I shall begin with a comparison of the views of Mr. Morgan and Mr. Sellars.

In outlining his theory as to the process of emergence Mr. Morgan, as has been indicated, gives only a general explanation. Emergence in his view is the result of the coming into being of higher forms of relatedness. The change which takes place with the emergence of the new is a change both in relationships and in terms. Thus his scheme of emergence would seem to involve the two factors of immanent change and synthesis.

Mr. Sellars' view of the emergence of the novel also involves these two factors of relatedness. His notion of the inherent character of change has already been stressed both in the chapter on his book and in this chapter. In his opinion the inherence of change makes possible the change of the term. Here, then, his theory shows agreement with that of Mr. Morgan.

There is, also, another point of agreement. Mr. Sellars, like Mr. Morgan, has recognised the importance of the process of synthesis in the evolving of new qualities. He has noted the fact that there is something more in synthesis than mere addition. Thus in its insistence upon the inherence of change in the evolving stuff and in its emphasis upon the nature of synthesis Mr. Sellars' view of emergence parallels that of Mr. Morgan.

In their discussions of the emergent aspect of evolution General Smuts and Mr. E. Noble lay great stress upon synthesis. The former in treating of the creative aspect of the evolutionary process traces it to the synthetic character of the wholes which are the manifestations of evolution. The increasingly synthetic character of the wholes found by this author in the higher levels of evolution might be compared with the higher forms of relatedness found in Mr. C. Lloyd Morgan's theory. The emergence of the novel in evolution results from the power of wholes to respond individually to stimuli. This power results from the character of the relatedness or synthesis in the wholes.

These wholes are not simply aggregates. Their whole-ness is produced by synthesis, not simply by addition. It is true that General Smuts has suggested that the mechanical aspect of evolution represents a form of holism, and that mechanism involves the recombination of the old, but, at the same time, he emphasises synthesis as the cause of the emergence of the new.

Mr. E. Noble's explanation of the process of emergence in evolution has likewise placed a good deal of stress upon the factor of synthesis. He is not content to explain the emergence of the novel mechanistically, though like General Smuts he does not deny the presence of a so-called mechanical element in evolution. To him there is apparent in the evolutionary process an element of novelty which reveals itself in the coming into being of the qualitatively new. This emergence of the qualitatively new is due, in his opinion, to the factor of synthesis. Here again, then, the factor of relationship is emphasised in the explanation of the process of emergence.

In the preceding brief summary and comparison of the theories of emergence of Mr. Morgan, General Smuts, Mr. Sellars, and Mr. Noble there are two important points to be noted. In the first place, each philosopher grants the presence of the emergent element in evolution; and, in the second place, there is general agreement as to the process involved in the emergence of the novel. These facts are of importance, because emergent evolution has not the traditional prestige of the mechanistic theory of evolution against which it is a protest, and because unanimity as to the process of emergence adds weight to the theory. Therefore, they must be borne in mind in making any estimate of the contribution of emergent evolution to evolutionism.

In attempting to evaluate the contribution made by the theory of emergent evolution to the study of evolution one must examine the theory from several points of view. It is at once a protest against a wholly mechanistic interpretation of the evolutionary process and an attempt to offer a reasonable account of that aspect of evolution for which mechanism is

inadequate. Evolution according to the mechanists may be explained quantitatively at all stages. In their view there is no development of the process which cannot be adequately explained in terms of the fundamentals, matter and motion. Even the complex stages of life and mind, it would seem, are ultimately to be explained in terms of these factors. Such a theory, it is thought by those who uphold the doctrine of emergence, fails to give an adequate account of the qualitative aspect of evolution. Mechanism has, it is true, as the author of "Emergent Evolution" has admitted, its place in that process, but it alone is inadequate for the explanation of evolution. It will serve to explain what Mr. Morgan has called "resultants," for in these the qualitatively new in the emergent sense is not present. It cannot, however, account for the novel qualities exhibited by an entity, which were not inherent in any of its component elements. Emergent evolution is important, therefore, in the history of evolutionism, for it marks a growing recognition of a neglected aspect of evolution. Whether one agrees

with the explanation of emergence given by the authors here discussed or not, one must admit that they have given a new interest to the problem of evolution. Disregarding for the moment, therefore, their special theories of emergence I think it may be said that they have contributed to the study of evolution by turning attention to the qualitative aspect of that study.

Of course, the reply of the mechanist to the criticism that he has neglected the qualitative side of evolution is the assertion that this is due to the limitations of human knowledge. It is, he maintains unreasonable to term mechanism inadequate simply because the mechanist cannot give a precise explanation of every new step in evolution. Increasing scientific knowledge, he believes, will enable us to reduce the new or higher to terms of the lower.

This argument of the mechanist has been stressed, because it serves to bring out a point which must be grasped, if emergent evolution is to be fully understood. The point to which I refer is the factor of relatedness in evolution. The theory of emergent

evolution is concerned with those novelties which arise as the result of the formation of new kinds of relatedness. Such novel qualities are not to be thought of as latent characteristics of the single elements composing the system of relatedness. They represent, so to speak, the individuality of the entity in which they appear. It is not possible to reduce them to terms of the elements of which the entity is composed. I have laboured this question of the nature of relatedness, because it is the positive contribution of the proponents of emergent evolution considered here. I use the word "positive" in order to emphasise the fact that the emergent aspect of evolution is not an unexplored mechanical phase. The philosophers discussed in this thesis have recognised the fact that in evolution the qualitatively new has emerged as the result of a process which is not mechanical. They have attempted to explain in general terms the emergence of the novel by attributing it to the formation of new kinds of relatedness. Thus they have made a positive

contribution to the study of that aspect of evolution for which mechanism is inadequate.

In summing up the contributions made to the study of evolution by the men dealt with in this thesis it may be said that their work has been of value in two ways. It has served to show the inadequacy of a wholly mechanistic view of evolution. It has, however, done more than merely expose the limitations of mechanism. It has supplied a reasonable hypothesis for the general explanation of the emergent aspect of evolution. These, then, are in general terms the contributions to evolutionism of the theory of emergent evolution.

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