

free radicals in the gas phase and in solution, and he interpreted the results in terms of several models.

Harden McConnell (Stanford University) discussed excitons in paramagnetic organic crystals. These excitons effect not only the EPR spectra but also the scattering of x-rays and the phase transitions in the crystals. G. Wilse Robinson (California Institute of Technology) presented the final paper on the subject of electronic and vibrational excitons in crystals of aromatic molecules. He discussed the splittings observed in optical transitions and how these are related to the electronic exciton interaction. He also discussed the effective mass of excitons and energy transfer rates within the crystal.

GEORGE C. PIMENTEL and
HARMON W. BROWN,
Program Arrangers

Two sessions of contributed papers comprised the last day's (30 December 1965) program of Section C.

The first group of papers was largely concerned with physicochemical separation processes; particular attention was given to chromatographic techniques. A description was made of a method for determining sorption isotherms of vapors on granulated sorbents. Radioactive tracer pulses were used over wide ranges of temperature and pressure. The application of liquid chromatography to systems ranging from unstable diazonium salts to polymers, derived from polybutadiene to lipid extracts from tubercle bacilli, was discussed in some detail. The evaporation of solvents from resin films was studied with attention to the various factors involved. The solvent activity as a function of concentration was determined by an isopiestic method. A spectacular set of color slides illustrated the use of a sample, hot wire capable of producing a controllable temperature gradient on a microscope stage; representations of phase diagrams of many substances could be obtained directly.

The afternoon session dealt with other aspects of physical chemistry as well as spectroscopy and energy transfer. A study was reported of the lifetimes of several vibronic levels in the B state of I_2 by the rotating shutter, phase shift technique. The fluorescence lifetimes varied from level to level while the quenching constants did not. The role of charge transfer states in en-

hancing the phosphorescence of donor anthracene was discussed, and the effect of varying the acceptor was described. In the photosensitized *cis-trans* isomerization of octene-2 the effectiveness of various sensitizers was correlated with the positions of their triplet levels. Two of the papers described different optical techniques for making physical measurements. That depolarized light intensity is a useful technique was demonstrated in the study of transitions in polymers. The depolarization of light by a sample changes with temperature, and some transitions can be found that are not seen with the well-known differential thermal analysis method. The diffusion coefficient and the activation energy for the diffusion of copper into cadmium sulfide have been determined by monitoring the transmitted light intensity and using a model for the mechanism of light absorption by the copper centers. Studies of the Kerr effect in polypeptide solutions and organic solvents were reported. They could be interpreted in terms of a large degree of association between molecules, which also produce enormous viscosities. Finally, a reaction mechanism study showed that the metal chelate catalysis of the reaction between alcohols and isocyanates can be quantitatively described if it is assumed that alcoholysis of the metal compounds is the first step in the reaction sequence. The resulting alkoxy compound is the actual reactive species.

JOHN W. OTVOS,
Program Arranger

Astronomy (D)

Section D met in joint session with the American Astronomical Society and the Astronomical Society of the Pacific.

Sessions of contributed papers were held on 28-30 December 1965.

On 29 December a special session was held on "Chemical abundances as clues to nuclear astrophysics and galactic evolution." This was introduced by a review paper by George Wallerstein (University of Washington), and followed by nine papers on specialized topics connected with unusual chemical abundances.

On the evening of the 29th, the Helen B. Warner lecture, "Studies of stellar magnetism: past, present, and future," was given by George W. Preston (Lick Observatory).

The morning of 30 December was devoted to a discussion of some controversial topics in planetary astronomy. After a review paper by Hyron Spinrad (University of California, Berkeley), nine papers covered radio and optical observations and theoretical discussion of the planets Mercury, Venus, Mars, and Jupiter.

The Society dinner was held on 29 December.

The meetings were well attended and even though concurrent sessions were held, both lecture halls were generally crowded.

FRANK BRADSHAW WOOD, *Secretary*

Geology and Geography (E)

The most exciting day of the Berkeley meeting of AAAS for geographers was undoubtedly 27 December. A large audience heard an excellent series of papers by former students of Carl Sauer on cultural geography. The subjects discussed ranged from a detailed analysis of the expansion in North America of the Athabaskan-speaking Indians to the distribution of the mithan variety (*Bos frontalis*) of domesticated bovid of Southeast Asia. That man still has a "trick up his sleeve" in developing a cultural scene wholly unique in all history was pointed out by David Lowenthal, who read a paper entitled "The American scene." He described various viewpoints concerning our appetites, desires, decisions, and evaluations which have brought our own problematical and controversial culture into being.

The Section E dinner featured an impromptu exposition on geographic viewpoint by Carl Sauer as he acknowledged the honor paid him by his students during the day's sessions. Trevor Lloyd (McGill University) delivered his retiring vice-presidential address entitled "International scientific collaboration in the Arctic." Lloyd shared with his audience numerous personal experiences and encounters with the Soviet government and personnel which illustrated the difficulties of carrying on completely successful, scholarly effort when political differences, viewpoints, and rivalries constantly intervene. However, Lloyd also emphasized how much has been learned of the geography of the northern high latitudes in the very few decades since technological improvement of transport, communication, and food and clothing has opened

the Arctic to the present-day type of investigator. Many of his listeners must have thought of how far and swiftly we've come from the days of Peary and Amundsen and, indeed, since the day of Byrd and Stefansson.

The session on Remote Sensing of Environment (28 December) reviewed the many new developments in an area of science and engineering which is destined to place tools in the hands of investigators almost beyond their fondest dreams. The audience was made aware of the possibility that "you ain't seen nothin' yet" as the speakers hinted at marvels of remote sensing which may soon be removed from security wraps. (Persons interested in remote sensing should be aware of a forthcoming symposium on the subject to be held at the University of Michigan in April, 1966.)

Papers on Tertiary Provincial and Immigrant Faunas attracted the "bone paleontologists." It was clear that the work of Cope and Marsh and Loy Miller (University of California, Berkeley) has been handed down to young men with great patience in pursuing the search for remarkably scarce bits of evidence, and the skill to interpret what they do discover after endless hours of arroyo walking.

Another group of geologists was attracted to a limestone hydrology symposium organized by the National Speleological Society. The spelunkers reported on interesting processes of erosion, related to bedding plane circulation. They also described patterns of ground water circulation in carbonate rocks of complex structure which are revealed by chemical quality and other parameters, such as quantity and temperature.

Section E sessions concluded with an unusual symposium on extraterrestrial sedimentation (29 December). The geologists, together with astronomers and meteorologists, heard about the probing of other planets and the necessity of theoretical studies for an understanding of processes on other planets with atmospheric and other physical conditions which contrast to those of the earth. It's a curious turn of events if, in our zeal to explore extraterrestrially, we develop instruments and techniques and make observations which ultimately will enable us to discover more of the vast unknown concerning our own planet.

Harry Ladd (retiring vice-president of Section E) announced the election of

Joe Webb Peoples as vice-president of Section E for 1966. He invites suggestions for, inquiry about, and attention to announcements concerning the section program to be arranged for the annual meeting of AAAS to be held in Washington, D.C., 26-31 December 1966.

RICHARD H. MAHARD,
Secretary

Tertiary Provincial and Immigrant Terrestrial Vertebrates

This symposium, held on 29 December 1965, was part of the program of Section E.

The science of historical zoogeography is now at that stage in which detailed data are needed to more clearly define when, where, and under what ecologic conditions land mammals were or were not able to disperse between faunal provinces or between continents. The Pacific Coast Province has remained more or less an isolated faunal unit since the earlier part of mammalian history. According to Malcolm C. McKenna, the older faunas of this province show apparent strong endemism in the middle Paleocene but there is increasing pandemism in the later Paleocene to Oligocene. This prominent pandemism appears to continue into the middle Miocene, according to Faunal evidence from the Mojave Desert area presented by Richard H. Tedford. However, with the late Miocene there is a change to increasing endemism in the Pacific Coast Province, possibly because of progressive climatic zonality.

Climatic zonality appears to have been responsible, by the late Miocene, for divergent evolution in several mammalian lineages. Thus at this time, according to S. David Webb, the forests of the northern Pacific Coast Province were frequented by browsing camels, ancestral to the living Old World camel. However, the grasslands of the southern Pacific Coast Province were frequented by grazing camels that were ancestral to the living South American llama. Other ecologic conditions separated the eastern and western moles since at least the late Miocene, according to J. Howard Hutchison. The Pacific mole ranged from the southern grasslands to the northern forests within the Pacific Coast Province.

South American immigrants became quite prominent in the southern Pacific

Coast Province during the late Pliocene and Pleistocene. This is shown by a number of new forms in the succession of faunas from southern California described by Theodore Downs and John A. White. Other remarkable South American immigrants are the fossil capybara from eastern Arizona described by John F. Lance.

CHARLES A. REPENNING,
Program Arranger

Zoological Sciences (F)

Section F cosponsored a five-session symposium on Molecular Mechanisms of Temperature Adaptation. Plant, animal, and microbial physiologists and biochemists combined efforts and were surprised to find that each group, working with very different organisms, was arriving at similar conclusions concerning genetic variations in respect to temperature and mechanisms of acclimatization. Several zoological societies had programs of contributed papers and symposia. The American Fisheries Society had a symposium dealing with the Sacramento-San Joaquin Estuary. The Herpetologists League sponsored three sessions of contributed papers. The Society of Systematic Zoology sponsored a very popular two-session symposium on systematic studies of fauna on the Galapagos, a symposium on Biological Data Retrieval and Computer Analysis, and four sessions of short papers. The American Society of Zoologists featured the following symposia in addition to the one on temperature adaptation: Hypothalamic Control of the Anterior Pituitary (2 parts), Neurosecretion of Invertebrates other than Insects (4 sessions), The Vertebrate Ear (2 parts), Problems in Invertebrate Embryology (3 parts), and Modern Approaches to the Study of Adenohypophyseal Structure and Function (2 parts). There were five sessions on Developmental Biology, four on Invertebrate and General Zoology, six sessions in Comparative Physiology, four in Comparative Endocrinology, three in Vertebrate Morphology, and sessions on Radiation Biology, Ecology, Cytology, and Genetics. The Animal Behavior Society had a symposium on Experimental Analysis of Aggression, also separate sessions on learning, agonistic behavior, territorial and parental behavior, sexual behavior, communication, orientation, and navigation.

Science

Geology and Geography (E)

Richard H. Mahard

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