In the coming atomic age nuclear energy will be the driving power of the social order.

The foregoing are not the views of a scientist; they are those of a layman who has taken a keen interest in certain branches of science for many years. Though he has worked as a machinist in a war plant until recently, and spent his life prior to that in the mines in South Wales and America as a miner, he has reflected a good deal on some of the major problems of life.

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The Atomic Bomb and the Anthropologists

In his admirable address, "Science and Our Future" (*Science*, 1946, **103**, 415–417), Dr. E. U. Condon very properly criticizes the viewpoint of anthropologists who "fatalistically await death, reading papers to an academic society meeting in a museum in Philadelphia." I think it should be placed on record that almost all the anthropologists present at that meeting rejected that viewpoint, and that upon my moving and Dr. Margaret Mead seconding, the following resolution was unanimously adopted by the American Anthropological Association:

RESOLVED: That the American Anthropological Association, constituted of scientists interested in the study of human nature and society, recognizes the responsibility of anthropologists to study the effects of the discovery of the use of atomic energy, and to participate actively with other scientists in efforts to make appropriate social inventions to guard against the dangers, and utilize the promise, inherent in atomic use.

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Pathogenesis of Kernicterus

The purpose of this communication is to present our concept of the pathogenesis of kernicterus (jaundice of the nuclear masses of the brain), based on recent clinical, serological, and pathological observations. Until recently there was no explanation for the post-mortem finding of kernicterus only in cases of icterus gravis neonatorum (a form of congenital hemolytic disease or erythroblastosis) and not following other types of jaundice, even of severe degree.

As is well known, the great majority of cases of congenital hemolytic disease occur when an Rh− mother, already sensitized to the Rh factor by a previous pregnancy or transfusion, bears an Rh+ fetus. The antibodies in the sensitized mother's serum may be of two principal varieties, namely, bivalent antibodies (agglutinins) and/or univalent antibodies (glutinins or blockers). If the maternal serum contains a high titer of univalent antibodies, the Rh+ fetus will almost surely be stillborn. With low-titered univalent antibodies, viable infants who recover after suitable transfusion therapy are the rule.

In our experience, when the complication of kernicterus supervenes, the antibodies in the maternal serum are almost always of the bivalent variety (agglutinins). This suggests the following mechanism for the development of kernicterus. Maternal Rh agglutinins in the infant's circulation combine with its Rh+ erythrocytes, bringing about the formation of small clumps (agglutinates of red cells) which plug the smaller arterioles with the formation of agglutination thrombi. In an organ like the liver, the resulting damage may be one factor in the production of jaundice, thus explaining its lack of correlation with the degree of anemia. In the bone-marrow, the resulting irritation may cause a pouring forth of nucleated red cells into the circulation. In the brain, plugging of terminal vessels can produce areas of ischemic infarcts; the nuclear masses would be most vulnerable, since ganglion cells are particularly susceptible to anoxia. Due to the concomitant presence of deep jaundice, the damaged ganglion cells take up bilirubin—a sort of *in vivo* staining reaction. If the infant dies at this point, post-mortem examination will show the presence of kernicterus. Infants surviving the immediate neonatal period and dying after the jaundice has disappeared will show at post-mortem examination evidence of cerebral damage but without kernicterus. In a recent case studied by us, where death occurred 48 hours after birth, in addition to the post-mortem finding of kernicterus, histologic study showed the blood vessels of the brain to be packed full by agglutinated masses of erythrocytes, as required by our theory.

Infants with kernicterus occasionally survive, in which case they develop signs of a diffuse neurologic disorder of varying severity, usually accompanied by mental deficiency. Such cases are rare and would be expected to make up only a very small fraction of the group of so-called nonspecific mental deficiency cases. Therefore it could be predicted a priori that attempts such as have recently been made to show a statistical difference in the distribution of the Rh factor among mothers of mentally deficient children in comparison with the normal population would almost surely yield insignificant results unless the series is large enough to detect a small percentage difference.

Attempts have been made to show a connection between Wilson's disease and kernicterus. In three cases of Wilson's disease studied by us we found no evidence of isoimmunization of pregnancy, indicating a dissimilarity in the pathogenesis of the two conditions.

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Genetics and Biological Theory

E. B. Wilson, in his classical work (*The cell in development and heredity*. New York: Macmillan, 1928), states: "In practice all purposes of experimental analysis are sufficiently met if the hereditary 'units,' 'genes' or 'pangens' be thought of merely as modifiers which call forth responses, this way or that, according to their