be followed by a more detailed account of experiments.

On November 6, 1915, six specimens of *A. punctipennis* were allowed to feed on a patient in whose blood had been demonstrated the gametes of tertian malaria. The mosquitoes had been bred from larvæ and before and after the blood meal were given only raisins and water as food. They were kept at room temperature and were dissected and examined in the usual way after intervals of 7 days (two specimens), 9, 18, 20 and 24 days. The first four showed a moderate to heavy infection of the stomach with oocysts. In the one examined on the twentieth day were found mostly rupturing and ruptured oocysts and an intense invasion of the salivary glands with sporozoites—the form which is inoculated by the mosquito into the human host. The sixth specimen alone proved to be negative and in this one the condition of the ovaries suggested the explanation that this may have been due to the ingestion of only a small amount of infective blood.

On a second case of tertian malaria having a much fewer number of gametes, a single specimen of *A. punctipennis* was fed on November 12. Upon dissection on December 2, a light infection of both the stomach and glands was found to exist.

In each experiment bred specimens of *A. quadrimaculatus* were fed on the patients as controls and these also showed a high percentage of infections upon subsequent examinations.

The demonstration that *A. punctipennis* is an efficient host for tertian malaria does not necessarily indicate that it is an efficient carrier of other forms of malaria and, in fact, from Hirschberg's results we may anticipate that such is not the case.

The writer is indebted to Dr. C. C. Bass and Dr. F. M. Johns of the laboratories of clinical medicine of Tulane University for assistance in the work upon which this statement is based and to Mr. F. Knab for the verification of the determination of the mosquito.

W. V. KING

BUREAU OF ENTOMOLOGY,
U. S. DEPARTMENT OF AGRICULTURE

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE SECTION G, BOTANY

PACIFIC COAST MEETINGS

THE following officers were present: Professor W. A. Setchell, sectional vice-president; Professor L. L. Burlingame, acting secretary. The meetings were held in the Hearst Mining Building, University of California, with the exception of the meeting on August 4, which was held in the Botany Building, Stanford University. The following papers were read:

Tuesday, August 3

The Embryo of the Gymnosperms: PROFESSOR JOHN M. COULTER, University of Chicago.

Attention is called to three features of Gymnosperms: the proembryo, the archegonium and the cotyledons.

Proembryo.—The proembryo presents every gradation from a tissue completely filling a large egg to such segmentation of the egg as occurs in Angiosperms. This series represents a progressive change extending from the Devonian to the present time. No better example of progressive evolution, or orthogenesis, can be found. The change is due to the fact that wall-formation begins earlier and earlier in the history of the embryo, thus restricting free nuclear division and limiting the amount of proembryonic tissue. The conditions that favor wall-formation and inhibit continued free nuclear division are unknown, but that this phenomenon is a response to some progressive change in conditions is evident.

Archegonium.—A similar series of progressive changes is shown in the development of the archegonium, extending from the appearance of archegonia at the full maturity of the gametophyte, through forms in which they appear earlier and earlier in the ontogeny of the gametophyte, and ending with the maturation of eggs at the free nuclear stage, resulting in the elimination of archegonia. The conditions for gamete-formation as contrasted with those for vegetative activity, are getting to be known through experimental work. This progressive change, therefore, is to be explained by the gradual earlier appearance of conditions for gamete-formation, which in general are conditions of minimum vegetative activity. In all probability, these are the conditions that also favor earlier wall-formation in the ontogeny of the proembryo.

Cotyledons.—Evidence is now at hand to prove that polycotyledony and dicotyledony are merely different final expressions of a common method of development. Polycotyledony was more common in the primitive gymnosperms; and neither coalescence nor splitting explains the two conditions.

Discussion: Professors Clements and Campbell.

Methods of Pollination and Evolution of the Male Gametophyte: L. L. BURLINGAME, Stanford University.

There are four types of pollination devices and male gametophytes found among the Gymnosperms as follows:

1. The Cycadofilicales and Cordiatales male gametophyte has numerous cells in its pollen grain. It is as yet uncertain whether they are spermatogenous or prothallial. No pollen tubes of any sort were formed. The pollen grains were lodged in pollen chambers in the nucellus.

2. The Cycadales have a single prothallial cell, a pollen chamber, swimming sperms and a haustorial pollen tube that is probably to be homologized with the rhizoid of their ancient Pteridophyte ancestors.

3. The Araucarian conifers have a multicellular prothallus, non-ciliated sperms, and a protruding nucellus without a pollen chamber. The pollen lodges on the ovuliferous scale at a distance from the nucellus and forms a long branching haustorial pollen. This tube is probably to be homologized with the germ tube and not the rhizoid of their pteridophytic ancestors. It is not homologous with that of the cycads, since it does not have the same function, grow in the same direction, and was probably derived from different ancestors.

The Abietinean conifers have short direct pollen tubes, two evanescent prothallial cells, and non-ciliated sperms. They could readily have been derived by reduction from the araucarian type. There seems to be very little probability of the reverse process, since such a course of evolution would be accomplished through a number of intermediate steps each of which is apparently distinctly disadvantageous to the plants adopting it.

Some Notes on Western Species of Cupressus: L. R. ABRAMS, Stanford University.

Among the Californian conifers the genus *Cupressus* occupies an important position in point of interest to the botanist, and especially to the plant geographer. The true cypresses belong to warm temperate climates, and are associated in our minds with the sunny Mediterranean countries. But *Cupressus* is not altogether an old world genus; fully half if not more of the species are North American, and more are in California than in any other one section.

Turning to the geological records we find that in Tertiary time *Cupressus* flourished in Greenland and northern Europe. The present far separated eastern and western branches, then, like torreyas and sequoias, are the remnants of a once widely distributed race. The local distribution of the California species, which seldom or never form forests but exist in small isolated groves, is also suggestive of a decadent race, once flourishing but now struggling against the invaders of a new age.

Up to the present time five species have been recognized in California: *C. macrocarpa* Hartw., *C. goveniana* Gord., *C. macnabiana* Murr., *C. sargentii* Jepson and *C. bakeri* Jepson. Two remote groves, little understood or unknown to those who have undertaken to monograph the genus, have proved after careful field studies to be distinct from other Californian species. Those of San Diego County, which previously have been placed in *goveniana*, are in no way related to that species, but belong to the smooth-trunked group represented by *guadalupensis.* The other, an hitherto unknown grove situated in the Piute Mountains is the only grove in the Sierra Nevada. This species has the glandular foliage of *macnabiana* and *bakeri,* but the fruit is more the nature of *goveniana.* It is unquestionably distinct from these, however, and is to be described as a new species.

Geologic History of the Gymnosperms: E. W. BERRY, Johns Hopkins University (read by FORREST SHREVE).

Wednesday, August 4

Morphogenic Effects of Light: GEORGE J. PEIRCE, Stanford University.

Stimuli are sometimes classified as formative and directive. The influence of a given stimulus may be due to its quantity, the direction from which it is received, etc. Then we find the *quantity* of light exercising a distinct effect upon the quantity, and inferentially upon the growth. This is plainer perhaps in parts of the world where the quantity of light falling upon the earth's surface is greater than elsewhere, owing to the dryness and cleanness of the atmosphere. The top of the forest and the upper surface of the chaparral are remarkably flat, despite the number of species composing each. That light is a factor in determining this is shown by the behavior of *Escholtzia,* bur clover, geranium, mint and other plants, wild and cultivated, coming up in chaparral, hedges, vines, etc. These ordinarily short plants may become extraordinarily long under these special conditions of light.

The *direction* from which light comes also determines the form which certain plants assume.

This is shown by plants cultivated from the spore upon a clinostat revolving a horizontal plane. To avoid error from single cultures, or from successive cultures on the same instrument or instruments, a multiple clinostat has been devised, which revolves forty or more turn-tables simultaneously. This weight-driven multiple clinostat will be shown to all interested.

Discussion: MacDougal and Clements.

Theories of Photosynthesis in the Light of Some New Facts: H. A. SPOEHR, Department of Botanical Research, Carnegie Institution of Washington.

The Distribution and Succession of the Flowers of the Giant Cactus in Relation to Isolation: D. S. JOHNSON, Johns Hopkins University.

The flowers of *Carnegiea gigantea* growing about Tucson, are rarely symmetrically grouped about the growing point of the massive stem. They are usually most abundant on the east side and least abundant, or wanting, on the west side. If more evenly distributed about the circumference, the flowers are larger and open first on the east side. This is true of plants on all slopes and of branches as well as of the main axis.

The most evident external factors which may be concerned with this peculiar distribution of the flowers are sunlight and the air temperature. In the season of hot days and cold nights, prevailing when the flowers are developing, the morning sun would increase the temperature, and so the rate of growth on the east side of the crown first. The high air temperature during midday would allow this temperature of the east side of the cactus to be maintained till late afternoon. The opposite or west side, on the contrary, would probably not reach its maximum temperature till mid-afternoon, or later not long before the evening cooling of the air sets in.

Discussion: Lloyd, MacDougal and McCallum.

Demonstration by Peirce and McMurphy of smelter smoke effects on vegetation.

Thursday, August 5, 10 A.M.

Factors Affecting the Distribution of the Components of the Flora of California: DOUGLAS H. CAMPBELL, Stanford University.

1. The geographical position of California, more or less shut off from the eastern states by its mountains and the deserts, results in a flora very different from that of other parts of the United States. There is an unusual proportion of plants peculiar to the state.

2. The climate of California, especially the coast region, is dominated by the Pacific Ocean—the climate, compared to Atlantic American, is very mild and equable. Topography, rather than latitude, regulates the temperature, *e. g.*, there is apt to be more difference between the maximum of San Francisco and Sacramento, than there is between Eureka and San Diego.

3. Rainfall conditions show a wide range, exercising a great influence upon its floras of different parts of the state. Thus the flora of the redwood belt of the northern coast has probably not a single plant found in the arid district of the southeast, like the Colorado desert.

The prevalence of a dry summer throughout the state results in the prevalence of "Xerophytes," *i. e.*, plants adapted to withstand long periods of drought.

4. The remarkable range of conditions, *i. e.*, temperature, rainfall, elevation, soil, etc., results in a variety of vegetation equalled in very few parts of the world.

5. The principal botanical regions are: (1) The coast flora, (2) the redwood forest belt; (3) the valleys, (4) the mountain region of the Sierra; (5) the deserts of southern California.

6. The plants of California show two distinct types; a southern flora of Mexican origin, and a northern flora more nearly related to the vegetation of the northeastern states. These two floras mingle in the central part of the state, the northern forms following the mountains southward, the southern types mainly occupying the valleys. There is a slight infusion also of Asiatic types from the north.

The Rôle of Physical Features in Determining the Distribution of Plants: FORREST SHREVE, Department of Botanical Research, Carnegie Institution of Washington.

The Chapparal and Its Habitat (illustrated): W. S. COOPER, Stanford University.

The broad-sclerophyll vegetation of the Pacific coast, as a dominant type, is confined to the region in which the long dry season, characteristic of the California climate, is combined with low total precipitation and absence of summer fog.

The broad-sclerophyll vegetation comprises two formations: (1) the Oak-Madroña Formation—true forest; and (2) the Chaparral—bush or scrub. Each is subdivided into various associations, the subdivisions being different in different parts of the state.

In the Palo Alto region the Chaparral includes (1) the Adenostoma Association and (2) the Arctostaphylos Association. The former is found upon south slopes and summits, the latter upon gentle north slopes; and the Oak-Madroña Forest on steep north slopes and in ravine bottoms.

Measurements of evaporation, soil moisture, and soil temperature were made covering a period of eighteen months to determine the habitat differences to which these vegetational differences are due. It was found that the evaporation rate was greatest on summits and south slopes and least on north slopes, as would be expected, but that at the top of the vegetation the differences in evaporation between the aspects were slight. Greater differences were found at the surface of the ground. As to soil moisture, a great difference was found between the two slopes during the rainy season, but this difference gradually decreased during the dry season, almost disappearing at its close.

The conclusion of the study is that the actual physical habitat differences between north and south slopes, though perceptible, are slight, and that evaporation is the fundamental factor. The striking differences seen in the evaporation rates at the surface of the ground, in the soil moisture on the two slopes and at different times of the year, and in the soil temperatures, are due in very large part to the reaction of the vegetation upon the habitat.

Discussion: Abrams and Clements.

Distribution of Cacti with Reference to the Rôle Played by Root Response: W. A. CANNON, Department of Botanical Research, Carnegie Institution of Washington.

In southern Arizona the roots of the cacti lie relatively close to the surface of the soil and are subject to the maximum temperature changes, including the highest temperatures of the summer season. Experiments show that a relatively high temperature of the soil is necessary to the best root growth of the cacti. Owing to the arid foresummer in southern Arizona such root growth takes place in midsummer only, when the seasonal rains come. Since active growth does not occur in the colder portions of the year, although the soil may be moist, the possibility is suggested that the cacti as a family are mainly limited to such regions as have summer rains, other conditions being favorable.

A comparison of the climatic conditions of those portions of America, where the cacti form a prominent portion of the flora, shows that as a matter of fact, they agree in this, that rains are characteristic of the warm season. On the other hand, in regions otherwise apparently favorable, the cacti are either wholly wanting, or they constitute only an insignificant part of the flora.

Climatic Cycles and Succession: F. E. CLEMENTS, University of Minnesota.

Discussion: Abrams, Cooper, Eastwood.

The Diversity of Ecologic Conditions and Its Influence on the Richness of Floras: JOHN W. HARSHBERGER, University of Pennsylvania. (Read by H. M. HALL.)

Ecologic conditions are those which are associated with the environment. They include the influence of climate, soil, physiography, chronology and the life relations of the surroundings. The influence of these conditions on the richness of floras may be considered statistically. The generic coefficient, which is the relativity of genera and species, is inversely proportional to the diversity of the ecologic conditions. The generic coefficient was worked out for the floras of Point Pelee, Ontario; for the pine-barrens of New Jersey; for Hartsville, South Carolina; for the Altamaha Grit Region of Georgia; for Miami, Florida; for the Florida Keys; for the Upper Susquehanna, Pennsylvania; for Lancaster County, Pennsylvania; for Columbia, Missouri; for Jackson County, Missouri; for the Yosemite National Park, California; for the state of Connecticut; for the state of Pennsylvania; for Alabama; for the central Rocky Mountains; for the state of Washington. It was found that Point Pelee with a simple topograph was at one extreme with a generic coefficient of 74.7 per cent. and the Central Rocky Mountains and the southeastern United States at the other extreme with highly diversified and generic coefficients of 23.9 per cent. and 23 per cent. respectively.

Discussion: Clements, Hall, Eastwood.

Plant Succession in the Palo Alto Region: W. S. COOPER, Stanford University.

The Palo Alto quadrangle comprises two distinct physiographic areas: (1) the mountains, covered mainly with residual soils, and (2) the alluvial slope to the bay and beneath it, composed entirely of transported soils derived from the mountains.

On the latter area there is a very perfect succession of vegetational stages, correlated with the building up of the alluvial slope by stream deposition. The stages are as follows: (1) Algæ, in the shallow water of the bay; (2) Salt Marsh; (3) Composite-Willow Formation; (4) Oak Forest, composed mainly of *Quercus lobata* and *Quercus agrifolia;* (5) *Chaparral,* mainly *Adenostoma.* The Salt Marsh replaces the Algæ soon after the soil surface emerges at low tide. The Composite-Willow formation follows with the elimination of the salt from the soil. The Oak Forest appears when there is sufficient feeding ground for the tree roots, well aerated, above the water table. The Chaparral follows when the distance to the water table becomes so great that the oaks can not obtain sufficient water. The chaparral is permanent because it flourishes independently of moisture supply from the ground water. This succession thus progresses from halophytic to mesophytic conditions and from thence to xerophytic, the final stage being far less mesophytic than the intermediate ones.

In the mountain area successions are short and indistinct and there will be no climax formation for the whole area, short of base levelling. North and south slopes will differ in vegetation as long as they exist, the present dominant vegetation of each aspect being the temporary climax of a short succession.

Discussion: Campbell, Clements, Eastwood.

The Flora of the Desert Basin of the Mohave: S. B. Parish, San Bernardino.

The topography of the Mohave Desert is complex in contrast with that of the Colorado Desert, which is a simple valley, but the climatic and edaphic conditions are practically identical, and are of a pronounced xerophytic character, and consequently such is the character of the plant population. It is, however, locally modified by intrusions through the passes; by the influence of the Colorado River and very markedly by that of the Mohave River. The distribution of the cacti is found to depend upon the amount and reliability of the rainfall. Some account is given of the vegetation in and about the infrequent springs. Certain differences in the respective vegetations of the Mohave and the Colorado Deserts are noticed and shown to depend upon different emigration currents.

Friday, August 6, 10 A.M.

Some Features of the Distribution of the Marine Algæ of the West Coast of North America: W. A. Setchell, University of California.

Discussion: Clements, Lawrence.

Gas Conditions in Nereocystis: T. C. Frye, University of Washington.

Physiological Conditions in the Large Kelps of the Pacific Coast: G. B. Rigg, University of Washington.

The great size and the rapid growth of the four conspicuous kelps of the Pacific coast as well as their potential value as a source of potash fertilizer and of various by-products makes the investigation of their physiological processes a matter of both scientific interest and economic importance.

The growth of the large kelps *Nereocystis leutkeana, Macrocystis pyrifera, Alaria fistulosa* and *Pelagophycus porra* is rapid. Possible factors in this are (1) mechanical stretching by tidal currents (2) great turgidity due to high osmotic pressure in cell sap (3) abundance of potassium, influencing nuclear division.

There is much more potassium than sodium in kelps while the reverse is true in sea water. Possible factors in this are (1) greater permeability of the protoplasm for potassium; (2) a change of potassium compounds into some other form which does not lower the diffusion gradients.

Workers are not agreed as to the source and composition of the gases in the floats of marine algæ, hence definite conclusions as to their part in metabolism are impossible.

Probably carbon dioxide for photosynthesis comes from either the gas in these floats or from carbonates in water, rather than from carbon dioxide in sea water.

Tidal currents may be a factor in photosynthesis by keeping the fronds at the surface. The kelps produce no starch. Their sugars may be a factor in high osmotic pressure.

Studies on the respiratory ratio in marine algæ throw some light on the materials oxidized in respiration.

This paper contributes (1) a summary of the literature bearing on the physiological processes in the large kelps; (2) some hitherto unpublished data with regard to these processes; (3) some suggestions as to possible interpretations of the available data on them; (4) a statement of the more conspicuous gaps in our information in regard to these processes and of the importance of a comprehensive investigation of them.

The Personation and Multiplication of the Fruits of Certain Opuntias: D. S. Johnson, Johns Hopkins University.

The fruits of some few of the cacti, like those of certain Eucalyptoids, differ from those of most other seed plants in not falling from the tree, at the end of the growing season in which they were initiated by the flower. In the exceptional forms mentioned, of which *Opuntia fulgida* is one of the most striking examples, the fruit remains attached, and growing, season after season.

The primary flowers of the season in *Opuntia fulgida* are formed from the lateral buds, or areolæ, of the last year's branches and also from areolæ of the persistent fruits of former seasons. These primary flowers shed the perianth five or six days after the opening and give rise to fruits, which not only remain attached but also give rise, sometimes even before the flower has opened, to the buds of secondary flowers. The latter in turn bud out Tertiary ones and these initiate flowers of a fourth generation, by the middle of July. All of the four, or more, generations of flowers formed in a season, remain attached and growing for several seasons. In each succeeding season any fruit of the first season's series may give rise to a similar set of primary, secondary, Tertiary and Quaternary fruits. In this way clusters of a hundred fruits, including from ten to fifteen generations, may be formed.

If these persistent fruits remain attached they give rise only to flower buds. If they are broken off and placed on moist soil the same areolæ develop roots and vegetative shoots, and so start a new plant.

Teratology and Phylogeny in the Genus Trillium: R. R. GATES, University of London.

Trillium is a genus of plants which is in an unstable or mutable condition. Many of its variations are teratological. There are frequent records of double flowers appearing, especially in *T. grandiflorum*. In such cases it appears that the same root-stock continues to produce a double flower year after year. Hence a germinal change must have occurred leading to the production of such a rootstock.

A form related to *T. grandiflorum* and known as var. *variegatum* has been studied in Michigan, the Niagara peninsula and near Syracuse, N. Y. This is exceedingly variable, producing in some cases 10 per cent. of abnormal plants which can not reproduce from seed yet which reappear in large numbers each year. This form frequently has long petioles to the leaves, which suggests that *T. petiolatum*, an unrelated species with long petioles, may have originated similarly through a mutation.

In various species of *Trillium* individuals occasionally appear having a whorl of four leaves and their flower parts in 4's instead of in 3's. This is a generic feature of the related Euro-Asian genus *Paris*. Another peculiarity of *Paris* is the elongated connectives, a feature which is a specific character in *T. decumbens* and occasionally appears in teratological specimens of *Trillium*.

Such facts show that variations tend to follow certain paths or lines of cleavage, and these lines must depend upon the structure of the germ plasm. It would appear that the teratological variations of one genus may, under certain conditions, give rise to the stable condition of a derived genus. The paths of variation in a genus may thus indicate tendencies which have found expression in various related genera.

Morphology, Relationship and Sex-determination in Thalocarpus curtisii: F. MCALLISTER, University of Texas.

The morphology of *Thallocarpus Curtisii* is the same as that of the Riccias with two minor exceptions. The rhizoids lack the peg-like thickenings characteristic of the Marchantiales, and the four spores of the tetrad adhere to form a spore ball as is the case with some of the *Sphærocarpus* species. The gametophyte seems to be the same in structure as the spongy Riccias. The sporophyte has no traces of a foot nor of sterile nutritive or elater-like cells. It is difficult to see how this liverwort was ever included with the *Sphærocarpos* forms.

The four spores of the tetrad form, on germination, two male and two female plants. In this respect there is a similarity to *Sphærocarpus Texanus* and *S. Californicus*.

Quasi-experimental Formation of Æcidia in Cotton Leaves: F. E. LLOYD, McGill University. (Read by title only.)

Small plants of cotton were grown in 3-inch pots for over one year, and subjected to severe physiological drought, moderated sufficiently to keep them alive. Plentiful watering, aided by rising temperatures, resulted in forcing growth in many lateral shoots, and these produced a large proportion of abnormally shaped leaves. The whole series presented a variety of shapes, the simplest showing a mere constriction across one or more lobes. Foldings, lobulations and concrescences entered in to accentuate the departure from the normal, which, passing through stages with ill-formed and only partially separated ascidia, culminated in perfect ascidia raised on their proper petioloid supports.

Such abnormalities appear to rise from identical conditions with fasciations and indeed both these kinds of aberrancy are found associated in the same plant (*Fraxinus, Spinacea*). They have been shown to be inherited in some cases.

Desiccation and Starvation of a Succulent: D. T. MACDOUGAL, E. R. LONG, J. G. BROWN, Dept. Bot. Research, Carnegie Inst. of Wash. (Read by title only.)

A number of large sound individuals of *Echinocactus*, and of several joints of *Opuntia* were deprived of water supply, and compelled to carry on existence at the expense of accumulated water and food-material. Some of the preparations were exposed to the full illumination to which they were accustomed, and others were placed in diffuse light obtaining differential effects in water-loss, respiration, disintegration of acids, and photosynthesis. The principal generalizations arising from the studies are as follows:

An *Echinocactus* in the open may survive no more than two years at the expense of its surplus food material and water. Similar plants in diffuse light have been seen to be sound after six years of starvation, although the effects were marked.

Non-reducing soluble sugars which are present in only minute proportions if at all in normal *Echinocacti,* are noticeable constituents of the sap of desiccated plants.

Extended desiccation and starvation made no alteration in the integument of *Echinocactus,* but in a plant which had been thus treated for 73 months the cuticle was thicker than the normal, while the outer wall of the epidermal cells was thinner. Cytoplasm and nuclei in the epidermal system were reduced but new cork layers were being formed as in the normal. Division was seen in the epidermal layer at the bottom of the grooves of the stem. The stomata remained permanently open and many were in a collapsed condition. Guard cells of stomata differed from the normal in having anterior walls thinner as compared with the posterior walls.

The palisade layer was thinner than in normal plants of Echinocactus. The cytoplasm was reduced to small masses in the angles of the cells, and the nuclei were variously deformed and reduced in size. Vacuoles had disappeared from the nucleoplasm and a thickened granular layer was present in the peripheral portion.

The most pronounced effects of desiccation and starvation were exhibited by the cortex of *Echinocactus.* The changes noted as having been seen in the palisade tissues were followed by the entire disappearance of the protoplasts and the hydrolyzation of the cell masses formed lacunæ as large as 8 cubic centimeters.

On Wednesday, August 4, Section G and the Biological Society of the Pacific held a dinner at the Hotel Sutter, San Francisco.

W. J. V. Osterhout, *Secretary*

SOCIETIES AND ACADEMIES

BIOLOGICAL SOCIETY OF WASHINGTON

The 544th meeting of the Biological Society of Washington was held in the Assembly Hall of the Cosmos Club Saturday, November 6, 1915, called to order by President Bartsch, with 90 persons present.

On recommendation of the council, Gilbert F. Bateman, Trinidad, Colorado, was elected to active membership.

The first paper of the regular program was by O. P. Hay, "A New Pleistocene Sloth from Texas." Dr. Hay discussed the finding in Texas of a new member of the genus *Nothrotherium.* This discovery extends the range of the genus from South into North America. The specimen was exhibited and remarks were made on the interrelationships and distribution of the living and fossil American Edentates.

The second paper was by J. N. Rose, "Botanical Explorations in South America." Dr. Rose gave an account of his botanical explorations in South America. He outlined first the field work which he and Dr. N. L. Britton had planned in connection with the cactus investigations of the Carnegie Institution of Washington and then proceeded to describe the great cactus deserts of South America which he had visited. During his last trip to South America he spent six weeks in the state of Bahia, Brazil, six weeks in the state of Rio de Janeiro, Brazil, and three weeks in Argentina. Large collections were obtained. Many living plants were sent back to the United States for cultivation. The living collection is now on exhibition in the New York Botanical Garden. Several remarkable generic types of cacti were discovered. Dr. Rose's paper was illustrated by numerous lantern slides of regions visited, of cacti in their native environment; and by many interesting botanical specimens.

The last paper of the evening was by Dr. L. O. Howard, "Some Biological Pictures of Oahu (Hawaii)." Dr. Howard showed a large number of lantern slides from photographs made by him during a short stay the past summer on the island of Oahu. Special emphasis was laid on those which dealt with agricultural problems and economic entomology, many of which are peculiar to the Hawaiian Island.

M. W. Lyon, Jr.,
Recording Secretary

THE NEW ORLEANS ACADEMY OF SCIENCES

The regular meeting of the academy was held in Tulane University on Tuesday, November 16, 1915, Dr. Gustav Mann, president, in the chair.

The paper of the evening was by Dr. W. H. Dalrymple, of the Louisiana State University, on "The History of the Cattle Tick Fight in Louisiana." Dr. Dalrymple gave a brief history of the fight in Louisiana, first, by individual effort, then by state effort, and, finally, by federal aid. The paper proved of considerable interest and there was much discussion at the close.

R. S. Cocks, *Secretary*