yield of human viruses for vaccine production.

8) The cells must be approved by the National Control Authority.

The data obtained in a number of field trials of vaccine produced in one such human diploid cell strain is sufficiently encouraging to warrant continued efforts. Over 200,000 persons have now received vaccines produced in the human diploid cell strain WI-38. Vaccines against poliomyelitis, adenovirus type 4, measles, rubella, and rhinovirus, some administered orally and others parenterally, have produced no known untoward effects.

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Paleomagnetism: United States–Japan Committee on Scientific Cooperation

Since 1962 geophysicists from the United States and Japan have been engaged in a research program involving rock magnetism, archeomagnetism, paleomagnetism, and geomagnetism of the Pacific area. An organizational meeting for this program was held in Tokyo 4 years ago; a second meeting was held in Berkeley in 1964; and a third meeting, the latest, was held 27–29 October 1966 in Kyoto, Japan. Approximately 13 U.S. scientists and 20 Japanese scientists attended the conference.

The fundamental mechanisms by which rocks become stably magnetized were discussed by the groups from Tokyo University, Pittsburgh University, Massachusetts Institute of Technology, and the University of Colorado. Among the important new results reported was an improved model for the acquisition of thermoremanent magnetization by multidomain grains; a demonstration that the extreme stability of the thermoremanent magnetization in volcanic rocks may be due to the formation in large titanomagnetite grains of single domains of magnetite separated by ilmenite lamellae; an explanation for the irreversible changes on heating of titanomaghemite, and various studies by the Tokyo and Osaka groups of pressure effects on remanent magnetization.

Naoto Kawai (Osaka University) hypothesized that the main dipole component of the geomagnetic field is undergoing an eastward rotation. To the extent that they are coherent, archeomagnetic results from Iceland, England, France, Russia, Japan, and the western United States suggest such an eastward movement. However, it was pointed out that the evidence for this conclusion is somewhat inconclusive because the nondipole field tends to obscure changes in the main dipole. Therefore, more archeomagnetic data from the southern hemisphere and from the central Pacific regions are needed. Paleomagnetic studies of secular variation on a longer time scale made by the U.S. Geological Survey group indicate that the low values of secular variation presently observed in the central Pacific region have persisted for at least 700,000 years. In contrast, the secular variation at midlatitudes in North America and in Alaska has been larger than that expected from the present nondipole field.

One of the main objectives of the program was to determine a radiometric time scale for reversals of the geomagnetic field. This has now been done for the interval back to 4 million years ago. During this time there have been four broad epochs of alternating polarity, as well as four much briefer polarity fluctuations termed events. The fourth event was identified on the basis of new data presented at Kyoto by the U.S. Geological Survey group and the Tokyo–M.I.T.–Colorado group. The two sets of results were complimentary, each group having identified one of the boundaries of the same short polarity event occurring about 3.8 million years ago. Rikitake (Tokyo University) discussed the current state of theoretical studies of geomagnetic reversals.

The focus of much of the paleomagnetic research now being done has shifted to geomagnetic intensity studies. The research reported by groups from Tokyo University, Kyoto University, and the University of California indicate that it is possible to recover information about ancient intensities of the earth's field from some rocks, provided great care is exercised in experimental procedures.

Paleomagnetic results for the Cretaceous and Tertiary from the Pacific Basin were reported by groups from Tohoku University, Tokyo University, Kyoto University, Osaka University, the University of California, and Washington University. Among the generalizations to emerge from these studies are the following: (i) Cretaceous pole positions form a well-defined grouping for each continent, but the groups for different continents are displaced from each other. The implication is that there was little polar wandering during the Cretaceous. (ii) Paleomagnetic results from Japan fall into two distinct groupings, suggesting that the Japan arc was bent during the Late Cretaceous. (iii) The remanent magnetization of sea mounts in the western Pacific, as determined from magnetic anomalies, are consistent with paleomagnetic poles in the Atlantic. S. Uyeda and V. Vacquier interpret this as indicating a northward movement of the Pacific Ocean basin relative to North America and Asia.

In his summary remarks, John Verhoogen (University of California) stated that the U.S.–Japan program had been rewarding not only in terms of scientific advances but also in terms of furthering cooperation and understanding among geophysicists of the two countries. The exchange of postdoctoral and graduate students was an especially successful part of the program. Verhoogen, speaking for all of the American delegates, urged that the channels be kept open for such exchanges in the future, and also that the conferences be continued at 2- or 3-year intervals. Tsuneji Rikitake (Tokyo University) responded that he also felt the exchange of students had been extremely beneficial, and urged continuation of the meetings. These suggestions met with the approval of the entire group.

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Forthcoming Events

February

26. **Psychoanalysis**, 5th annual conf., New York, N.Y. (D. M. Kaplan, 175 W. 12 St., New York 10011)

26–2. International **Anesthesia Research** Soc., 41st congr., Bal Harbour, Fla. (Executive Secretary, 227 Wade Park Manor, Cleveland, Ohio 44106)

27. **Thermoanalysis**, Chemical Inst. of Canada, symp., Toronto, Ont. (H. G. McAdie, Ontario Research Foundation, Toronto, Ont.)