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Topic: GRAND
LOGIC 1893

Chapter III.

The Materialistic Aspect of Reasoning.

§40. The class of chemical substances having the most complicated molecules is, without doubt, that of the proto-plasms.* This chemical complexity is, in my opinion, sufficient to account for the extraordinary properties of ^{these} ~~these~~ substances, by virtue of which they grow into animals and plants. In particular, the laws of nervous action are, as I think, traceable to the chemical characters of the protoplasm of which the contents of nerve-cells are composed. But I cannot stop to argue this, here.

§41. When a group of nerves are stimulated, it is certain that the ganglions with which the group is most intimately connected on the whole are thrown into an active state. This in its turn usually occasions movements of the body. ^{These} ~~These~~ movements ~~are~~ are often intelligent; that is to say, what is to be accomplished determines what is done. Now, as all mechanical action is determined by the conditions at the instant, the question arises how is the tendency of ^{nervous} ~~animal~~ reactions toward ends to be accounted for. Suppose, ^{then,} that, ^{in the beginning of} at first, the

* The theory that there is but one protoplasm shall be considered in our chapter on fallacies.

In that case,

reflex movements were not intelligent. Then, the stimulation continuing, the irritation would spread from ganglion to ganglion, while increasing in intensity. Meantime, the ganglia first excited would begin to be fatigued, and their action would flag; and thus for a double reason the bodily activity would be of a changing kind. This would happen again and again, until at last some motor would remove the stimulus; and as soon as this was withdrawn, the excitement would quickly subside.

§42. Now it seems to be a universal property of protoplasm, intimately connected with the property of growth, that it takes habits. That is to say, 1st, when a lump of protoplasm is irritated disturbed, say by a prick, at a given point, ~~an excited~~ a so-called excited state, in which the matter is more fluid, is brought on; and this condition spreads. But, 2nd, it does not spread uniformly, but very differently in different directions, and precisely what direction the spreading will take seems to be very ^{as} uncertain as a throw of dice. Nevertheless, 3rd, there is a preponderance of cases in which the path of spreading, is the same as it had been the last time a similar stimulation of the same point occurred, or as it had been in the majority of cases.

§43. The nerves are particularly ready to take and to change their habits. Consequently, in the case we have been considering, if after the withdrawal of the stimulus and the

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consequent cessation of the habit excitement, the stimulation should be repeated, the last mode of reflex action, which ~~withdrew~~ ^{removed} the stimulus is more likely to occur at once than any other; and if in case it does not occur at once, the action will as before go on until a reaction takes place which shall remove the stimulus. In this way, a habit is pretty certain to be speedily ~~acquired~~ ^{so reacting} from any stimulus as to remove ~~that~~ ^{the} stimulus.

§4. ^{In fact,} Now the greater part of intelligent actions are directed toward causing the cessation of some irritation. We eat to get rid of hunger, etc. Even when the eye of an infant rolls to the light, the action is perhaps of this kind; for the field of distinct vision on the retina is less sensitive to light than other parts. ~~Also~~ ^{When} we stop ^{and} listen to a sound, there may be a different principle; but then, any sensation when it is interpreted is diminished in intensity in immediate ~~fact~~ consciousness.

§5. But other principles of intelligent action may probably be deduced from the ~~fundamental~~ primitive characters of protoplasm. There are many circumstances which lead us to believe that habit-taking is intimately connected with nutrition. Protoplasm grows: and that not as a crystal in a ^{super-saturated} concentrated ~~sol~~ or highly concentrated solution grows, by simply attracting matter like itself. It grows ^{chemically} by transforming other substances into its own ^{chemical} kind, of

This I believe to be due to the excessive complexity of its molecule. Chemists have estimated that the number of atoms in ordinary egg-albumen is nearly a thousand; and there are ~~now~~ several circumstances which show that it must be nearly that. The most conclusive of these is the fact that a solution of albumen may be enclosed in the merest film of coagulum, and will float in water without bursting its sac.* But albumen is not protoplasm. Albumen is dead; protoplasm is essentially alive. Hence, it is not too much to suppose that protoplasm, even of a low order, has several thousands of atoms in each molecule; and any high order of protoplasm probably has ten thousand. Such a molecule must be excessively unstable; and I believe that in the excited condition a ^{considerable percentage} ~~certain proportion~~ of the molecules of protoplasm

* I assume for the percentage composition of albumen the following

Oxygen	21.5	=	1.34	times	at. wt.
Hydrogen	7	=	7	"	" "
Nitrogen	16.5	=	1.10	"	" "
Carbon	54	=	4.5	"	" "
Sulphur	1	=	0.03	"	" "
	<u>100</u>		<u>14.05</u>		

I assume the solution having an osmotic pressure of ^{1/2 at.} ~~at.~~ to be of 12.5 p.c.
 I assume the sp. r. Albumen to be 1.25, then by the laws of osmotic pressure, there would be 980 atoms to a molecule

are partially ~~of poles~~ decomposed. The peripheral stimulus deranges one or more molecules (which must be imagined as something like little solar systems, only vastly more complex) and an ^{errant} fragment from one of these enters another such system and perturbs that. But after the stimulus is removed they gradually settle down again, some molecules being destroyed, but others being recombined with ~~food~~ groups of atoms coming from food, while still others take ^{up} fragments which had been thrown off from neighboring molecules. I think it is pretty clear that the new portions thus taken in would be a very long time in acquiring the ideally stable positions in the molecule; so ~~that for~~ and until they did so they would be more likely to be thrown out than other portions of the same molecules, and so a new excitation ~~would~~ would be likely to repeat approximately the phenomena of the previous one; and the spreading of the disturbance would be likely to take the same course as before.

§46. If this theory be true • different modes of spreading ~~would~~ might differ greatly in regard to the amount of nutrition that would accompany them; and since the recombined molecules would be the ones most likely to be deranged, those habits would be most likely to be formed which would result in the greatest nutritive gain. Thus,

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the animal would appear to exhibit a preference for modes of action involving the formation of new molecules of protoplasm. ~~If the animal~~ ^{Here there} ~~there~~ was a feeling of pain at every breaking of a molecule, and a pleasure at every recombination of such a system, the animal would ~~seem to himself to~~ have a preference for pleasurable actions, and it would seem to him as if this pleasure, or the anticipation of it, were the cause of his ~~action~~ in one way rather than in another.

This is a ^{mode} way in which it would seem perhaps possible that a tendency to act intelligently, that is, ~~with~~ so as to bring about a certain result, might arise in mere mechanical system. Although it has not been shown that observed phenomena of intelligence could be ^{thus} accounted for in this way, but only that they perhaps might be ^{accounted for,} and although the theory presents at one point a monstrous absurdity, that of supposing a piece of dead mechanism to feel pain and pleasure, yet, after all, this does not touch the main point, and I feel quite sure that ^{the hypothesis} it affords an instructive point of view from which to contemplate the general question.

§47. It is plain that intelligence does not consist in feeling in a certain way, but in acting in a certain way. Only, one must acknowledge that there are inward actions, — what might be called potential actions, that is, actions

which do not take place, but which somehow operate
 influence the formation of habits. Certain stimuli, com-
 monly visceral in their origin,
 throw the brain into an activity which simulates the
 effects of peripheral excitations of the senses. The reactions
 from such stimuli have the same internal character;
 an inward action removes the inward stimulus. A
 fancied conjuncture leads us to fancy an appropriate
 line of ^{behaviour.} ~~conduct.~~ This would be as unimportant as
~~day-dreams~~ are often supposed to be, were it not
 Day-dreams are often spoken of as mere idleness; and
 so they would be, but for the remarkable fact that
 they go to form habits, by virtue of which when ~~the~~ a
 similar real conjuncture arises we ~~shall~~ really
 behave in the manner we had dreamed of doing.
 [insert 53 1/2]
 People who build castles in the air do not, for the most
 part, accomplish much, it is true; but every man
 who does accomplish great things is given to building
 elaborate castles in the air and then painfully copying
 them on solid ground. ^{indeed,} In ~~truth~~, the whole business
 of anticipation, and all that makes us intellectual
 beings, is performed in ~~fact~~ imagination. Vigorous
 men are wont to hold mere imagination in contempt;
 and in that they ^{would be} quite right, ^{if there were such a thing.}
 How we feel is no matter; the question is what we shall do. But ~~that~~ ^{that} feeling
 which is subservient to action and to the intelligence of

Some say the soft Ideal that we roved
 Confronts us fiercely, foe-beset, pursued,
 And cries reproachful, "Was it, then, my praise
 And not myself was loved? Praise now thy truth;
 I claim of thee the promise of thy youth,
 Give me thy life, or cover in empty phrase,
 The victim of thy genius, wife-mate!"

action

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~~action~~ is correspondingly important; and all inward life is more or less so subservient. Mere imagination would indeed be mere trifling; only no imagination is more. "More than all that is in thy custody, watch over thy phantasy," said Solomon, "for out of it are the issues of life." *Omni custodia serva cor tuum, quia ex ipso vita procedit.*

§47. A decapitated frog almost reasons. The habit that is in his cerebellum serves as a major premise. The ^{excitations} ~~sensation~~ of a drop of acid is his minor premise. And his conclusion is the act of wiping it away. All that is of any value in the operation of ratiocination is there, except only one thing. What he lacks is the power of preparatory meditation.