

with clear definitions of adulteration, and adequate means for the enforcement, by the co-operation of State and National authorities, of its provisions in regard to this class of fraud, the food sophisticator will pursue the even tenor of his way undisturbed. The European Continental legislation on this subject is much superior to the English act.¹ Under Continental statutes, every dealer is held responsible for the quality of his merchandise, whether of foreign or domestic origin, and every food material must be sold under its true name; artificial products imitating a natural product must be properly labelled in a conspicuous and legible manner; all unwholesome foods are confiscated and destroyed without compensation to the owner; and adulterations generally are considered acts of fraud. Suitable police supervision and control are provided for the enforcement of these statutes; and, although these laws are somewhat of a paternal nature, they are much more effective than any we have.

The average American repudiates the idea of a paternal government supervision over his affairs, or any thing tainted with the idea. He realizes that he is a full-grown man and a sovereign, and that therefore he is perfectly competent to take care of himself; and no cheat or swindler can ever get the better of him. He may be willing to support, even to clamor for, a legislative measure to regulate the production or sale of a food product, provided it advances his particular business interests. He would, however, regard with apathy any general law that would guarantee to the public the liberty of purchasing pure food, with a reasonable certainty that they were not imposed upon in their purchases, if it was incumbent on him to take the necessary steps to execute its provisions by bringing samples for analysis, etc.

It may be, however, that some day he will reach the conclusion that his individual smartness, great as it may be, is not sufficient to wage successful warfare against the food sophisticator's combinations, which have made this country for years the choice dumping-ground of the frauds of Europe, Asia, and Africa. When this happens, we may hope that the proper laws will be passed to suppress the fraud, and that we, the chemists of the country, will have opened to us a new field of usefulness,—a field in which we ought to put forth our best efforts, with the constant aim to maintain the purity and wholesomeness of the food for suffering humanity.

THE ORIGIN OF HUMAN FACULTY.

In a paper read before the Neurological Society, Dr. Romanes has presented in very convenient shape an outline of his recent work, "Mental Evolution in Man," which, being at once authoritative and brief, may be appropriately noticed in these columns. Taking for granted the truth of his first proposition, that no exception must be made in the case of the human mind to the law of continuous evolution,—a proposition fully discussed in the original work,—Dr. Romanes concentrates his energies upon tracing the probable causes and history of this transition from the intelligence of brute to that of man.

For this purpose it is found necessary to agree upon a working classification of mental products or ideas. The division adopted is that of simple ideas, which are simply the traces left in the mind by a sense-impression,—the seeing with the mind's eye, as it were; of compound, or, better, generic ideas, which are obtained by a fusion of several impressions, and so involve some amount of comparison; and, finally, of general ideas, which are named abstractions,—a symbolic mode of referring to a group of ideas. These may be more briefly referred to as percepts, receipts, and concepts. The first two are common to animals and men. A dog has a generic idea of man, and a simple idea of some particular man; but he cannot make the third step, and call the one by the word "man" and the other by the word "John." This is the distinction most usually insisted upon as dividing men from

the most intelligent of animals, and not only involves a substitution of a symbol for an idea, but, to get this idea, requires the mind to look in upon itself and observe its own actions,—introspection or self-consciousness. While these concepts may at first be very simple, they may be subjected to mutual comparison, and the relations thus deduced again give rise to concepts, and thus a kind of algebra of receipts and their corresponding concepts be formed,—an algebra of the imagination, in which all the higher intellectual work is accomplished. Now, the difference between a mind capable of however limited a degree of conceptual ideation and one having only receptual ideation is usually agreed to be the possession of language by the first, and its absence in the other. We must therefore consider the mental powers involved in language. Language, considered broadly, is the faculty of making signs: this intelligent animals do. The dog barks to have the door opened, a parrot will give rise to sounds to express its wants, and so on. But there is a broad difference between this which is receptual sign-making, and the peculiarly human conceptual sign-making. The man can think about the name, which is to the animal merely an association of sound with thing. "The difference between naming a thing receptually by mere association, and naming a thing conceptually by intentional thought, is all the difference between knowing that thing and knowing that we know it." It is, then, the genesis of the self-conscious faculty that forms the special object of study,—the faculty that enables us to think of words as words, and of ideas as ideas. But we must remember that even in the human infant there is a stage of sign-making anterior to self-consciousness. There is first the indicative stage, in which the child, like the dog or parrot, makes intentionally significant signs or tones; there is then the denotative stage, in which the child uses names receptually by mere association, just as the talking birds do; upon this follows the connotative stage, in which a child will apply a name not alone to the object with which it was first learned, but also to objects with varying degrees of similarity to it,—will extend the meaning of "bow-wow" from the house terrier to other dogs, to pictures of dogs, to a person imitating the dog, etc. (parrots have been observed to possess the rudiments of this connotative stage); lastly there is the denominative stage, where the name is consciously bestowed as such (this occurs in the child between the second and third years, when the child arranges its names in statements). It is important to note that the first three stages occur in animals, but that they occur in a very much more perfect development in the child, before it reaches the distinctively human form of speech. The receptual intelligence of the child is greatly in advance of that of any animal; although this supremacy must not blind us to the fact that it is a difference of degree only, and not of kind. This preconceptual intelligence of a child is superior to that of a dog in the same sense as the dog is more intelligent than a bird. An intelligent chimpanzee, Dr. Romanes believes, would "follow a child through what would probably seem a surprising distance in the use of denotative names and receptually connotative words," if it had the power of articulation; and it would, too, under this condition, have been able to "answer us in the same way that a child answers us when first emerging from infancy." From here on, the child rapidly advances beyond the capacity of any animal, though it has still a long development to pass through before it reaches the truly human or self-conscious stage. A very large share of mental activity at this period is formed by the making of propositions which, to distinguish from the later propositions, may be called preconceptual propositions. If a child sees its sister crying, and its words for the person and the act are "Dit ki," this is a statement, but one made for the child by the "logic of events." It is not conceptual or introspective, but is of the "psychological kind that we might have expected a monkey to make, if a monkey had been able to pronounce denotative names as well as it can understand them." Up to this point we have been considering differences of degree only: the issue is thus narrowed down to the transition from the preconceptual to the conceptual stage.

¹ For copies of European laws on food adulteration see Reports of the Commissioner of Internal Revenue for 1888 and 1889; and for a summary of their leading features see Science, 19, xiv. p. 308.

Here we must note that even in the lower animals we find some of the conditions to the subsequent appearance of self-consciousness in the more gifted intelligence of man. The animal mind has a store of images to a certain extent independent of sensuous impressions. Animals dream, pine for absent friends, seem subject to hallucinations, etc. The brute, too, is able to 'establish true analogies between its own subjective states and the corresponding states of other intelligences.' The individual so far realizes its own individuality as to recognize that it is one of a kind, and thus has a rudimentary or nascent self-consciousness. This in the child is supplanted by a pre-conceptual self-consciousness, which is exhibited by all children after they have begun to talk, but before they begin to speak of themselves in the first person, or show that they realize their own personality. It is the recognition of self as an active and feeling agent, but involves no introspection. At this stage, then, the child has the characteristics just described as common to itself and the animal, but, in addition, has far better apparatus for sign-making, a better knowledge of others' states of mind, a better faculty of denotative utterance, and so on. Here the interval between denotation and denomination becomes so narrow that the step is easy. 'The mere fact of attaching verbal signs to mental states has the effect of focusing attention upon those states; and, when attention is thus focused habitually, there is supplied the only further condition which is required to enable a mind, through its memory of previous states, to compare its past with its present, and so to reach that apprehension of continuity among its own states wherein the full introspective consciousness of self consists.' Now, this step, though an important one, is not so important as to warrant our supposing it a step different in kind from the other steps of mental evolution, especially if we remember, that, even when self-consciousness appears, the human mind is in an infantile condition, and if we take into account the enormous difference in intelligence of a child and of a youth, where a difference in kind is out of the question.

We must add to this picture of individual development the parallel evidence of racial development. This evidence shows that the several distinctively human steps of thought were in ages past difficult or impossible. Of especial importance is the evidence of language. 'The gradual evolution of articulate language has preserved for us a kind of paleontological record of the gradual evolution of conceptual thought, with the result of showing that in the life-history of the human species, as in the life-history of the individual child, this conceptual thought derived its origin from these preconceptual levels of ideation which have already been occupying our attention.' In brief, then, Dr. Romanes concludes, that, on the basis of an exact psychological analysis, the differences between the intelligence of man and brute, though presenting marked contrasts, yet seem to be connected by intermediate stages, which should be regarded as differing in degree rather than in kind, and that this view is strengthened by considering the slow and painful steps of human intelligence, from its beginnings in savagery to its present lofty attainments, at first view so entirely separating, mentally, man from the rest of creation.

HEALTH MATTERS.

The Nutritive Value of Boiled Milk.

THAT the sterilization of milk, however important, is not without its disadvantages, has been shown by Randnitz and others. To determine the comparative assimilability of proteids and fats from boiled and non-boiled milk, Dr. Evsey V. Vasilieff of St. Petersburg undertook a course of most careful experiments on six healthy young men, aged from eighteen to twenty-three years. Each experiment lasted six days, during three of which the men received raw milk, and during the other three boiled milk, the daily amount of the article in either case varying between 1,850 and 4,200 cubic centimetres. The following, according to the *Provincial Medical Journal*, are

the conclusions deduced by the author from his very instructive researches:—

1. The assimilation of nitrogenous ingredients from boiled milk is invariably less than that from the raw article. In the case of raw milk the average percentage of non-assimilated nitrogen amounts only to 7.05, the maximum to 7.62, and the minimum to 6.42; while in the case of boiled milk the respective figures are 8.18, 8.79, 7.76.

2. The same holds true with regard to the assimilation of fats. When fat is ingested in a raw state, the average percentage of non-assimilated fatty acids is 3.89, the maximum 4.85, and the minimum 2.88. In the case of boiled milk, however, the figures rise to 6.01, 6.99, and 4.53 respectively.

3. Boiling seems to affect especially the assimilation of the fats of milk, since the percentage of fatty acids in relation to the total quantity of dried fæces in those fed on boiled milk is considerably larger than in those fed on non-boiled milk. In the former case, fatty acids constitute 19.03 per cent of the total amount of dry fæces; but in the latter, not more than 16.81. In other words, when a person ingests his milk boiled, every 100 grams of his dry fæces contain a surplus of fats amounting to 2.22 grams.

4. Therefore, as regards its nutritiousness, boiled milk represents a decidedly inferior dietetic article, compared with raw milk.

5. As far as proteids are concerned, the difference in their assimilation may find some explanation in Dr. I. Schmidt's researches, according to which, under the influence of boiling, cow's milk undergoes important chemical changes, nearly all the albumen and a part of the caseine being transformed into hemi-albumose. Schmidt's analysis proves that raw cow's milk contains 8.55 per cent of caseine, 8.4 of albumen, and 6.1 of hemi-albumose. Under the influence of ten minutes' boiling, the proportion of caseine sinks to 7.59 per cent, that of albumen to 0.7, while that of hemi-albumose rises to 23.4.

TRICHINÆ IN SWINE. — Professor E. L. Mark has recently published the results of the examination of 3,064 hogs raised in the vicinity of Boston, Mass. (*Report of Massachusetts State Board of Health*). The examination extended over the five years 1883 to 1888. The results show that 14.07 per cent of the males and 10.61 of the females were infected with trichinæ. Similar examinations of Western hogs have shown only from two to three per cent to be infected. Professor Mark reaches the conclusion that this difference is probably due to the character of the food given to those raised in the vicinity of Boston, and presumably in the vicinity of other large cities. Of the fifty-six raisers of the hogs examined by him, fifty-one fed city offal. The source of the infection he believes to be in the uncooked meat found in kitchen garbage. It would be interesting to know the condition, in this respect, of the large number of hogs fed upon this food in and about the other large cities, says the *Brooklyn Medical Journal*.

THE PSYCHOLOGY OF EPIDEMICS. — Every epidemic carries in its train curious exaggerations of many well-recognized characteristics, and these frequently call for appreciation and for treatment almost as much as the disease in which they originate. Perhaps one of the most striking of these mental perversities is to be found in the idea that the epidemic is to be treated by 'common sense' or by *nostra* which have been largely advertised, or by specifics which are known to the laity mainly through their frequent mention in the daily press. Those suffering under this delusion feel that it is wholly unnecessary to seek skilled assistance, and they boldly dose themselves with remedies of whose power and properties they are absolutely ignorant. In Vienna, according to the *Lancet*, it has already been found necessary to forbid the sale of antipyrin, except under doctors' prescriptions, as no less than seventeen deaths were attributed to stoppage of the heart's action owing to overdoses. The freedom with which the prescription of this remedy has been assumed by the public has long since been viewed with anxiety by the medical profession, and frequent warnings have already fallen upon deaf ears.