that any well-accredited scientists who feel so disposed may investigate it at their leisure.

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THE FUTURE OF TAXONOMY

THERE is one point in Dr. Mickel's interesting discussion[1] which seems to need further comment. He refers to the small group of taxonomic workers in Washington, "flooded with specimens of insects sent in from all parts of the country for identification, so that the amount of time that can be spent in actual research is exceedingly small." Also to the specialist on Coccidae "so loaded down with routine identification work and administrative duties that he has practically no time for research." Whatever may be said concerning the ability or industry of particular workers, we are here concerned with a matter of policy, and criticism must be directed to those "higher up"—ultimately to the highest power, the people of the United States, who permit such things to be. The truth is, however, that in the long run, even with existing facilities, it would pay to do much more revisional or monographic work. Only a few days ago I received a letter from a worker in the National Museum, explaining the difficulty of conducting exchanges, because so many of the species of a certain group were erroneously identified. Without revisional work, the museum collection may well be a source of error. Specimens come in from many workers, and it is impossible to check up the identifications as they are put away. Even specimens labeled "type" can not always be trusted, as has been shown by a National Museum specialist in a paper just published. Then again, in the absence of adequate monographs, entomologists give up the idea of determining their species, and at the same time the idea of studying them. Consequently, even when they receive names for their specimens, they often do not know the species, and will not recognize them again. The practice of wholesale determination of specimens has faults analogous to those of indiscriminate charity.

On the other hand, if, with enlarged resources, we went to work cooperatively to monograph our fauna, we could enable serious students to work up their own materials. They would, of course, find difficulties, and would be entitled to assistance from the museum or bureau, after they had tried to help themselves. This assistance would be cheerfully given, with the knowledge that it would promote study, instead of preventing it. Identifications, based on revisional work and not on the labeling of specimens, derived from various sources, in the collection, would be far easier and more accurate. Time would be saved for all concerned, except those who have been in the habit of requiring a specialist to do their work for them. Broadly, then, we need more constructive imagination.

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[1] Clarence E. Mickel, "The Future of Taxonomy," SCIENCE, 71: 436, April 25, 1930.

INACTIVITY OF CHICORY[1]

RESULTS previously reported[2] indicated absence of stimulative effect of infusions of chicory on isolated intestinal segments. Later repeated observations of no gastro-intestinal response in intact rabbits, dogs and guinea-pigs to massive doses of such infusions seem to indicate further that chicory, in the form used as a beverage ingredient, probably has no laxative effect.

Such a quantity of the root is popularly consumed that it was thought worth while to investigate other possible actions. A careful series of urine secretion determinations in man (myself) and guinea-pigs have yielded, without exception, quantitatively negative results. Intravenous or stomach tube administration of as much as 60 cc of a 20 per cent. infusion produced no observable effect or discomfort in intact guinea-pigs. Substitution of an alcoholic extract (evaporated to alcohol-free) for the infusion made no difference in the complete negativity of the findings.

The only indication of a possible drug action encountered was a tetanus-like hyperexcitability of frogs which had received the relatively tremendous dose of 2 cc of a 20 per cent. evaporated tincture (roughly equivalent to 5,600 cups of an average coffee-chicory blend in man). Administration of virtually unlimited dosage failed to elicit any comparable effect in mammals. It seems quite probable that chicory has no particular pharmacological significance as used in coffee mixtures.

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CAN A CATFISH COUNT?

A BULLHEAD catfish (*Ameiurus nebulosus*) which had been maintained since babyhood in a twenty-three-gallon all-glass tank of still water with several others of its kind was between three and four years old when it evolved a method of entertaining itself that may be called unique considering the general absence of a spirit of play in this group of fishes.

A single spray of Canadian water-weed (*Anacharis*) trailed about a foot from the main plant, touching the glass at the rear of the tank (*i.e.*, the side

[1] From the Departments of Physiology and Pharmacology, Marquette University School of Medicine, Milwaukee.

[2] C. Reynolds, *Proc. Soc. Exp. Biol. and Med.*, 25: 696, 1928.

away from the light). The catfish, which was called "White Whiskers" because the four "chin" barbels were white, was seen every day circling this spray. It always moved over the spray, then under, always proceeded from the left to the right of the tank, and showed a preference for making the swing an even number of times before coming to rest.

Often it was observed at play when there was not time to count its motions, but on five different days its circuits in this peculiar game of solitaire were counted. On one day it played fifteen games, during which it recorded in all 115 swings around the spray. On the five days it played forty games and traced the circle 263 times!

In these forty games the fish came to rest thirteen times after completing the circle an odd number of times (from one to nineteen), but on twenty-seven occasions it recorded an even number of swings(two to sixteen).

Was it merely a matter of chance, or did the catfish derive some conscious physical satisfaction from encircling the spray an even number of times?

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

RECORDING CEREBRAL ACTION CURRENTS

ACTION currents from the cerebral cortex of the dog have been obtained by using five stages of vacuum tube amplification recording with an oscillograph. The operation which exposed the surface of the cortex was performed under both general and local anesthesias. Records were taken after recovery of the dog from the general anesthesia. Precautions were developed which have insured the minimal operative shock. Records were made with a film speed of twenty-one inches per second.

We have succeeded in recording from at least three distinct parts of the cortex, namely, portions of the occipital lobe, areas on the boundary of the temporal and parietal lobes and from the motor areas in the frontal lobe. These action currents appear to be of the same general nature as those obtained from the peripheral nerves. There would appear to be no very essential difference between different parts of the cortex in the form or frequency of the impulses themselves. At any one point one may obtain a wide variety of temporal and intensity relationships between the impulses.

From the degree of simplicity of patterns obtained with relatively large electrodes, it is inferred that a high degree of localization of function is not the case. Our largest electrodes covered about one four-hundredth of the brain surface. It may be readily seen that this is not at all sufficient to give spatial reference to nearly all the discriminable functions that the psychologist knows. We must fall back upon temporal factors within these areas, qualitative factors there, or functional patterns involving perhaps large portions of the cortex.

In general, we get records from the so-called motor and somesthetic areas with active movements of the dog, from the somesthetic and not from the motor in passive movements and slight effects in the visual area with a change from light to dark in the room. In certain cases we obtained records from the so-called visual area during active movement of the dog. This may indicate that this so-called sensory area was in this case an integral part of the dynamic pattern which gave rise to the movement. It would appear, however, that there must be a spatial factor in this dynamic pattern in order to give a sufficiently differentiated reaction here to correspond with our experimental data. The limited complexity of the records which we obtained makes it impossible to account for all the differences in the reactions of the animal in terms simply of the type of patterns on the records. Specialization of function, that is, the existence of a spatial element in the functioning of the cortex, is a fact, but we do not know as yet the degree to which this specialization is true or its constancy over a period of time.

Further work is in progress along all the lines suggested.

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A CONVENIENT AID IN BALANCING CENTRIFUGE TUBES

A 15-CM dental chip blower syringe of about 50 cc capacity with right-angled delivery tube has been found to be very convenient in balancing centrifuge tubes. With this syringe the rate of delivery of water is much more easily controlled than with the commonly used large dropping pipette, and it has the distinct advantage of being unbreakable. It is convenient to place it in a wide-mouthed bottle, the bulb serving to keep the water clean. The syringe is stocked by dental supply houses and retails for about seventy cents.

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