Photo by American Museum of Natural History, N. Y.

Unusual food materials exhibited at the American Museum of Natural History, New York. At the upper left is dulse; center, a squid; right, mussels; middle of picture, periwinkles; right, sand collar snail; foreground, kelp

An Era of New Food Resources

WITH the steady dwindling of the regular food supplies of the world, governments and scientific men everywhere are ransacking the uttermost corners of the earth, as well as the depths of the sea for new materials suitable for human consumption to make up for the serious shortage that is threatened. This is really by no means a new movement, for our Government departments, together with many institutions, have been working along these lines for many years, and many new sources of food have been developed, especially among the fishes. Now however, the search is being prosecuted with renewed intensity, and many things are being suggested that were never thought of before.

Our illustrations show portions of some exhibits prepared by the American Museum of Natural History, in New York, for the information and education of the public. Some of these are not entirely new, although not familiar to our people. Dulse, for instance, is a seaweed that has been used as a food in Ireland, and some of the other European countries, for many years, and is highly esteemed. The same may be said of some of the kelps, the periwinkle and the mussels. Among the new things here shown are the devil fish and the skate, which are said to furnish desirable food material, although it is not likely that the public will take to them readily, largely on account of their appearance. There seems to be little reason for this position, however, for the flounder, which has no claims for distinction on this account, is highly esteemed.

This question of habit and prejudice is a difficult one to overcome, as has been instanced in the efforts to introduce the tile fish by our Bureau of Fisheries. This is a beautiful and desirable fish, but because it is something new it is still regarded with suspicion, and but few people will buy it at any price. Another striking example is that of the pollack, a handsome fish that not so many years ago was not considered fit for human consumption. Today it is highly esteemed, and the very fishermen who formerly condemned it as a "bait stealer" now consider it a great delicacy.

The last of our illustrations shows some models of snakes, which are suggested as capable of utilization as food. It is not an attractive suggestion, still many kinds of snakes are much more desirable in their habits of living than some creatures that are popularly approved of; the crab and the lobster, for example. Still, in the old days when our western country was a trackless wilderness it is said that more than one wanderer

on the plains found a rattlesnake stew not only palatable, but appetizing when other food failed them far from the habitations of man.

Many of the suggestions shown in the accompanying illustrations are not acceptable to the American people, who have always been accustomed to generous supplies of the best kinds of foods; but if the war continues another year, and the dealers in foods are permitted to pursue the same course in the future as in the past, we may still come to eating snakes, and be glad to get them. For a year past staple food stuffs, such as flour, cheese, sugar and meats, have sold in London from 30 to 60 per cent lower than in New York, even with exorbitant freight charges added—and still Congress hesitates over a law to regulate this matter lest too much power may be given to those charged with the supervision of food supplies. In the meantime the food speculator continues to exercise supreme and unrestricted power. To meet the emergency autocratic power is necessary, and not a timid law that affords innumerable and unlimited opportunity for legal quibbles and delays that practically nullify the ostensible regulations. We have seen how such laws operate in the case of our pure food regulations, which are largely nominal, and nominally enforced; and it is even hinted that these regulations should be relaxed in the present emergency—which is certainly not a proceeding in the interest of the public.

Human Psychology and Animal Psychology*

By C. Saint Saëns

Editorial Note.—Apropos of the views of Dr. Grasset upon human biology, some account of which was given recently in these pages, our readers will find the following observations by Mr. Saint Saëns, a distinguished member of the French Institute, of interest:

It requires a certain courage, some persons might even say of rashness, for an ignorant person to declare that he does not entirely share the views of such a savant as Dr. Grasset. If I venture, nevertheless, to do so, it is to undertake the defense of the intelligence of animals, which Dr. Grasset rejects as being completely outside the sphere of human intelligence. To be sure, we must guard against anthropomorphism; but do we not run the risk of falling into the error of Descartes in discarding it *a priori*, in wishing to deny it without taking experience into account? We are past the period when theories

were glorified regardless of facts; and without going to the extreme of positivism that cuts the wings of hypothesis and takes account of demonstrated facts alone, we can no longer accept a theory, no matter how seductive it may be, if it is contradicted by the experimental method.

Led by my myopia to the observation of minute details, I have done much observing throughout the course of my long existence, from my tenderest youth up; and he would be deceived who thought he detected in the result of my observations the influence of the imagination of the artist; I have always observed phenomena coldly, conscientiously, letting my imagination reign in its own sphere, and not allowing it to intervene where it is not necessary.

If I fully understood Dr. Grasset,¹ he claims that the psychic function of man presents such characteristics that it should be the subject of a special psychology, which appears to me quite incontestable; and that what chiefly distinguishes man from other living creatures is intellectual superiority and the faculty of indefinite progress.

Neither intellectual superiority nor progress needs be demonstrated. Is this progress indefinite? This is the opinion of the imaginative; it is that of Victor Hugo. In reality, we know nothing at all about it; an impenetrable veil covers the future of humanity. We observe that all species after having progressed up to a certain point, have disappeared; no one knows whether this law is destined to be applied to the human species. Are the *specifically human* biologic laws of such nature as to preserve the human species from the general law? Nothing is less certain. But that is not the main question, which is this: "All living creatures which possess psychic neurons perform acts . . . which are truly psychic acts, acts of volition. But the act willed by man differs from the act willed by the higher animals in a very important characteristic: while, in the case of the animal, all acts are the direct and necessary consequence of its constitution and of its automatism reacting in its exterior environment, in man, on the contrary, there appears in his volitional and contemplated acts an entirely peculiar contingency, a direct intervention of the individual exerting volition which prevents the *prediction* of the act of the man as one is able to predict the action of the animal . . . The animal is predestined to obey the biological laws of its species, while man obeys them only if and when he will . . . He

**Revue Scient.*, Paris.

¹See *Revue Scient.*, Feb. 3, 1917, p. 65.

Preparing a specimen of the devil fish for exhibition. The wings have a fine flavor

Coloring a model of snakes. Some kinds of reptiles furnish acceptable food

may sustain with energy the pretension that two and two make five; he may commit suicide . . ."

The answer to the argument quoted in the preceding paragraph is that only a madman or a jester could sustain that two and two make five; we need pay no attention to this. But the conclusion drawn is that the animal is entirely lacking in freedom of action; that all his acts can be foreseen; that he is incapable of committing suicide.

No one who has seriously observed animals could make such affirmations. Without speaking of trained animals, accomplishing acts foreign to their nature, I could fill a hundred pages with observations demonstrating that animals are capable of observing, of reflecting, and of acting in accord with the result of their observations.

Let a few examples suffice:

In a small town near Paris, a female dog had her foot broken, and since there was no veterinary in the place she was taken to a doctor who performed the necessary operation. Some time afterward another dog having met with the same accident, the first patient conducted him to the physician. Shall I tell of my own dog, Dalila, going to hunt a lump of sugar for her mother and afterwards going to seek another for herself? Are these acts which could have been foreseen?

As for suicide it exists among animals. I have been a witness of that of a sparrow, captured, caged and unable to accustom itself to captivity. It committed suicide under difficult conditions, with a courage and a strength of will of which few men would be capable.

And how shall we regard the following observation made, not in the world of the higher animals, but in that of insects, so different from ours? It was in the forest of Fontainebleau. On a stone half a dozen ants gathered about a bit of squirrel dung were regaling themselves with avidity. From time to time I approached the group of epicures with my finger, at a distance of about a decimeter (about four inches distant); all the ants quit their repast, save one who did not see fit to disturb herself. Finally, I put my finger very close to the group; all the ants fled, except the one that had not been frightened before. She turned suddenly towards me, remained motionless a few moments, erecting herself on her legs and menacing me with her mandibles; then she rushed upon me with all her speed. . . .

This observation proves two things; that these little creatures are capable of reflection and even of an extraordinary courage; and that all the individuals of the same species do not act with predestined certainty in the same fashion.

I should be afraid in venturing into the realm of philosophy, of exceeding my strength and undertaking questions beyond my ability; I will only venture to remark that in speaking, apropos of human biology, of laws *non-experimental, eternal and immutable*, the learned doctor appears to me to be leaving the domain of science proper to plunge into theology; and that I entirely cease to comprehend him when he says that every one should bend, *freely, but obligatorily*, before certain laws.

To return to human and animal intelligence, its domain appears to me to bear a certain analogy to the solar spectrum, wherein we distinguished the infra-red, the visible position and the ultra-violet.

At one end of the scale I find faculties possessed by animals but denied to man; a sense of orientation, foresight of earthquakes, etc.

Then follows the region wherein the psychic faculties are *identical* in man and animals.

The other end of our scale comprises the immense extent of exclusively human intelligence.

The common region is perhaps extensible. There is nothing to prove that animal intelligence may not be perfectible, and many facts seem to prove the contrary.

As for the so-called instinct, whose name is given abusively, among animals, to faculties which are evidently psychical, it is the same in the nursing and in the new-born animal; the essential and undeniable difference begins with the first smile of the tiny infant.

The skate is not handsome, but it supplies good food

Incipe, parve puer, risu cognoscere matrem! Nothing, therefore, is more legitimate than the study of a peculiarly human psychology, and the affirmation of a profound difference between human psychology and that of animals.

Only, in my opinion, this difference, so profound, is not absolute. Therein lies the kernel of the matter.

Buttons as a By-Product of Beer*

For many years the spent yeast which collected in immense quantities in the breweries and distilleries of Germany was looked upon as a bothersome waste product. Although a small proportion of this material found employment in the baking industry, the vastly greater part constituted an unmitigated nuisance. But of late this has been changed. In the first place, it was recognized that on account of its high content of albumen it was of potential food value. At first, on account of the bitter taste from the hops, the yeast was available only for use in the manufacture of articles like soup tablets. Later, means were found to remove this; so that by a

*From the *American Bottler*.

process of sweetening and drying a large variety of tasty and nutritive food products were manufactured, suitable alike for human consumption and for use as fodders, and the entire yeast output of the breweries, amounting to 10,000,000 kilos annually, was in this way utilized.

Upon the subsequent discovery of means of increasing the albumen content of the yeast the manufacture of yeast food products graduated from the ranks of subsidiary industries, and plants of an annual capacity of many million kilos were constructed for the sole purpose of the formation and conversion of yeast. Of the magnitude of these plants some idea may be formed from the fact that the cement vats for the generation of yeast are the size of the largest swimming pools, and that the yeast compound stands two or three yards deep in them. But even then the surprises which the yeast has in store are not at an end. It has recently been found that on account of its plastic nature the yeast can be readily molded into any desired shape. This would at once suggest the possibility of a wide field of utility in the arts and in the manufacture of various small articles now commonly made of bone, horn, rubber, and various kinds of composition. The prospects of so utilizing the yeast did not at first appear encouraging. It was of a most unattractive, dirty, gray-brown color, and its consistency was not especially good.

However, after much experimenting, a process was discovered for dyeing it satisfactorily, as well as for graining it; and then means were found to control its texture within very wide limits. The worked-over yeast, styled "ernolith," has the form of a powder, which after dyeing is hot-pressed into any desired shape. These shapes may then be worked over mechanically—may be sawed, scraped, filed, drilled, bored, turned, engraved, ground to a keen edge, polished to the last degree. The material has an extremely close structure, with a conchoidal fracture, and it possesses sufficient hardness and elasticity for all ordinary purposes. Furthermore, it takes hold with a vice-like grip of metal parts pressed into it, so that wires, collars, etc., of metal may be firmly attached with minimum effort. As an instance of the advantage derived from this property, it has always been a matter of considerable difficulty to attach a metal shank to a bone or horn button. It has been necessary either to screw it in or to cement it in. With a button of ernolith, the shank is merely pressed in when the button is first formed, and it is then firmly fixed. Similarly, all manner of animal and vegetable fibres—wool, cotton, asbestos, etc.—may be pressed into the substance of the ernolith. A variety of articles can profitably be made of ernolith, extending into all branches of artistic and technical work. Buttons, door-bell plates, knife handles, are just a beginning, suggesting at once extension to handles and wall plates of every description. While its greatest appeal to German consumers at present is due to its ability to replace to a large extent many of the materials which the war has made scarce on the Continent, it will certainly remain in many of the fields which it has conquered as a very cheap and very satisfactory composition.

Long Reinforced Concrete Bridges

The Walnut Lane bridge, Philadelphia, has a reinforced concrete span of 233 feet; at Grafton, New Zealand, a span of 320 feet; at Rome, 328 feet; at Largweiz, Switzerland, 330 feet, and the proposed bridge over Suytén Duyvil Creek, New York, 703 feet.