year. Exhibit No. 2 illustrates "The Extraction of Nickel by the Mond Process," and consists of flow sheet, photographs, samples of intermediate and fine products, letterpress and booklets. Exhibit No. 3 illustrates "The Properties and Applications of Nickel and its Alloys," and consists of samples of products made in many different alloys, photographs, letterpress and booklets. Lectures illustrated by traveling exhibits or lantern slides are also given by members of the firm's staff.

DISCUSSION

PHYSIOLOGICALLY ACTIVE COMPOUNDS

IT has perhaps become customary to associate very intense biological activity chiefly with "toxines," "enzymes" and other bodies which are the despair of the organic chemist.

This attitude may have resulted partly from the fact that pharmacologists have seldom expressed the results of their experiments in striking terms. Professor A. J. Clark[1] has recently recalculated some pharmacological data in the literature and expressed the results in what may be termed an almost sensational manner. Thus he finds that doses of acetyl-choline which I had found sufficient to cause a distinct fall of blood-pressure in a cat could only produce a concentration equivalent to 1 mg in 500,000 gallons of blood. Clark has found that even smaller concentrations may affect the frog heart and shows that the volume of the cell of the frog heart is about 3.4×10^{11} times greater than that of the molecule of acetyl-choline. "This relation in size is similar to that between a large whale (100 tons) and a midge (1/3 mg). The remarkable fact is that a few thousand of these molecules when attached to the cell are sufficient to depress its activity."

My data could have been expressed in a different way: 1 grain (originally defined as the weight of a grain of wheat) would suffice to lower the blood-pressure of more than a thousand million cats; yet this dose might not kill a single cat. Clark also calls attention to the work of Loewi which indicates that stimulation of the vagus liberates acetyl-choline around the heart cells and in this way slows or weakens the heart. I had found indications of the presence in the adrenal glands of compounds which were far more active than choline and which seemed to yield choline on chemical treatment; this observation led me to prepare acetyl-choline and so to the discovery of the remarkable physiological activity of this compound. Recently Dale and Dudley have succeeded in isolating acetyl-choline from the spleen, and Kapfhammer and Bischoff believe that they have found it in ox blood.

Dale and Richards found that histamine, a compound widely distributed in animals, is active in even smaller doses than is acetyl-choline.

Clark also calls attention to a number of other very active "drugs" (thyroxin, epinephrine and secretin) which are formed in the body and concludes, "Modern investigations show, therefore, that there is a complex system of control of the body by means of the release of drugs."

The possibilities of finding drugs useful in the treatment of diseases by the pursuit of such studies are obviously very great, but at present very little scientific work is being done along these lines. Ehrlich more than thirty years ago reproached the medical profession and those responsible for the direction of medical research for abandoning to chemists and commercial interests research in this field which he termed the "ureigenstes Gebiet" of the medical profession.

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[1] *Jl. Soc. Chem. Ind.*, June 27, 1930.

SALINITY AND SIZE

IN the *American Naturalist* for March–April, 1930, Federighi[1] notes the smaller size of *Urosalpinx cinerea* from the saline waters at Beaufort, North Carolina, as compared with snails of this species from the less saline waters at Norfolk, Virginia, and he refers to observations by Vernon,[2] Flattely and Walton[3] and Hubbs upon the effects of salinity upon size. Hubbs noted that "within certain limits, size is directly proportional to the salinity," while Vernon and Flattely and Walton "maintain that the more saline waters tend to restrict the size attained."

It may be of interest to note that in a little paper[4] I published in 1904 I described dwarf specimens of *Neritina virginea* in the very salt shore ponds near Port Henderson, Jamaica, West Indies, and similar dwarfs from the almost fresh water in the mouths of two rivers on the northern side of the same island.

[1] Federighi, "Salinity and the Size of *Urosalpinx cinerea* Say," *American Naturalist*, March–April, 1930.

[2] Vernon, "Variation in Animals and Plants," Henry Holt, 1903.

[3] Flattely and Walton, "The Biology of the Sea Shore," Macmillan, 1923.

[4] Metcalf, "*Neritina virginea* variety *minor*," *American Naturalist*, 38, 1904.

The dwarf forms from either region have less than half the length or breadth of the forms on the ocean shore.

Interesting experiments might be made upon this widely distributed *Neritina* to see if it is so adapted to waters of an optimum salinity that rearing it in either more or less saline water causes it to be of smaller size.

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MOLLUSCAN HOSTS IN NORTH AMERICA FOR HUMAN FLUKES

PERHAPS the most impressive thing to the student of trematodes is the relatively great number of digenic worm parasites affecting man that are indigenous to the Orient, Africa, India and Europe. Equally striking is the lack of fluke parasites which affect man in North America. These significant facts may be explained in terms of man's distribution during geologic time. Such facts should encourage research on our own molluscan fauna taxonomically and experimentally to determine the probability and possibility of the dangerous exotic flukes becoming established on this continent.

Has any one yet tried to infect the North American relatives of *Melania, Katayama, Oncomelania, Bulinus, Bithynia, Planorbis coenosus* or *Segmentina* with the miracidiae of man's most dangerous flukes? These genera harbor such flukes in the Old World. Does any one know whether the Japanese snail, *Viviparus malleatus,* will not carry any of these dangerous flukes? This snail is already well established in the Kern River and the irrigation ditches about the city of Bakersfield, California. There are many orientals working in close contact with these snails in California. Is any one sure that these gardeners can not infect these snails with any one of the many flukes of the Orient? Likewise *Bithynia* has been introduced from Europe and *Viviparus* and *Segmentina* also have species native to North America.

Diseases such as yellow fever, malaria, sleeping sickness and filaria are carried by two or more species of the same genus of insect and, in the case of filaria, by two different genera. The distribution of these diseases now depends on the distribution of the species of animals that can carry them. Man is no doubt still giving his diseases to mosquitoes and snails that are capable of being infected because of their relationships to the original hosts.

Many of the animal parasites of man in North America are exotic forms. The hookworm of the South is supposed to have come from Africa with the slaves. Many other worms have had a similar history. In North America, rich in trematodes in other orders of vertebrates, we find few important flukes, except those brought in by foreigners, which affect man. It may not be impossible, however, for them to become established if the proper snail host should be introduced, or if the immature stages could live in a closely related snail. Such may be a possible explanation of the human fluke, *Paragonomus westermani,* in the New World.

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A BITUMINOUS FOSSIL PLANT FROM THE TRIASSIC OF NORTH CAROLINA

A SPECIMEN of solid hydrocarbon (bitumen), in the shape and with the external markings of a flattened tree root, was recently taken from the roof of the Cumnock Coal Mine of the Deep River Triassic Coal Field of North Carolina. This peculiar specimen is black in color, brittle and has many pores, marking the presence of former gas bubbles. The specimen was about 30 feet from a large, basic, igneous dike which cuts through the Cumnock coal seam. This igneous dike has altered the bituminous coal to natural coke (carbonite) for a number of feet on either side of the dike.

It is apparent that this bituminous fossil plant root was formed by the filling of a root cavity by the bitumen distilled from the coal in the formation of the natural coke.

Local deposits of solid hydrocarbons in the Triassic sediments or Mesozoic basalts have been mentioned by a number of scientists, as J. G. Percival, T. S. Hunt, E. S. Dana and I. C. Russell. These deposits have been cited from Gaspé, New Jersey and Connecticut. The occurrence in these localities is in amygdaloidal cavities in the cellular basalt or along joint planes in the Triassic rocks.

The source of the bitumen in the deposits in Gaspé and New England is doubtless from the igneous dikes which have picked up the hydrocarbons in their course through carbonaceous rocks. The hydrocarbons thus gained were deposited in the most accessible rock openings, the joint planes and amygdaloidal cavities. This latter type of opening does not occur in the basic rock deposits in North Carolina, since in this section of the country the Mesozoic basic rocks are entirely intrusive in character and non-cellular, but the solid hydrocarbons do locally occur along the joint planes.

There are probably many fossil bituminous plant stems in the Triassic coal field areas of North Carolina and Virginia, but as far as I know there has been up to the present no record of such discovery.

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