

deficit" and "suction tension," and (3) because there is no need for the term "net osmotic pressure."

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STRAIN SUSCEPTIBILITY TO THE EUROPEAN CORN-BORER AND THE CORN-LEAF APHID IN MAIZE

THE European corn-borer (*Pyrausta nubilalis* Hubn.), a chewing insect, and the corn-leaf aphid (*Aphis maidis* Fitch), a sucking insect, are both serious pests of *Zea mays* L. Differential susceptibility to the corn-borer among corn strains has been recognized for several years. The authors have recently found: (1) a differential susceptibility among corn strains to the aphid and (2) significant correlations in the degree of strain susceptibility to these two widely different pests.

Among corn hybrids grown in northwestern Ohio, significant correlation coefficients of 0.570 and 0.844 were found in different seasons between expected aphid infestation based on aphid susceptibility ratings of the parent inbred lines and estimates of actual corn-borer infestations. Estimates of aphid abundance were based on actual counts of infested plants. Estimates of corn-borer abundance were based both on counts of infested plants and on stalk breakage associated with corn-borer damage. These correlation values are as high as have usually been found between corn-borer infestation counts on the same corn strains in different seasons. Correlations between corn-borer and aphid infestations on the same plots may, however, be very low because of competition between the insect species.

The relation has one immediate practical application. For corn-growing areas where the corn-borer is a serious pest, the differential strain susceptibility to corn-borer infestation provides a basis of major importance in classifying breeding material. The chief difficulty in measuring strain susceptibility has been burdensome techniques. In general, the choice lay between (1) adequate sampling of stalks with either natural or manual infestation and (2) feeding etiolated leaves of different strains to young larvae in the laboratory. Manual infestation reduces the number of plants needed for dissection but adds the requirement of rearing moths and applying eggs; it adds also an uncertainty of simulating natural conditions. Further, stalk dissection readings are subject to a large error unless properly timed with reference to the usually different maturity of the strains under study. Laboratory feeding also requires the rearing of moths and handling of eggs and larvae in addition to providing a constantly fresh supply of food.

Counts of aphid colonies, on the other hand, can be made rapidly. The evidence indicates that the degree of aphid infestation may be used as an index to the

degree of strain susceptibility to the corn-borer, at least for preliminary classifications of corn-breeding material.

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AN EXPERIENCE OF GENERAL ANESTHESIA

HAVING been occupied for some time with a disquisition on "Biology and Substance" I have had an experience in the last two days that furnished me facts and reflections on the subject that interests me a good deal and it has occurred to me might be of some interest to other people.

The discovery had recently been made by myself and my dentist that I had two teeth that were worse than useless, with the consequent decision that they had better be extracted. Passing over details in preparation for this I merely mention that the decision was that there should be general instead of local anesthesia—heretofore never experienced by me. Early in the morning I found the anesthetist with some sort of a contrivance beside my head with the instruction that I breathe perfectly naturally. My only response so far as I remember was the foolish question as to whether this was "N O" or "N O 2," to which she replied "N O."

Although I was naturally not holding the stop watch, as near as I could judge it could not have been many minutes at most before I was completely gone so far as my consciousness was concerned. When I came to my senses forty-five minutes later, as I was told, I was aware of some soreness in my mouth and not much later I was wide awake and restored to my regular bed in the hospital. What particularly interests me is the problem of what, during the period of non-existence so far as my consciousness was concerned, that substance, "N O," was doing to me.

I note, first of all perhaps, that from my little knowledge of chemistry and biochemistry I know that nitrogen and oxygen were playing important parts in my existence up to the time my existence disappeared. Their action on me must, however, have been very different when the two were combined to make "N O" than when either was thus uncombined. How is such a thing possible? How was it that the combination of those two chemical elements could produce such a striking effect as compared with what either of them could do alone or in other combinations; and the gist of my inquiry is as to the latent qualities or properties which each separate chemical substance

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must have that can be actualized in no other way than by their coming together to make the compound substance put me out of conscious existence. No amount of chemical examination in the laboratory, so far as I know, would indicate that the two would unite and make a substance that would have such a remarkable effect.

I raise the question of whether this striking example of chemical transformation is more or less typical of all chemical transformation. Is there anything about the phenomenon that we can say intelligently, other than that chemical transformation in general is a process of bringing into actuality the potential qualities that the elements have, which can be discovered in no other way than just that of their acting on one another; and that when they have made a compound substance, the action of that substance can be discovered in no other way than by trying it on a living being more or less like myself?

I wonder if this sort of thing which is now common knowledge to us moderns, does not throw some light on the seemingly endless speculation of the philosophers and theologians, not to say some expert scientists, with reference to what the idea of substance really amounts to.

It looks to me as though the idea of potentiality, of which Aristotle made much as to that particular meaning of the Greek *dunamis*, has been overly neglected in the natural knowledge of the modern era.

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THE CONQUEST OF LEPROSY

In 1927 my wife and I visited Dr. Douglas Collier and his wife, Dr. Mary Collier, at their mission station at Nan, Siam. We also went to Chiangmai, where Dr. J. W. McKean was in charge of the admirable institution for the care of lepers. These medical missionaries worked under the auspices of the Presbyterian Board, and we felt that their work was of the utmost importance to the country, and a credit to their American supporters.

The years have gone by, Dr. McKean has retired, and now lives in California; Dr. Collier has moved to Chiangmai, and taken up the work with the lepers. All this might not call for special comment were it not that at last after long years of investigation, it appears probable that leprosy may be actually conquered. The experimental work at Chiangmai, in its present form, was initiated by Dr. M. J. Oberdoerffer, a young German who had worked in Africa under the British Empire Leprosy Relief Association. It appeared that the eating of colocasia predisposed to the development of leprosy, apparently due to a toxic substance also found in partly decomposed fish. Using this method, it was found possible to cause monkeys to acquire leprosy, something which it had seemed impossible to do before. The conclusion was reached that injury to the adrenal glands was the more immediate cause of trouble, and short-wave radiation was used to stimulate these glands, with satisfactory results. However, it was suggested that possibly the use of diphtheria antitoxin might be beneficial, as in diphtheria a toxin is liberated which damages the adrenal glands. In diphtheria, antibodies are formed, but this seems not to be the case in leprosy. When the work had reached this promising stage, Dr. Oberdoerffer, on account of poor health, felt obliged to leave Siam. Dr. Collier continued the work, now using toxoid instead of the old antitoxin. The results have been extraordinary, and Dr. Collier states:

In the use of toxoid and antitoxin we have a treatment which far exceeds any method yet known. Results are obtained in a few weeks, which formerly were seen only after months or years of treatment. While the early cases are less spectacular in response, all types seem to be benefited.

It is reasonably hoped to immunize the children and associates of lepers, and so in time eradicate the disease. All these matters are set forth in a paper just received, published in the *Journal of the Thailand Research Society* (Bangkok), February, 1940.

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SCIENTIFIC BOOKS

THE KOSHER CODE

The Kosher Code of the Orthodox Jew. Being a literal translation of that portion of the sixteenth-century codification of the Babylonian Talmud which describes such deficiencies as render animals unfit for food (Hilkot Terefoot, Shulhan 'Aruk); to which is appended a discussion of Talmudic anatomy in the light of the science of its day and of the present time. By S. I. LEVIN, senior rabbi of Minneapolis,

and EDWARD A. BOYDEN, professor of anatomy, University of Minnesota. xx + 243 pp. Minneapolis: University of Minnesota Press. 1940. \$4.50.

THE anatomist and embryologist must visit, if not frequent, the slaughter-house. The late Professor Minot remarked, in his quiet way, "It is hell," as he sent the reviewer there. Dr. Boyden's errand, fifteen years ago, was to find how often partly divided and supernumerary gall bladders occur in calves and sheep