2, 4, 6 and 9. The title of the course will be "Astronomy in Our Daily Life."

THE sixth annual scientific award of the American Pharmacological Manufacturers' Association was presented at the meeting held in New York on December 11 and 12 to the National Research Council in recognition of its "fundamental contributions to public health in the field of the medical sciences; and also in recognition of its essential services to our country in World Wars I and II." The nominating report was made by Dr. George R. Cowgill, professor of nutrition at Yale University. Dr. Alan Gregg, director of medical sciences, of the Rockefeller Foundation, made the presentation address. It was entitled "The Essential Need of Fundamental Research in Medical Sciences for Social Progress." Dr. Ross G. Harrison, chairman of the National Research Council, accepted the award. He spoke on the "National Research Council and Its Action in the Field of the Medical Sciences." Dr. Frank B. Jewett, president of the National Academy of Sciences, made the concluding statement.

THE tenth award of the Oberly Memorial Fund, in memory of Eunice Rockwood Oberly, will be made in the spring of 1945. This prize is awarded every two years to the compiler submitting the best bibliography in the field of agriculture or the related sciences. The amount of the prize is approximately $100, the interest on the fund for two years. It is administered by the American Library Association. Those submitting bibliographies in competition for the prize should send four typewritten or printed copies to the chairman of the committee before March 1, 1945. The bibliography must be accompanied by a letter stating that it is being submitted in competition for the Oberly Memorial Award, 1944–45. The members of the committee are Nelle Uree Branch, Mary G. Burwash, Marvin A. Miller, Caroline E. Reinke and Margaret C. Schindler. W. P. Kellam, librarian of the University of West Virginia, Morgantown, is chairman.

IT was recently stated in SCIENCE that Nobel Prizes were to be presented in the United States for the first time on December 10. A correspondent calls our attention to the fact that the Nobel Prize in Physics for 1939, awarded to Professor Ernest O. Lawrence, of the University of California, was presented to him at the University of California in Berkeley on February 29, 1940. The presentation was made on behalf of King Gustavus V by Mr. Carl E. Wallerstedt, Consul-General of Sweden in San Francisco.

DISCUSSION

THE MAGNIFICATION OF DIFFERENCES BY A THRESHOLD

CONSIDERING the political implications of the subject, the discussion in SCIENCE regarding the effect of heredity upon human physiology and psychology has been carried on with unusual clarity and objectivity, and it is likely that all who have taken part in it would agree that in everyday life we need to encourage a respect for human differences, whether caused by culture, physical and biological environments or heredity. As Mead[1] has put it, we may assume that each human group has something of value to contribute to mankind as a whole.

The problem discussed is part of a much larger one, the effect of heredity upon the behavior of any animal, and on this basis it is possible to be somewhat more objective.

That heredity can affect behavior is a matter of fact. The well-known cases of the waltzing mice which run endlessly in narrow circles, of the vestigially winged Drosophila which can not fly and the nervous disease of Huntington's chorea among human beings represent a few of many obvious examples. But these bizarre cases are also rare, and there remains a problem of determining just how important hereditary effects may be. The author has made certain experiments along these lines on fruit-flies[2] and house mice[3] which indicate one special type of conditions in which heredity may produce important results.

Professor Dobzhansky[4] has admirably summarized the theoretical reasons for believing that variability of behavior caused by heredity should be relatively very small compared to that produced by environmental factors. This expectation has been confirmed and the author has been struck by the difficulty of finding differences caused by heredity and the ease with which they could be modified by slight changes in the environment. Among the mice two inbred strains were found in which (under special conditions) one type of male would react peaceably and the other aggressively to a strange mouse. Later it was found that either strain could be trained in a few days to either fight fiercely or be wholly pacific.

However, one very interesting situation was observed, that in which the ordinarily minor effects of heredity appeared to be magnified by a threshold. Among the fruit-flies it was found that in a given

[1] "And Keep Your Powder Dry." New York: Morrow & Co. 1942.

[2] *Am. Naturalist*, 77: 184–190, 1943.

[3] *Jour. Heredity*, 33: 11–15, 1942.

[4] SCIENCE, 100: 406, 1944.

stock under conditions of weak illumination the possession of red or white eyes might make the difference between a fly's crawling toward the light or not crawling at all, an enormous difference in behavior, whereas under other conditions the same factor might produce little effect. It also seems likely that the large behavior difference observed in mice was associated with a threshold of training.

The sort of situation in which heredity may shift the threshold of stimulation or performance is theoretically possible in any animal. Human life (at least in the United States) appears to have many threshold situations, from athletic contests to social barriers. Acting as a "last straw" in certain special environments it is possible that heredity may produce in the behavior of human individuals differences whose importance is all out of proportion to its general effect.

Certain words of caution regarding this suggestion need to be spoken. Differences produced by environmental factors may also be magnified by a threshold. Because of the presumably greater powers of learning of human beings it must be expected that heredity will be found to have smaller effects upon behavior than in the lower animals. Furthermore, this idea applies only to individuals under special conditions and does not apply to large groups with variable heredity and environments.

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PHOTOGRAPHY OF CRYSTAL STRUCTURES

SIR LAWRENCE BRAGG[1] has shown that Fourier series summations of x-ray diffraction data from a crystal can be made optically, yielding "photographs" of the crystal structure, in which the individual atoms are seen in their proper relative positions. The method is essentially a superposition of exposures of patterns of light and dark bands, the choice of band patterns and the lengths of exposure being determined by the x-ray data.

As shown previously by the writer,[2] this method can be made much easier and faster by the use of a previously prepared set of masks, on which the proper patterns are printed. The same set serves for all structures and for both electron density summations and Patterson summations. A set of 316 such masks, on a roll of 35 mm film, has recently been prepared in these laboratories. With it, pictures of structures for which suitable x-ray data are available can easily be made in a half hour. Magnifications of 100,000,000 or more are readily obtained.

Although the accuracy of atomic positions and of relative electron density values at different points in the structure is undoubtedly less than can be obtained by computational methods, the ease and speed of the photographic method should make it useful both in working out new structures and as an aid in the description of structures which have already been deduced.

We hope soon to be able to furnish duplicate copies of our new set of masks, at a nominal cost, to others engaged in crystal structure analysis.

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[1] W. L. Bragg, *Z. Krist.*, A70: 475, 1929; "The Crystalline State," p. 229, London and New York: Macmillan. 1934.

[2] M. L. Huggins, *Jour. Am. Chem. Soc.*, 63: 66, 1941.

HUMAN GENETICS AND ANTHROPOLOGY

ANTHROPOLOGISTS and human geneticists have many problems in common, and it would seem that they would see eye to eye on major issues. They probably do on most, but apparently not on all. At least in recent comments in SCIENCE Professors Herskovits[1] and Ashley Montagu[3] have questioned the actuality or even the reasonableness of the existence of physiological and inherent response differences between major subdivisions of the human species.

In my comment[2] on Professor Herskovits's note I wrote: "If primary human stocks (Mongoloid, Negroid and Caucasoid) and if subdivisions of these major groups ('races') have any validity at all, and the author believes that Professor Herskovits will admit that they do have some, it seems almost inevitable that both physiological and inherent response differences must exist." In a later issue of SCIENCE Professor Ashley Montagu[3] commented as follows: "At first blush this seems a reasonable enough statement but when one inquires why it appears to be so it will be found that it is suspected that physical characters are probably linked with functional ones, that there is a genetic linkage between the genes for the two different orders of phenomena." He continues: "If such is the ground upon which this assumption is usually made then it ceases to be a reasonable one, for the good reason that it is based on no more than a suspicion or a hunch and not upon facts which are known to exist or have been demonstrated." He adds later, "Genetic linkage between particular physical traits and particular psychological traits is a phenomenon unknown outside folk belief."

May I add at once that the reason presented by Professor Ashley Montagu is not the one which makes it seem almost inevitable that inherited physiological and psychological differences exist between primary human stocks and races. In fact, the reason he presents has no bearing on the question at issue. The

[1] SCIENCE, n.s., 100: 457–461.
[2] SCIENCE, n.s., 100: 146–147.
[3] SCIENCE, n.s., 100: 383–384.