

MAN AS A LIVING MEMORY

WE ARE LIVING MEMORIES of all that our fathers were and did; the mechanism by which we inherit their qualities is precisely the same as that by which we recollect what we ourselves felt, thought, and did at some earlier day. The seat of this racial memory is a substance called the germ-plasm, which passes from parent to child and constitutes a material basis of heredity. Present in the body throughout life, this germ-plasm keeps in close touch with its processes and changes, and these changes, if they are thoroughgoing enough, may affect it in turn, so that acquired characteristics may sometimes be inherited. Here in the rough, and very briefly stated, we have the new theory of heredity enunciated by an Italian student of biology, Eugene Rignano, who has also the training of an engineer and a physicist and who attacks his problems in a somewhat new way.

His book on this subject, entitled "The Inheritance of Acquired Characters," is now presented to the English-reading world for the first time, and has been the cause of no little discussion. The author asserts that he is the first to give a scientific explanation of how acquired characteristics may pass from father to son. Those who believe that they do so pass have been unable to offer a satisfactory explanation; while those who have formulated the generally accepted theories of inheritance have been unable to give this kind of inheritance a place in them and have therefore believed that it does not exist. Rignano adopts their idea of a specific inheritance-substance, the "germ-plasm"; but he goes further and asserts that this and the bodily tissues act and react on each other through life—the peculiar feature of his new hypothesis. In order to explain how the germ-substance gives out, as it were, in a succeeding generation, the qualities that have been impressed on it in a previous one, the author formulates a subsidiary theory, namely, that of the deposition of specific substances or "accumulators" by nerve currents—which substances possess the power of causing other currents similar to those that deposited them. This property he believes to account for all mnemonic action, and inheritance and memory thus rest on exactly the same physical basis. We read:

"The close dependence of memory upon the nutritive processes indicates strongly that the preservation of memories is to be ascribed to accumulations of substance. Further, as was very well remarked by Hensen, the fact that many memories may remain entirely dormant throughout several years, and then can come again with great distinctness into consciousness, notwithstanding that all the parts of the organism have been renewed several times in the interval, indicates . . . that in order to preserve these memories it is sufficient if for one given substance there be substituted another identical one.

"If it appears thus to be shown by facts, that the preservation of memories is due to accumulation and conservation of substance, a whole series of other facts seem to demonstrate that the reawakening of these memories consists in the restitution of the same currents as had formerly constituted the actual sensation or impression."

How can effects be stored up in the germ-plasm, perhaps for years, until they are needed to give effect to inheritance in the production of a new individual descendant? This, the author reminds us, is simply the phenomenon of the reawakening of memory—a very common one. He gives the following instances:

"Cases are frequent, for example, of adults who are able to repeat poetry which they had learned in their earliest childhood, even after many years during which they have never had occasion to repeat it at any time. Coleridge speaks of a young girl who, in the delirium of fever, repeated long pieces in the Hebrew tongue which she did not understand, but which she

had heard read aloud a very long time before by a priest in whose service she had been. A Lutheran preacher of German origin living in America, who had in his congregation a considerable number of Germans and Swedes, related to Dr. Rush that nearly all a little before dying pray in their mother tongue. 'I have,' said he, 'innumerable examples of it, and among them several in which I am sure they had not spoken German or Swedish for fifty or sixty years.'

"The following two facts are still more typical:

"A lady in the last stages of a chronic disease was taken from London to the country. Her little daughter, who had not yet learned to talk, was sent to her and after a short visit was sent back to the city. The lady died several days later. The daughter grew up to maturity without remembering her mother. She had then occasion to see the room in which her mother died. Altho ignorant of that fact, upon entering the room she started, and when asked the cause of her emotion, she said, 'I have a distinct impression of having been in this room before. There was in that corner a lady in bed, apparently very ill, who leaned over me and wept.'

"Similarly, a man of very marked artistic temperament, as soon as he came in front of a castle in Sussex, had an extremely vivid impression of having already seen it, and he recalled in his imagination the procession of visitors in all its details. He learned from his mother that he had actually been brought there on an excursion at the age of sixteen months and that the recollection which he had of the visit was very exact."

This reawakening of memory through contiguity in space, the author goes on to remind us, is only a particular case of the general law of the association or succession of ideas. They indicate that the mnemonic center becomes active only when the sight of the same place induces in the environment of that center almost the same state of distribution of nervous energy as was present at the former time when it received the impression. That is exactly the result of what the author calls his theory of "specific accumulators," described above, and it is this result, carried over by the germ-plasm to an individual of a succeeding generation, that causes that individual to look like his parents, to feel like them, and almost literally to remember what they were and what they did.

An interesting theory and one, whether it stands or falls, which may influence the future trend of thought on the subject.

ELECTRIC BURNS—Burns due to electric currents are totally unlike those produced in other ways, according to *Cosmos* (Paris). They occur at the point of contact of the human body with electrical conductors, and are found generally on the arms or hands, tho sometimes on the top of the head. Says the paper just named:

"Superficial burns are rare. Generally the considerable heat developed at the point of contact determines a massive destruction—a carbonization of the tissues throughout a considerable depth. These deep burns appear to be actual losses of substance and constitute a kind of lump of killed flesh included within completely healthy tissues. On the head, burns of the bone are frequent, but the necrosis is ordinarily limited to its outer layers; injury to the spinal column and brain is to be feared only when the necrosis involves the whole cranial cavity.

"The most unexpected feature of electric burns is perhaps their indolence, especially when we remember the violence of the pain caused by ordinary burns. This symptom, almost always present, is attributed to the destruction of the nerve-endings, or to the aseptic evolution of the wound; the indolence is so absolute that some persons who have been burned do not know it.

"Finally, electric burns have an aseptic evolution; the inflammatory reaction is absent, there is no suppuration, the carbonized tissues are gotten rid of little by little without the intervention of any infectious phenomenon. These peculiarities are due to the sterilization of the tissues in mass, by the great

rise of temperature produced at the level of entrance of the current. The treatment of the burns is thus quite simple, consisting of the keeping of the wounds from infection. Only the existence of injury to the bone sometimes necessitates active treatment."—*Translation made for THE LITERARY DIGEST.*

A PARISIAN MIRAGE

IN THE YEAR 1900, Parisians who were favorably situated saw a second Eiffel Tower standing upside down on top of the real tower with which they were familiar. The phenomenon was casually mentioned in the papers as an interesting mirage, but altho some notes of it were jotted down by scientific men, no attempt to explain or analyze it seems to have been made until recently. In an article contributed to the *Revue Scientifique* (Paris, December 2), Mr. A. Chauveau, of the Institute of France, denies that the apparition was a true mirage—which is a reflected image—and asserts that it was a shadow, on a layer of mist, akin to the phenomenon known as the "Specter of the Brocken."

In the latter, however, the observer stands within his own shadow which he sees projected on a cloud below him, while in Paris the shadow was that of another object and the observer stood well outside of it. Mr. Chauveau reports that the shadow appeared to move as the spectator moved, seeming at one time to stand upright and inverted, as described above, and again horizontal, with its top still touching that of the tower. He regards the latter position, however, as the actual one and the vertical position as the result of perspective, as the observer stood directly under it. To cast such a shadow the light must evidently come from below, and this is hard to explain. There

was no near-by sheet of water to act as a reflector, but Mr. Chauveau thinks that the reflection may have taken place from the inner surfaces of fog-globules. He says in substance:

"The mirage consisted of a real shadow of the Eiffel Tower, whose upper part, illuminated from the south, cast its silhouette toward the north in the immediate neighborhood of its summit, on a kind of horizontal screen formed at that time by the atmospheric haze at the height of the top. The shadow thus cast appeared in a form, in a place, and with a fixt direction, in the manner of the 'Specter of the Brocken.' It showed itself lying nearly horizontal in a north-and-south direction. The point of junction (with the tower) formed a sort of right angle. All this was seen most clearly by the observer when he looked at the shadow crosswise. Placing himself in the plane of the shadow with his back to the north he would take the axis of the shadow for the simple prolongation of that of the tower. Hence the illusion of an Eiffel Tower standing upside down.

"The position of the shadow indicated that the solar rays, the primary source of the mirage, effected the illumination of the tower, shining from south to north and from below upward.

"This deviation of the light, since the tower and its shadow were very close together, certainly took place at a point very near the monument. It occurred perhaps in the layers of the slightly misty air around its upper part. It is for the meteorologists to say whether these atmospheric layers could possibly be, under the circumstances, the seat of phenomena of refraction and total reflection capable of giving to the sun's rays the direction indispensable to the production of such illumination as to enable the Eiffel Tower to throw its shadow on the sky."

SOME USELESS "FOODS"

THAT MANY commercial "food" preparations are useless or worse, is asserted by Cora Frances Stoddard in *The Scientific Temperance Journal* (Boston, December). In the course of her article she pays her respects to various combinations whose components, as she asserts, neutralize each other's virtues, and in particular to those containing alcohol, which often, she says, acts upon other ingredients in a way calculated to render them useless. Other foolish preparations contain two enzymes or digestive ferments, neither of which is able to act in the other's presence, which thus hinder each other instead of acting with double force, as was apparently intended. Her statements are confirmed as "perfectly true" by a leading New York physician, Dr. Warren B. Chapin. Says Miss Stoddard:

"A bit of conversation was overheard in a drug-store. 'I'd like to sell you some Blank's wine if you make up your own beef, wine, and iron,' said a drummer. 'Of course, the beef and iron

have to be put in to comply with the United States Pharmacopœia, but you and I and every other druggist know that the alcohol largely precipitates the iron and destroys the "albuminoids of the beef."

"Then, queried the thoughtful bystander, 'the alcoholic preparations of beef and iron are practically worthless?'

"That's about what it amounts to. The alcohol by its effects on the beef and the iron defeats the very purpose for which the combination is supposed to be used."

"Among the various 'get-well-quick' schemes proposed to a trusting public have been much-advertised commercial alcoholic 'predigested foods,' 'liquid beef,' etc. Pharmacologists declare that they have little or no practical food value. Some of them are not beef at all, but preparations of the white of egg which is a much less valuable proteid than beef,

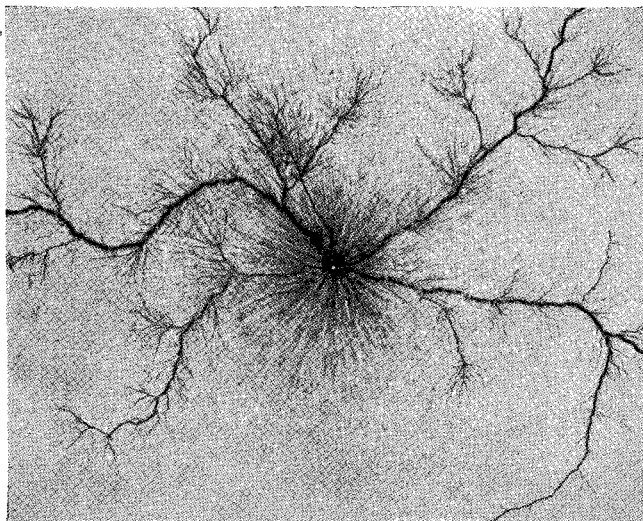
while the alcohol, which sometimes reaches as high as 19 per cent., makes what little protein there is unavailable as food. A recent book, 'Pharmacopœia and the Physician,' says of these preparations that even if life could be sustained by the food which these alcoholic preparations contain, long before a person had taken a sufficient amount of this 'food,' he would have been put into a state of continued intoxication by the alcohol.

"If one really wants 'liquid beef,' the only genuine way of getting it of any value is to press out the juice from a fresh piece of beef and prepare it as wanted.

"There is another class of commercial preparations which has been much overestimated—the alcoholic preparations of pepsin and of other digestive ferments supposed to aid digestion. Some of these preparations are valueless because they mix enzymes that are mutually antagonistic. For instance, some contain both pepsin and pancreatin. Pepsin acts only in the presence of an acid and there it destroys pancreatin. Pancreatin acts in an alkaline or neutral solution and there destroys pepsin. To put the two together in one solution, and expect both to aid digestion, is, as one pharmacologist remarks, about as absurd as trying to apply hot and cold water at the same time by putting hot water into an ice-cap.

"Starchy foods like gruel may be partly digested by adding diastase from grain before the gruel is eaten, but it would be useless to take by itself a solution of diastase with the idea of helping digestion, because its action would be checked by the hydrochloric acid and destroyed by the pepsin of the stomach before it could have any important action on the food.

"But even if a preparation does contain 'a harmonious family' of pepsin and other digestive enzymes, if put up with



Illustrations from "The Popular Science Monthly."

FIG. 1.—THE OVERCHARGED CLOUD.

The discharge lines "resemble a system of rivers and tributaries, which penetrate the cloud."