Both Jones and Frazer indicated that the solid-state, post-fabrication, cyclodehydration which was involved with their respective aromatic polymers appears to be solely intramolecular, and thus does not result in any cross-linking. With the polyhydrazides, the crystalline form changes during their conversion to polyoxadiazoles. This conversion is 5 to 10 times faster with an unoriented polyhydrazide than it is with a highly oriented polyhydrazide fiber.

An ingenious, direct polymerization of benzene to *p*-polyphenyl, the simplest linear aromatic polymer, was described by P. Kovacic (Case Institute of Technology). The remarkably mild polymerization conditions (70°C) involve treating benzene, in the presence of water, with a combination of aluminum chloride and cupric chloride, with ferric chloride, or with molybdenum pentachloride. The *p*-polyphenyl, whose structure was established with a variety of evidence, is highly insoluble; it has good thermal stability (up to 525°C), but its molecular weight is not known.

This unusual benzene polymerization to *p*-polyphenyl was described as an oxidative cationic polymerization of the aromatic nuclei. A co-catalyst, preferably water, is required. In the ferric chloride reaction a molar ratio of 1:1 of H_2O and $FeCl_3$ gives the most active initiating agent and highest polymer yield. The $AlCl_3$–$CuCl_2$ system gives fewer side reactions and the purest product. With biphenyl or *p*-terphenyl as monomers in place of benzene, only dimer or trimer is obtained.

Film-forming and fiber-forming poly (phenylene sulfide) of molecular weight greater than 20,000 shows promise in high-temperature laminates and adhesives (Robert W. Lenz, Dow Chemical Co.). This highly crystalline polymer (melting point up to 295°C) is thermally stable up to about 400°C (in air). Its use at high temperature, however, is somewhat limited by its melting point, unless it is cross-linked. This polymer has been cross-linked by protracted heating under nitrogen at 400°C. This treatment causes a weight loss, and the insoluble, infusible product has improved toughness, adhesive strength, and thermal stability. Although the chemistry of the heat treatment is obscure, this polymer is another example of a polymer which is favorably modified by treatment with heat.

The poly(phenylene sulfide) is formed by an aromatic nucleophilic substitution reaction at 250°C and involves a self-condensation of salts of *p*-halothiophenols, preferably cuprous *p*-bromothiophenoxide. Although solution polymerization in pyridine is most rapid, an unusual solid-state polymerization of the pure salt, below its melting point, is also feasible. For some of the *p*-halothiophenol salt polymerizations, an unusual phenomenon termed "preferential polymer formation" occurs. The end group of the polymer chain is more reactive than the monomer, and the reaction takes on some of the characteristics of an addition polymerization rather than the purely step-growth, condensation polymerization expected.

All of the aromatic polymers discussed are excellent insulators, showing no semiconducting behavior.

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Physical Anthropology

The American Association of Physical Anthropologists held its 32nd annual meeting in Boulder, Colorado, 2–4 May, and felt it set a record by having approximately 75 percent of the attending members present papers.

Considering that the study of man is such a broad subject, and that there was only one symposium scheduled (jointly with the Society for American Archaeology), the contributions were expectably diverse. The symposium covered quite a bit of territory—from the origin of Mongoloids to Eskimo–Aleut cultures. It was organized and chaired by William S. Laughlin (Wisconsin) who also summarized the results of recent fieldwork in the Aleutian and Kodiak Islands. Carter Denniston (Wisconsin) reported on the blood groups of three Koniag isolates from the standpoint of the microevolution of small populations. He showed that in spite of a complement of Caucasian genes in all three groups which was caused by admixture, the blood group frequencies are clearly "Eskimo," with high proportions of A_1, R_1, R_2, and M. The discussion by Charles F. Merbs (Wisconsin) dealt with patterns of osteopathology in 100 entire skeletons of Eskimos and Aleuts, particularly in respect to survival disadvantage in the local culture and environment. The disease loads on these isolates were found to be relatively light. There is a high frequency of skeletal anomalies, especially of the spine (spondylolysis, lower thoracic spina bifida, and so forth), and little evidence of trauma except for compression fractures of the vertebral bodies and dental ablation. Osteomyelitis is rare; Pott's disease is unknown from the prehistoric period; dental caries are virtually absent, although tooth wear and abscessing are common; and arthritic signs are concentrated primarily in the elbow and spinal joints with marked sexual dimorphism as far as involvement of the elbow is concerned.

Four papers from the general program illustrate the broad range of the subjects covered. Paul T. Baker and Joel M. Hanna (Pennsylvania State University) described racial differences in Lewis waves—the temperature fluctuations in the human extremities which occur when they are exposed to temperatures low enough to produce tissue damage. Working in the southern highlands of Peru, they found that the Indians have higher Lewis wave responses than whites. They believe that this represents a genetic rather than a cultural adaptation to altitude (actually to the cold of the Andes). On the other hand, they attribute to acclimatization the finding that the hands and feet of the Indians were warmer than those of whites under milder cold exposure.

Alice M. Brues (Oklahoma) reported investigations on the polymorphism of the ABO blood groups after she used a stochastic computer program. Natural selection has previously been suggested as the explanation of the persistence of the A and B genes, which are subject to continual loss as a result of maternal-fetal incompatibility reactions. Calculations which simulate genetic drift in combination with incompatibility and selection effects, show that a stable situation can be brought about by selection which favors all heterozygotes over all homozygotes and that any marked disturbance of this pattern results in a rapid decay of the polymorphism. It was concluded that an overall heterozygote advantage has prevailed over a

long period, and that local or secular variations in this pattern must have been minor.

Morris Goodman (Wayne State) showed by means of two-dimensional starch-gel electrophoresis and immunodiffusion precipitin testing that the divergences in serum proteins between any two of the hominoid genera (*Homo, Gorilla, Pan, Pongo*, and *Hylobates*) are greater than those found among cercopithecine genera (*Macaca, Papio*, and *Cercopithecus*). Further, in disagreement with the taxonomic practice of having man be the sole living representative of the Hominidae and of grouping orangutan, chimpanzee, and gorilla together in the Ponginae, a serological classification would group *Pan, Gorilla*, and *Homo* in the Hominidae; *Pongo* and *Hylobates* would be separated from this phyletic assemblage and also from each other, but would still remain within the Hominoidea.

Janet A. Hartle (South Dakota), having set for herself the task of finding an unrecognized distinguishing feature of the Mongoloid cranial face susceptible of simple metrical demonstration, produced evidence that she had succeeded. The feature in question is the frontal process of the zygomatic bone and particularly the shape of this process as caused by the variable development of the marginal tubercle. She showed that this tubercle reaches its highest development in the classic Asiatic Mongoloids; is least developed in whites and Negroes; and is intermediate in size in American Indians. Hartle suggests that this racial difference may reflect a more forward attachment on the skull of the temporal muscles in Mongoloids and also in some way perhaps the claimed greater amount of fat over the Mongoloid face.

Even though attendance was down at this the farthest west meeting in its history, the Association will hold its next meeting in Mexico City by invitation of the Instituto Nacional de Antropología y Historia. Elected to office this year were Gabriel Lasker (Wayne State), president, and Alice M. Brues (Oklahoma), member of the Executive Committee. In an unusual move, the Association named Juan Comas (Mexico) as honorary president for the year. Frederick S. Hulse was selected as the new editor of the *American Journal of Physical Anthropology*.

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Astronomy

The rapid growth of the nation's newest observatory for optical astronomy gave added stimulus to the annual spring meeting of the American Astronomical Society which was held in Tucson, Arizona (17–20 April). The Kitt Peak National Observatory, whose location was selected only 4½ years ago and whose management is handled by AURA, Inc., now has in operation the world's largest solar telescope, a 36-inch Cassegrain reflector used for stellar research and, since April, an 84-inch reflector, which is the fifth largest in the world. The growing complex of telescopes atop Kitt Peak now includes the 36-inch Steward reflector of the University of Arizona relocated upon an area subleased from the National Science Foundation.

This meeting was highlighted by five papers on the most interesting new discovery in astronomy in the past several decades—the identification of "radio stars" as a new class of objects. These objects, first identified by the Mount Wilson-CalTech group of radio and optical astronomers, appear to be the consequence of the formation of stellar bodies at the nuclei of galaxies; such bodies have masses of 10^6 or more solar masses. Obviously much theoretical and observational work will be required to explore the nature of these new objects, whose prodigious energy output solves the riddle of the apparently large energy flux observed from those peculiar galaxies that are known to be strong radio emitters.

In accordance with the interest in the new instrumental developments in the Tucson region at the Kitt Peak National Observatory, the Steward Observatory, and the Lunar and Planetary Laboratory, a symposium on instrumental astronomy was held under the chairmanship of A. B. Meinel, president-elect of the Rocky Mountain and Southwestern Division of the AAAS. This symposium did not attempt to cover areas within the very broad field of instrumental astronomy that is developing within the United States, but instead leaned toward the presentation of certain techniques that have recently seen much development in other countries, in particular, in the utilization of interference phenomena in new observational research. While there are exciting new developments in the laboratory stage of exploration, the symposium adhered closely to the boundary condition of considering only those instruments that had been successfully applied to research.

W. S. Finsen (Republic Observatory, Johannesburg, Union of South Africa) described the eyepiece interferometer, a relatively simple device in theory but one requiring great skill in construction and use. It has enabled Finsen to make notable advances in the study of close binary star systems.

Methods developed for the study of emission nebulosities, particularly through the extension of Fabry-Perot interferometers, were described by G. Courtès (Observatoire de Marseille, France). His study of high-velocity emission filaments near the nucleus of our galaxy has emphasized the ability of this technique to detect features not observable by more conventional methods. He presented many fine illustrations of the emission structure of galaxies taken by him at Haute-Provence Observatory.

Luc Delbouille (Institut d'Astrophysique, Liège, Belgium) discussed the technique of scanning interference spectroscopy with the Michelson interferometer. This method, first pointed out by Felgett, utilizes all of the light from an object while obtaining the spectrum of the object. This method has been in the foreground of consideration for space missions since accurate guiding on the source is not necessary; however, Delbouille presented in a realistic manner the special problem that must be overcome if successful observations are to be made with this instrument. The work by him and his colleague, Miss Roland, has demonstrated that fine spectra can be obtained, and much hope is held for the future of this rather elegant technique.

As a comparison to the beginning efforts with scanning interferometers, G. P. Kuiper (University of Arizona's Lunar and Planetary Laboratory) presented the magnificent results which he recently obtained with conventional grating and prism spectrometers in the infrared. He presented a series of spectra, taken with cooled PbS and InSb detectors, of the planets and cool stars in the 1- to 5-micron region with resolutions of several thousand in the best traces. Of particular interest, Kuiper showed the first traces of omicron Ceti, an M8 star, showing the presence of water vapor in the stellar atmosphere. While numerous features discovered in these spectra have been