maps were copyrighted. In view of this fact, I am extremely sorry for having committed a mistake of using Professor Schuchert's interesting and informative results without first consulting him on that matter, and deeply apologize for hurting, though unwillingly, his feelings of ownership in that matter.

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SPECIAL CORRESPONDENCE

FIELD MUSEUM PALEONTOLOGICAL EXPEDITION TO HONDURAS

A PALEONTOLOGICAL expedition of Field Museum of Natural History worked in the Republic of Honduras from early November, 1941, until April, 1942. The personnel consisted of Paul O. McGrew as leader and Albert A. Potter, of the Nebraska State Teachers College, Chadron, Nebraska, as assistant. Señor Eliseo Carabantes was employed during most of the work and various other Honduran assistants were engaged from time to time.

The object of the expedition was to collect fossil mammals. Particular interest in fossils from Honduras arises from the geographic position of that country. Practically nothing is known of fossils from tropical America, and answers to several perplexing paleontological problems might be gained from study of fossils from that region. Data bearing on the accurate dating of the emergence of the Panamanian land bridge, on the dating of the Tehuantepec marine portal, on the still-existing environmental barrier between the two continents of the Western Hemisphere, on the value of homotaxis in correlation between deposits in northern and southern latitudes and on other problems might well be expected.

Three months were spent in the early Pliocene deposits of the Departamento de Gracias. These beds were worked briefly in 1937–38 by an expedition from the University of Chicago and previously reported upon.[1] Here a large collection of the dwarfed horse, *Pliohippus hondurensis,* was obtained. In addition fossils of dog, mastodon, rhinoceros, deer, camel and some reptiles were collected. All forms found were definitely of northern origin.

In the Departamento de Copan a deposit was discovered which produced an interesting and beautifully preserved collection of late Pleistocene mammals. This site was successfully quarried. Among the specimens collected were *Toxodon, Glyptodon* (?) and *Megatherium* as immigrants from South America, and *Equus, Camelops* (?) and *Felis concolor* of North American origin. Of *Megatherium* an essentially complete skeleton was obtained. The *Toxodon* is of particular interest, as it is the most northern occurrence of this group of South American mammals so far recorded. In 1886 Leidy reported a lower molar and a broken incisor from Nicaragua. Temporary conditions made it impossible to complete excavation in this Pleistocene quarry, but it is fervently hoped that in the not-too-distant future work there may be resumed.

Because of the uncertainty of water transportation, practically all the material was stored in Guatemala, where it will probably have to remain until the termination of the war. Consequently, its study and the determination of its bearing on the above-mentioned problems will necessarily be delayed. It may be stated, however, that the Pliocene fauna supports the conclusions previously reported and that the Pleistocene fauna should throw new light on our problems.

Sincere thanks are due to the government and people of Honduras, who cooperated in every possible way to make the expedition a success.

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FIELD MUSEUM OF NATURAL HISTORY

QUOTATIONS

SOME SIGNIFICANT FINDINGS OF THE EXPERIMENT STATIONS IN 1941

THE preparation of the annual report to Congress by the Office of Experiment Stations on the work and expenditures of the agricultural experiment stations for the fiscal year ended June 30, 1941, has brought together the usual progress reports of the more than 3,000 federal grant projects active at the stations during that year. It is now expected that in due course these activities will be discussed in that report, but on an abbreviated basis in conformity with the national need and policy to conserve both paper and the printing funds. In the meantime the opportunity is being availed of to place on record brief statements of a few of the more significant accomplishments. These examples have been selected as representative of the subject matter fields covered in station research and the varied agricultural conditions and problems of the states and territories. They are based on statements as to the work done and the progress made under each active federal project, prepared by project leaders and made available to the office by the station directors. It needs scarcely be emphasized that they

[1] E. C. Olson and P. O. McGrew, *Bull. G.S.A.*, 52: 1219–1244, 1941.

are to be regarded as typical of the work but in no sense inclusive. The order of presentation is also largely random.

A simple low-cost plastic material from cottonseed-hull bran for the manufacture of sheaves for textile looms has been perfected by the Tennessee Station and developed in a commercial molding plant. Several hundred thousand of these sheaves already are in practical use and are demonstrating their superiority to those made of other plastics. Utilization of cottonseed-hull plastics for special purposes where strength and hardness are required promises to increase appreciably the value of a cheap by-product of the cotton-production industry.

A coumarin compound has been isolated by the Wisconsin Station from sweet clover and identified as an anti-blood-clotting factor. Selective breeding of sweet clovers of low coumarin content is now possible to obviate the disease of cattle which sometimes develops from sweet-clover feeding and may cause bleeding to death from wounds. The discovery has also been found of value in human medicine, as the new compound and others related to it may be used in treating human diseases in which it is desirable to lengthen the clotting time of the blood.

Studies by the Kansas Station on the milling and baking quality of wheat indicate that undue importance has been given to test weight in grading wheat that has been swelled by exposure to rain. When the test weight of Turkey wheat of good quality was reduced as much as 6 pounds per bushel by wetting, a degree which would have meant heavy discounts if sold commercially, milling value was affected to only a negligible extent and in most cases the baking qualities were not impaired materially.

Improvements by the New Mexico Station in pinto beans as to color, maturity and rust resistance have resulted in three new strains which have shown an increased value at average prices in New Mexico of about $2 per acre on dry land and of $11 on irrigated land. Sufficient seed was expected to be available in 1942 for the entire state.

Following studies by the Maine Station, a yield equivalent to at least 5,000 pounds of 4 per cent. milk per acre is being produced in that state with Ladino clover. This is from 1,000 to 1,500 pounds more than is usually obtained with common grassland crops on fertile soil.

Pasteurization of dill pickles shortly after the completion of the curing period was found by the North Carolina Station, in cooperation with the department, to preserve crispness of flavor long after unpasteurized pickles have become unsalable because of softening. This development is seen as a boon to dill-pickle packers, especially in the Southern states.

Failures to control red scale insects, one of the most important pests of citrus, by fumigation with hydrocyanic acid have been found by the California Station to be due to the ability of certain resistant races of these insects to close their spiracles (breathing pores) when exposed to the gas and to keep them closed for at least 30 minutes. A search is being made for substances which can be combined with hydrocyanic acid and will result in earlier opening of the spiracles.

Double-hill planting of tomatoes was found by the Utah Station, in cooperation with the department, to reduce greatly the loss of plants by beet leafhopper attacks and transmission of curly-top disease. Even under light infestation the increased yield paid for the extra plants needed. Cheesecloth covers were also effective but ordinarily too expensive.

A mixture of chloronaphthalene oil and crystal naphthalene 3:1, developed by the Massachusetts Station, gave complete control of red spider of carnations in greenhouses and was less expensive than naphthalene alone.

In a search for cheaper sources of nitrogen in animal feeding, experiments with urea, a non-protein compound in which the nitrogen generally costs only from one fourth to one third as much as its equivalent in the usual protein supplements, have been carried on in several States and Hawaii. The Wisconsin Station obtained very favorable results with urea as compared with linseed meal for dairy cows as to milk production, butterfat, protein, and vitamin C content of the milk, and the production of normal calves. In lamb feeding a lower value for urea than for linseed meal has been obtained by the New York (Cornell) Station when used as a practically exclusive source of nitrogen, but with equal parts of the two feeds the combination was only slightly less valuable than linseed meal alone.

Wide variations in fertilizer requirements of sugarcane under different environmental conditions have made economical use of fertilizers difficult of determination. The Hawaii Station, in cooperation with the Hawaiian Sugar Planters Association, has found that by sampling the sheath of the young mature leaf and determining the content of sugar, water and minerals, a very reliable guide for fertilizing and irrigating can be obtained, based on known responses on soil types under local conditions of light and temperature. Such intensive applications of fundamental scientific knowledge promises to decrease costs of production by securing sugar accumulation close to the highest level possible. This is an important contribution to the economic stability of a territory largely dependent on its efficiency in production on a little over a quarter of a million acres.

The Missouri Station has succeeded in chemically combining the proteins of skim milk with iodine to produce an artificial thyroprotein which has the physiological properties of thyroid substance. In short feeding trials, milk production of goats was increased by feeding 5 to 10 gm daily of the artificial thyroprotein, and cows which were falling off in milk production were stimulated to produce more milk by feeding 50 to 100 gm daily. This cheap source of thyroprotein may prove a practical way of increasing milk production of dairy cattle.—*Experiment Station Record.*

SCIENTIFIC BOOKS

Muscle. Vol. 3, Biological Symposia. Edited by WALLACE O. FENN. ix + 370 pp. Lancaster, Pa.: Jaques Cattell Press. 1941. $3.50.

IN the explosive, self-restituting phenomena associated with the substance myosin, muscle presents a challenge to many minds. "As a gadget which works," remarks the editor, "it has an obvious fascination for any boy or girl. It has," he adds, "a similar fascination for physiologists, the what-makes-it-go boys of biology." Augmented by additions to the initial list, the range of this symposium stretches from the rigors of bio-mathematics to the whimsies of bio-reminiscence; indeed, from the mechanics of powerful locomotor systems to that of the submicroscopic protein particle.

With rare technical skill, the Ramseys have subjected the individual muscle fiber to many crucial tests. That the functionally end-plateless fiber can be, throughout, both receiver and transmitter of excitation is strongly supported in their experiments. One of the most interesting of these reveals a singular perversity on the part of fibers permitted to shorten to 60–70 per cent. of resting length. In this "delta" state the fiber, among other changes, loses its intrinsic property to relax.

As an outgrowth from a discussion of the above studies, F. H. Pratt's historical sketch of the all-or-none concept as applied to muscle seeks its motive in Ranvier's expression, *la devise du coeur*. The type of response formulated by this "motto" is compared as a norm with deviations common to muscular behavior.

H. A. Blair analyzes mathematically the alternative features of the excitatory process: a threshold quantity of local change, and a phase of subsidence when that change falls short of threshold value. It is evident that the field is charted by the strength-duration curve. The conditions are treated with reference to selected models, of which the single polarizable membrane is found to be as adequate as the double. Dr. Street collaborates in the ingenious experiments on single fibers.

The behavior of smooth muscle is traditionally capricious. Can it be harmonized with the stereotyped capacity of skeletal and heart muscle to discharge discrete impulses and to conduct them in all-or-none fashion with a concomitant action potential? E. Bozler makes the distinction between the "multi-unit" type of smooth muscle, dependent upon outside innervation, and the automatic "visceral" (syncytial) type. Their potentials are interpreted respectively as (1) bursts of impulses referable to the discharge of discrete motor units; (2) repetitive impulses accompanying syncytial conduction. The rat's ureter presents a special case, with potential-complex typically cardiac.

A. S. Gilson, Jr., assuming protoplasmic continuity in smooth muscle, suggests that lack of uniformity in size of bridges may explain the electrical irregularities; and suggests that repetitive activity of one cell might simulate the responses of a group.

It is pointed out by A. Rosenblueth that smooth muscle is conductively heterogeneous. Long fibers, striated or smooth, show much the same type of conduction—an all-or-none effect, with potential ahead of contraction. As in Bozler's experiments, the same may be true of the short, presumably syncytial uterine muscle during estrus. Nictitating membrane and pilomotors fail to share the conductive function: here the diffusion of a chemical mediator can be invoked to explain nervous control of relatively distant cells.

The nerve-muscle junction is examined by T. P. Feng, chiefly in the light of Wedensky inhibition. Numerous important sub-topics conclude with "Local Potentials in Non-curarized Muscle." These, in summating, resemble those in completely curarized muscle, although probably not strictly localized to the end-plate. The many data analyzed lead to the following via media:

> If the spike potential and the liberation of AC [acetylcholine] in the nerve endings are intimately coupled concomitant events, the least arbitrary view at present is perhaps that which allows the actions of AC and of the spike to be mutually reinforcing, forming together an exciting complex which might even include other elements, *e.g.*, potassium ions.

In surveying the past decade of work on action potentials, A. C. Young deals first with investigations extending the membrane theory. The speeding of propagation by rise of temperature and by stretching is cited in its contributory relations. The after-poten-