

Formation of Language.

SEVERAL years ago, being interested in speculations on the development of language, and having a son a few months old, I instituted a series of minute observations on the part of the entire family as to his utterances. The result, curious at the time, has received a new interest from a later observation. The nursery maid who had charge of the boy did not understand a word of English, Italian being the language spoken with the domestics exclusively. The first articulations of the child were evidently meaningless mimicry of what he heard from us, and it had so much the character of English speech that the maid supposed he was speaking English. There was no attempt to catch or repeat any word—only a gabble, a gibberish, in which we were not able to detect any resemblance to any word of any language. This continued for several weeks, when we perceived that he began to repeat certain sounds to which we found that he attached definite meaning, and as this progressed he left off his incoherent imitation of our language, and he soon had coined a small vocabulary for himself, comprising words for bread, water, milk, &c. The first word we distinguished was as nearly as I can render it "bumbhoo," meaning water. This phase continued some weeks also, when he began to couple our words for his objects with his own—as "bumbhoo-aqua," when he wanted water. Little by little he dropped his own words and began speaking only Italian. The three stages of the development of language were perfectly distinguishable, but I supposed that the words the child contrived were purely arbitrary, and am inclined to think so still; but during a late visit to Greece I went over to Crete, and visiting in the family of an old Cretan friend, I was interested in a little boy—his young son—who was in the state of development of speech which I have noted in ours as the second. He had only got two or three words, but that for water was precisely the same as that which my own little boy had invented. Have any of your readers who have the watching of child-talk made any analogous observations?

Rome, March 15.

W. J. STILLMAN.

Force and Determinism.

IN case any philosophers who do not happen to be physicists feel a doubt about the orthodoxy of what I understand to be one of the main doctrines in Dr. James Coll's recent book, reviewed in your issue of March 12 (p. 435), viz. that although expenditure of energy is needed to increase the speed of matter, none is needed to alter its direction (and the doubt has been already expressed to me); perhaps it will not be regarded as intrusive if I say that this statement is perfectly correct.

Determining the direction of motion involves no expenditure of energy or performance of work. Energy may be guided along desired channels without altering its quantity in the least—just as can matter. The rails which guide a train do not propel it, nor do they necessarily retard it; they have no essential effect upon its energy except a guiding effect. A force at right angles to motion does no work.

It is a function of living organisms thus to direct the path of transference of energy, but they add nothing to its quantity. There is no more energy in a live animal than in a dead one—in a lighted fire than in one ready to be lit. There is activity of transference and transformation in the one case, and stagnation in the other; but the law of conservation has nothing whatever to say against a live animal, or a mind, controlling the motion of molecules; although it would have everything to say against motion being produced *de novo* by an act of will. Life is not energy, it is a determiner of the paths of energy. That is its natural and principal function: it is a director, not a worker. Food and fuel work: life directs. It has control over triggers and sluice-gates. It is not the main-spring of the clock, it is the touch which sets it going. Its best analogue is flame: life is the spark which ignites a conflagration.

The distinction between generating motion and directing motion is evidently one useful to remember. If anyone has thought that an arbitrary alteration of, say, the weather, would necessarily involve a contradiction of the principle of conservation of energy, I think I am right in saying that he has been mistaken.

OLIVER J. LODGE.

Modern Views of Electricity.

MR. BURBURY asks for an explanation of the permanence of the atomic charges in air films, but this carries the question further than I can follow it.

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My suggestion is simply that the chemical attraction of zinc for oxygen is necessarily accompanied by + electricity on the zinc and - on the oxygen. The permanence of the charge is, on this view, bound up with the permanence of chemical affinity. It is perhaps only completely to be explained by a knowledge of the mechanism of the latter; and that is one of those "ultimate problems" which I was careful to avoid in my letter.

I fancy, however, that Mr. Burbury has not quite followed me in one point. There is to be no actual combination of zinc with oxygen—only a tendency thereto; and it is to this tendency that the polarized condition of the molecular chain is due.

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A. P. CHATTOCK.

CHEMICAL SOCIETY'S JUBILEE.

WE have already given the address of the President, Dr. W. J. Russell, at the afternoon meeting. Sir Lyon Playfair and Sir William Grove, two of the five remaining original Fellows of the Society, at the same meeting recited their recollections of the state of chemistry at the time of the foundation of the Society, and we now reproduce their speeches, as they forcibly serve—that of Sir Lyon Playfair in particular—to bring home to us the great changes which have taken place during the fifty years.

At the dinner at the Hôtel Métropole on the Wednesday evening, the Marquis of Salisbury delivered a speech remarkable for the emphasis which he laid on the importance of the work done by the Society in cultivating the higher study of chemistry rather than its industrial applications, and it is noteworthy that Sir William Grove had on the previous day expressed his preference for the abstract rather than the applied side of the science. Such a consensus of opinion is most significant and hopeful. Sir Lyon Playfair, in responding to the Marquis of Salisbury's speech, showed that he was fully aware of the latest discoveries, and able to appreciate their high theoretic import.

At the afternoon meeting Sir Lyon Playfair said:—

It is a sad feeling that there are now living among us only five of the original founders of the Chemical Society. I am one of those five, and have therefore been selected to address a few words to you to-day. You have learned from the excellent discourse of our President that before 1841 chemistry was being both rapidly developed and rapidly evolved. New methods of research were being created; organic chemistry had almost been created. There were many luminaries in the chemical firmament all over the world at that time, and if I mention a few names they will appear to many of you as milestones representing mere discoveries and progress, though they are names well known to the older members of the Society and the few founders who are left as strong personalities with whom we connect much kindness, hospitality, and encouragement. Liebig was then *facile princeps* chemist of the world. He formed a school, and showed how to advance chemistry by original research. At that time, in 1841, the year of our foundation, his brilliant pupil Hofmann had scarcely risen above the horizon. Kopp and Bunsen had made researches, but were still young. There were in Germany names of the highest importance in our science: at Göttingen there was Wöhler, the dear friend of Liebig, and associated with him in his work; in Berlin there was Mitscherlich, the aristocrat of chemistry; there was Rose, the most lovable of our fraternity, who had raised analysis to a high platform by improving methods of research; there was Dove, the jolliest of companions, who had joined physics to chemistry; and lastly, there was Rammelsberg, who took mineralogy out of the domain of physics, and made it part of the domain of chemistry. In France, at that time—I speak only of those whom I personally knew, and whose friendship has ever been valuable to me—there was a man who died only the other day, but who was a veteran then, and famous for his researches on the fatty bodies, Chevreul; there was Balard, the discoverer of bromine; there was