solved in water and then thoroughly mixed with the pulp at approximately 10 per cent consistency. The reaction was allowed to proceed overnight at room temperature, after which the temperature was raised to 50° C. for an hour. The spent liquor was drawn off, and a second treatment with sodium peroxide of the same strength was carried out for an hour at 50° C. Inasmuch as the unbleached sulfite pulp was not iron free, the bleached pulp was steeped for 15 minutes in a 1-per cent oxalic acid solution in order to remove the iron. It was then washed free of oxalates with distilled water, since tap water usually contains chlorine. A filter paper made from a pulp thus treated was chloride free, but its ash content corresponded to that of qualitative paper.

Reduction of the mineral content of the pulp without introducing chloride could be accomplished in several ways. Such acids as sulfuric, phosphoric, and oxalic, or mixtures of them in various strengths, could be used. In the present work, the pulp was mixed with a sufficient quantity of 10 per cent orthophosphoric acid to result in a consistency of about 5 per cent. It was heated to 50° C. for 15 minutes, the acid was filtered off, and the filter cake was washed free of phosphates.

In commercial preparation, it could be expected that traces of phosphate ion might remain in the pulp even though it was thoroughly washed. Therefore, when microdeterminations are made for phosphate ion, it would be best to use a standard filter paper from which the ash has been removed by hydrochloric acid. Pulp treated thus had an ash content comparable to that of commercial quantitative filter papers.

A high-speed laboratory stirrer was used to break up the pulp at a consistency of 1 to 2 per cent, after which it was thickened to the desired degree for bleaching. The purified pulp was dispersed in a similar manner in distilled water at about 0.5 to 1 per cent consistency. The filter paper was formed on a finely woven, cotton fabric which had been placed over the holes of a Buchner funnel of the size desired. The sheet was formed while the water was removed slowly by reducing the pressure slightly in the filter flask. When the water had been removed, full suction was applied. Then the sheet was wet with alcohol (chloride free) to harden it. The sheet was transferred to a glass plate, pressed, and then dried.

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Letters to the Editor

Science and Mankind's Plight

In his recent address at the AAAS meeting in St. Louis (*Science,* 1946, 103, 337), Dr. A. J. Carlson clearly depicts the dilemma mankind is in about the state of human affairs.

Dr. Carlson sees a helplessness in every direction that has us puzzled, much as a doctor who gazes baffled at a person very sick with some disease he does not understand. All leading scientists who have given thought to the world's troubles feel about them as he does.

This was very frankly admitted by Wesley C. Mitchell, then of Columbia University, in his striking address as president of the AAAS at the annual meeting of the Association in Columbus, Ohio, in December 1939, when with other things he noted:

"If we can come to a clearer understanding of how we behave, perhaps, and perhaps is all we can say, we can learn how to condition men so that their energies will go less into making one another miserable. . . .

"The outside limits of what scientists can accomplish as citizens are set by their ignorance. Not only does no individual have more than a tiny fraction of the knowledge that is needed; all scientists of the country put together do not know enough to solve many of the problems that a democracy faces."

Since Dr. Mitchell's address, great changes for the worse have come over the world, and the darkness now is much darker than at the time he expressed those views. The baffling problem now is to know how science can break through this darkness to save mankind, for only science can do that.

Dr. Carlson sees hope for betterment if the integrity ruling in science can be injected into the common life of the people. He now sees dishonesty, guile, deceit, and the Golden Rule in reverse, which is only too true, pervading and governing so much that is going on in the Nation and the world.

Since the desire for money is mainly the cause of this, it being regarded as an end rather than the means, which it really is, perhaps the social evils and human deterioration caused by money being so regarded will pass away when money ceases to be the power it now is.

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