cockerel by cloacal examination before he is placed in the mating pen. The only sterile birds in the flock—except one that died before this examination was made—were those in which the gland could not be found. Failure to find the gland in a young chick does not always indicate its absence, but in a grown cockerel the gland usually attains a size of two to three mm in diameter. There is considerable variability in size, but no relationship between the size and fertility was noted. These birds are being retained for further study.

Masui[1] claims to be able to separate the sexes of baby chicks by a similar examination—but gives no figures on the degree of accuracy or the possibility of exceptions. From our own observations the sexes can be separated with an accuracy of 75.6 per cent. at two weeks (127), and 81.7 per cent. at four weeks (186), and 88.1 per cent. at five weeks (67). The errors are of two kinds. One is due to faulty observation and is gradually eliminated with practice and familiarity with the technique required. The other error is due to the actual presence of the gland in the female and the absence of the gland in the male. The gland is definitely present in a few female chicks now ten weeks of age, and likewise absent in a few males.

These latter exceptions in chicks may merely represent the delayed dominant action of the gonads over the primary sexual characters of the opposite sex. On the other hand, these exceptions may have a relation to later sexual development and form the interesting class of delayed sexual maturity or even sterility as shown in the adult males examined.

W. FRANKLIN DOVE

BIOLOGICAL LABORATORY,
MAINE AGRICULTURAL EXPERIMENT STATION

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE POMONA COLLEGE MEETING OF THE PACIFIC DIVISION

THE Pacific Division of the American Association, with the Southwestern Division and a number of participating societies, held its twelfth annual meeting at Pomona College, Claremont, California, Wednesday to Saturday, June 13 to 16, 1928. About five hundred persons were present. The general sessions began on Wednesday with a luncheon at which the progress of research on the Pacific coast during the past year was traced by the speakers. Dr. R. G. Aitken, of Lick Observatory, spoke of discoveries in astronomy; Dr. I. S. Bowen, of the California Institute, in physics; Dr. W. C. Bray, of the University of California, in chemistry; Dr. P. A. Munz, of Pomona College, in botany; Dr. B. M. Allen, of the University of California at Los Angeles, in zoology; and Dr. K. F. Meyer, of the Hooper Foundation, San Francisco, summarized recent research in medical science.

On Wednesday afternoon the remarkable motion picture showing activities of living tissues *in vitro*, prepared by Dr. Ronald G. Canti, of the Cancer Institute and St. Bartholomew's Hospital, London, was shown. The periosteum of chick embryos, an amoeba and a sarcoma of the rat were seen with varying magnifications and varying rates of "speeding up." The behavior of blepharoplasts and other types of cells, the growth of tissues, cell-division and immobilization upon exposure to radium were all very clearly evident. The film was demonstrated by Dr. C. A. Kofoid, president of the Pacific division, who had seen it in Europe and obtained it for the meeting. So many wished to see the film a second time that it was repeated on Friday morning.

In the evening Dr. Frank P. Brackett extended to the visitors a welcome to Pomona College. After a brief response by Dr. E. G. Martin, chairman of the executive committee of the division, Dr. Kofoid gave the presidential address, on "The Luminescence of the Sea." The many unsolved problems involved in the astonishing increase in numbers of particular species of dinoflagellates, the resulting brown or red coloration of the sea-water and its luminous appearance at night, and the destructive effects of these epidemics upon the animals of the sea were touched upon. An outdoor reception followed the address.

The addresses of general interest presented as part of the intersectional meeting of the American Chemical Society will be mentioned in a later part of this report.

The Thursday evening address by Dr. F. H. Seares, assistant director of the Mount Wilson Observatory, was on the subject "Counting the Stars." Dr. Seares showed the manner of exploring the universe by systematic sampling of the numbers of stars of different magnitudes in unit areas of sky at varying angular distances from the Milky Way and of the statistic analysis of the data thus obtained.

On Friday evening Dr. Charles K. Edmunds, the new president of Pomona College, addressed the division on "Some Physical Features of China." His

[1] Masui, K., 1927, Report of the Proceedings of the World's Poultry Congress, Ottawa, p. 156.

observations there were made in connection with the magnetic survey of Mongolia, China, Indo-China and Siam, undertaken by the Carnegie Institution.

On Friday afternoon and Saturday many of the visitors went upon the well-planned excursions. About forty visited Mount Wilson, some arriving at the observatory in the afternoon, others in the evening, others on Saturday. About 120 visited the Huntington Library and its beautifully planted grounds at San Marino just south of Pasadena. About fifteen took part in the Big Pines excursion to the Los Angeles County Park in the mountains northeast of Claremont. The botanists of the party remarked upon the unusually good showing of late spring flowers. Another group made an excursion from Claremont to the coast, following it as far as Dana's Point. The route included the San Juan Capistrano Mission and the Santa Ana Canyon. Others visited the Citrus Experiment Station at Riverside.

The success of the meeting was in very large measure due to the careful preparations made by the Pomona College committee on arrangements, of which Dr. Frank P. Brackett, professor of astronomy, was chairman. The campus and buildings provided a setting which was very comfortable and pleasant, as well as thoroughly adequate for the requirements of the sessions.

At a general business session of the division held on June 14, three vacancies in the executive committee due to expiration of terms were filled by the election of Dr. S. J. Barnett, of the University of California at Los Angeles, Dr. Roy E. Clausen, of the University of California, and Dr. J. H. Moore, of the Lick Observatory. At the meeting of the affiliation committee which followed, several important matters of business were accomplished, including the admission to affiliation of the Oregon, Northwest Utah and Sacramento sections of the Chemical Society. At the meeting of the executive committee on June 15, Dr. Walter S. Adams, of Mount Wilson Observatory, was unanimously elected president of the division for the year 1928–29. It was decided that the 1929 meeting be held at the University of California, probably between May 15 and June 15. A Pacific Division prize of one hundred dollars was established, to be awarded for the most important scientific contribution reported by a member of the division at its next annual meeting.

AMERICAN PHYSICAL SOCIETY

(Report by S. J. Barnett, Acting Secretary for the Pacific Coast)

Two sessions were held on Friday, June 15. The first was a joint session with the Astronomical Society of the Pacific. Attendance at each was between seventy and eighty. Professor Hitchcock, of Pomona College, presided. There were thirty-nine papers presented, and, in addition, eleven other papers were read by title. The papers contributed to the morning session by the Astronomical Society will be referred to in the report for that organization.

It was decided that the next Pacific coast meeting of the Physical Society is to be held at Pasadena on December 8, 1928.

AMERICAN CHEMICAL SOCIETY PACIFIC INTERSECTIONAL MEETING

(Report by T. F. Buehrer, Secretary for the Intersectional Meeting)

An unusually large representation of chemists met this year with the Pacific division. The registration was nearly a hundred. The Arizona, California, Northwest Utah, Oregon, Puget Sound, Sacramento and Southern California sections of the Chemical Society took part jointly in this Pacific Intersectional Meeting. Dr. J. E. Bell was chairman of the unified program committee, and Dr. C. J. Robinson chairman of the committee on arrangements. The program included four sessions for addresses of general interest, which were attended by scientists in other fields as well as by chemists; and there were the usual divisional sessions, in three groups: divisions of analytical and physical and inorganic chemistry; divisions of agricultural, biological and organic chemistry; and the division of chemical education. There was also (on Wednesday afternoon, June 13) a reception given by Pomona College to the chemists, and on Thursday evening a dinner in the Guildhall, attended by about seventy chemists, followed by a brief motion picture, "The Rubber Latex," with explanatory lecture by Dr. C. R. Park. There was a luncheon on Friday for the Chemical Education Senate and a dinner for teachers of chemistry.

The first of the general addresses mentioned was given Thursday morning by Dr. Linus Pauling, of the California Institute, on "The Nature of the Chemical Bond." He showed that with the application of the quantum mechanics to chemical reaction, the two principal factors which are responsible for chemical valence are the Heisenberg-Dirac resonance phenomenon and the Pauli Exclusion Principle.

As illustrations he chose the hydrogen molecule and the hydrogen molecule-ion and stated that the foregoing principles verify G. N. Lewis' theory of the shared electron bond, which had been deduced from purely chemical evidence.

Professor W. C. Bray, in the first address of the second session, on "Catalysis and Chemical Reaction," outlined the general method of determining the mechanism of a reaction from rate measurements, choosing as an illustration the catalytic decomposition of hydrogen peroxide in a bromine-bromide solution. The constants calculated from the integrated rate expressions were shown to establish the hypobromous acid mechanism in this decomposition. He stated that as our knowledge of mechanism increases, it will be possible to predict with certainty a specific catalyst for any given reaction. Professor E. C. Franklin, speaking on "Liquid Ammonia as a Solvent," showed some striking experiments to emphasize the analogy between reactions in liquid ammonia and the corresponding reactions in the water system. Professor J. H. Hildebrand, in his address on "Developments in the Theories of Solutions," outlined the principal features of his "Internal Pressure Theory of Solubility" and presented a new equation for expressing the deviations from Raoult's law of "regular" solutions. This equation, derived thermodynamically, makes it possible to calculate solubilities of solids in certain solvents if the critical solution temperatures are known.

The last of the general sessions was a lecture on "Thyroxine and the Thyroid Gland," by Dr. George Barger, of the University of Edinburgh. Dr. Barger pointed out the theoretical problems and the experimental difficulties successively arising in the synthesis of thyroxine and how the research ultimately resulted in a successful commercial method of manufacture. He stated that the synthetic product was found by experiment to be absolutely identical in its physiological effects with the natural product.

There were twenty-six papers given before the divisions of analytical and physical and inorganic chemistry, fifteen before the divisions of agricultural, biological and organic chemistry and five before the division of chemical education.

At the business session of the Intersectional Meeting of the Chemical Society, it was decided to continue the plan of holding an intersectional meeting annually in conjunction with the Pacific Division of the American Association, and a program committee for the 1929 meeting was elected.

AMERICAN ASSOCIATION OF ECONOMIC ENTOMOLOGISTS—PACIFIC SLOPE BRANCH

(Report by Roy E. Campbell, Secretary)

Four sessions for presentation of entomological papers were held, with an attendance of 115 persons. In the first session, devoted to fruit insects, Perez Simmons and W. D. Reed showed that infestation of dried figs in California is chiefly due to the dried-fruit beetle. Trapping of overwintering adult beetles is recommended. Harry S. Smith and Harold Compere found the native home of the Citrophilus mealy-bug to be in Australia. Some new natural enemies of the mealy-bug have been brought to California. O. H. Swezey's paper on insect pests in Hawaii, most of which were introduced from other countries, reported success in the discovery, importation and utilization of their natural enemies. W. W. Jones gave data on the biology of a new species of Nepticula infesting the holly-leaved cherry. W. B. Parker reported a change in the habits of the pear-leaf blister mite, which has now become a bud mite.

The Thursday afternoon session, on evaluating results of field experiments in insect control, was begun by Ralph H. Smith. He pointed out the great variability in distribution of an insect (*e.g.*, the codling moth) in a field or orchard. This variability must be taken into account. J. R. LaFollette and R. S. Woglum described the twig unit system of determining results of treatment for black scale. H. J. Ryan told of a large-scale project of combating the Argentine ant over a thirty-thousand-acre district of citrus trees. Control of the Hippelates fly in the Coachella valley was reported by W. B. Herms. Although its breeding-places can not yet be found, the use of a special trap is proving helpful. S. F. Light, in a paper on the termites of the Pacific Coast, gave facts as to the different species, their distribution and economic importance. In the discussion, E. M. Ehrhorn stated that subterranean termites in Hawaii are controlled by fumigating the nests with carbon bisulphide. Injection of Paris green into tunnels of other forms gives promise of success.

The Friday morning session began with a very definite account by E. R. de Ong of specifications for oils used in spray work. R. S. Woglum's paper on climatic influence in distribution of citrus insects distinguished a group or assemblage of species which is seriously harmful only in the coastal areas of equable temperature, an interior group harmful in the hotter districts and a wide-spread group which is however checked in the interior by a few days of very hot weather. A. M. Boyce reported a progressive development of resistance to hydrocyanic acid gas in Drosophila and in aphids. R. W. Doane, in a study of a light epidemic of poliomyelitis, could find no evidence that it was spread by insects. W. H. Thorpe's paper on biological races of Hyponomeuta showed that there are biological differences among individuals reared on different plants, although no

differences in appearance may be perceptible, since they develop well only on their original host-plants. W. B. Herms reported a markedly favorable effect of yeast upon development of the mosquito, *Theobaldia incidens*.

Two papers were scheduled for Friday afternoon. The first, by W. B. Herms, showed the effect of quantity of larval food upon size of adult and upon the sex ratio in the greenbottle fly and in Theobaldia. The final address was by E. O. Essig, on the development of entomology in California. It included such items of interest as that, although the Spaniards introduced certain insects into California, no collection or description of insect species was done until the advent of the Russians.

The entomologists joined the other biologists present in a dinner on Thursday evening. Officers elected for the coming year are O. H. Swezey, *chairman;* S. B. Freeborn, *vice-chairman;* Roy E. Campbell, *secretary-treasurer.*

WESTERN SOCIETY OF NATURALISTS

(Report by Charles V. Taylor, Secretary)

The opening session, on Thursday morning, June 14, was devoted to an invitation program. Dr. T. Wayland Vaughan, director of the Scripps Institution, spoke of oceanographic research in the Pacific. Dr. C. W. Metz gave an account of his recent studies on individuality of chromosomes. Dr. T. H. Goodspeed described some effects of radiation on sex cells and on the vegetative organs of plants. Dr. E. G. Martin summarized his recent studies upon the recovery process following muscular exercise.

The afternoon was given to a joint session with the Ecological Society of America. There were in all fifteen papers presented.

The Western Society of Naturalists took part in the dinner for all biologists on Thursday evening at the Guildhall.

There were fourteen papers presented during the Friday morning session.

ECOLOGICAL SOCIETY OF AMERICA

(Report by A. G. Vestal, Secretary for the Pomona College Meeting)

An afternoon session with the Western Society of Naturalists was held Thursday, June 14. The Friday morning session of the Ecological Society began with a geographical paper by Richard J. Russell, of the Texas Technological College, on the land-forms resulting from the peculiar physiographic processes in the tundra climate of high mountain areas in the western United States. W. E. Allen discussed the futility, for certain environmental problems, of attempts to assign a dominating rôle to one "limiting factor." The emphasis should rather be placed on the relative significance of a number of variable factors. A paper by E. C. O'Roke described an apparently new disease of the California quail, which is killing the birds in great numbers. Ebbe C. Hoff enumerated the parasites found on sticklebacks. Some of them cause an easily recognized change in the external appearance of the fish. Hebbel E. Hoff described a number of marine ciliates grown in cultures from collections made in Puget Sound. Albert W. Snoke told of the advantages of the micro-Winkler apparatus of Thompson and Miller for making determinations of dissolved oxygen. He also reported work by R. C. Miller and A. W. Snoke on successions of hay-infusion organisms in cultures, and on the accompanying changes in carbon-dioxide content and hydrogen-ion concentration. Robert C. Miller reported on determinations made by Thomas G. Thompson and himself of contrasts in temperature, salinity, oxygen-content and other conditions of the sea-water at the margins of two opposing tidal currents.

SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE—PACIFIC COAST BRANCH

(Report by E. G. Martin, Secretary for the Pomona College Meeting)

One session was held on the afternoon of June 14. About fifty persons were in attendance. In accordance with the custom of the society no time-limit was set for the presentation or discussion of papers. Eleven papers were presented by their authors. In addition three papers were read by title.

AMERICAN PHYTOPATHOLOGICAL SOCIETY—PACIFIC DIVISION

(Report by B. A. Rudolph, Secretary)

Three sessions for reading of papers on plant disease were held. At the business session which preceded the papers of Thursday morning, J. W. Hotson was elected president for the succeeding biennium, E. Carsner, vice-president, B. A. Rudolph, secretary-treasurer, and J. T. Barrett, councilor.

The first paper, on "Rusts of the Pacific Northwest," was by J. W. Hotson. The elaborate key is based primarily upon host-plants. Mr. Hotson reported also on the destructive occurrence of *Armillaria mellea* in the timbers of mines and wells in Washington. A. M. Boyce and H. S. Fawcett described the attacks of an Aspergillus upon mealybugs in southern California insectaries. Humid conditions

favor the attacks. Artificial inoculation is usually followed by death within forty-eight hours. L. J. Klotz pointed out that the inhibition of enzyme action may be a factor in the resistance of plants to disease. Experiments with powdered bark of citrus plants resistant to Phytophthora indicate inhibition of the diastatic action of the fungus. H. E. Thomas showed that mechanical pressure, rather than enzyme action, seems to be the main factor in the penetration of healthy root tissue of host trees by *Armillaria mellea*.

The Thursday afternoon program began with an account of W. W. Mackie's long-continued experiments on inheritance of resistance to blast in oats. They show a 1:2:1 ratio for segregation of resistant and susceptible strains, indicating a single factor for blast resistance. J. T. Barrett showed that a crown-rot of black walnut used as a root stock for the Persian varieties is due to *Phytophthora cactorum* and found great difference in the susceptibility of different stocks. In a study of inorganic nutrition of the fungi, A. R. Davis, R. H. Marloth and C. J. Bishop found that culture-medium salts devoid of calcium and boron retarded both growth and spore-formation of certain molds. Both Ca and B are regarded as essential plant foods. G. Savastano and H. S. Fawcett showed that certain mixed inoculations produced characteristic rots in citrus fruits and that the rate of decay may depend upon the mixture of organisms used. I. C. Jagger reported on the brown blight disease of lettuce. The cause has not yet been determined, but the infection now appears to come from the soil. The constant occurrence of Asterocystis radicis on roots of affected plants has led to experiments upon this fungus. O. A. Plunkett prescribed control for *Peronospora sparsa*, which affects hothouse roses in Southern California.

In the Friday morning session, T. C. Scheffer described results of steam sterilization of soil of seedbeds for conifers by the inverted pan method. Good control of damping-off fungi was obtained. Keith O'Leary reported a new moss host, a Leucolepias, for *Eocronartium muscicola*, in a new locality in Washington. The experiments of M. Shapovalov and F. S. Beecher on tomato yellows showed the following effects when the light intensity was reduced: prolongation of incubation period in the host, acceleration of plant growth, mildness of disease symptoms and reduced incidence of the disease. J. G. Brown showed that Pima cotton grown in soils containing 0.2 to 0.4 per cent. NaCl shows improved resistance to angular leaf-spot caused by Phytomonas, due to collection of Cl ions in the parenchyma. F. Sidney Beecher's measurements of light intensity by means of Dr. R. F. Bacon's chemical photometer, using uranyl acetate and oxalic acid, enabled him to estimate the amount of light cut off by glass, muslin and other plant-house coverings and to determine that the artificial illuminants now used are very inadequate as compared with sunlight. He suggests that a much wider range of the spectrum than the violet and ultra-violet portions may be photochemically effective. Clayton O. Smith, in cross-inoculation and cultural studies of citrus blast and allied organisms, finds great similarity of *Bacterium citriputeale*, *B. syringae* and *B. cerasus*. Further studies are in progress. E. Carsner and C. F. Lackey report, among other results, an attenuation of curly-top virus by passing it through resistant sugar beets or through *Chenopodium murale*. In a study of Texas root-rot, R. B. Streets found that the fungus, *Phymatotrichum omnivorum*, attacks the cortex of tap-roots of cotton and alfalfa. Chemical sterilization of the soil is successful, but thus far too costly.

The western members of the American Meteorological Society met again this year with the Pacific Division of the American Association for the Advancement of Science. They had done so previously at the Los Angeles meeting in 1923. There were three sessions for presentation of papers.

The Astronomical Society of the Pacific held two sessions on Thursday, June 14, at which seventeen papers were presented. To the joint session on Friday morning with the Physical Society, the astronomers contributed six papers, mostly on stellar spectra. Closely allied studies were reported by the physicists, on spark spectra and related subjects.

The newly organized Pacific Section of the Botanical Society of America, covering the entire field of botany, held its first meeting with the other societies at Pomona College. It replaces the western division of the Physiological Section of the Botanical Society. It held three sessions for the reading of botanical papers.

The Western Society of Soil Science met on Tuesday, June 13, 1928 (the day preceding the meeting at Pomona College), at the Citrus Experiment Station, Riverside. This arrangement permitted the members to inspect the laboratories and field experiments of the station, and afterward to attend the meeting of the Pacific Division only a few miles away at Claremont. Their program included the presentation of twenty papers.

ARTHUR G. VESTAL,
Secretary, Pacific Division, American Association for the Advancement of Science
STANFORD UNIVERSITY, CALIFORNIA