into methemoglobin and thus is no longer active as a physiological oxygen carrier. In view of these considerations we suggest that glutathione is one part of the mechanism which prevents the accumulation of methemoglobin in the intact erythrocyte.

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## THE CRYSTALLINE CHARACTER OF LIVING MATERIAL

THE notice in SCIENCE for August 13, 1937, Supplement, page 6, outlining Dr. George A. Baitsell's conclusions concerning the crystalline character of living material is interesting. Dr. Baitsell's work is specially significant from two angles. Firstly, because his conclusions are based upon x-ray investigations; and secondly, because his conclusions can be correlated with similar findings by several workers in the past who used data mostly obtained by microscopic methods. The very close relationship between crystallinity and living structures was realized and extensively advocated by the German scientists, Otto Lehmann, Ernst Haeckel and Friedrich Rinne. The main contention of Rinne's work, "Grenzfragen des Lebens" (1931), is upon the fundamental similarity of crystalline material and organic structure. Rinne in his book also insisted upon the continuity of the organic with the inorganic world.

The writer, in a paper entitled "Iron as the Original Basis of Protoplasm" (1935), shows that the iron bacterium *Leptothrix ochracea* is crystalline. He also summarizes observations on the double refraction of plant cell-wall material, the geometric outline of plant cells and the double refraction of certain chromosomes as general indications of the crystalline character of cellular material. The writer concludes that there are four fundamental factors in the generation of life, and one of these is the aggregation and crystallization of an iron compound, ferrous hydroxide.

On a general basis, all these relationships between crystalline and morphological phenomena can be reduced to the conceptions of modern atomic physics. R. Fuerth, of Prague, especially, has applied physical conceptions to structures and functions of organisms (*Die Naturwissenschaften,* 16: 777, 1928). On this basis, not only organic structures but organic functions are reduced to electromagnetic fields.

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## POLLEN AND HAY-FEVER

WHILE the recognition of pollen as the cause of hay-fever is general, apparently the behavior of the inhaled pollen does not seem to be clearly understood. At any rate, when I asked for information on this subject from medical men, who I took for granted could give me the desired data, I was rather taken aback when I was told they could give me no references bearing on this subject. Further questioning brought out the admission that they had never thought of the pollen grain as a living thing, comparable to bacteria or other pathogenic organisms.

When it was first shown that pollen was responsible for the symptoms of hay-fever, it at once seemed to me that the inhaled pollen spores might very probably find the moist mucous membranes a favorable medium for germination. The rapid germination, accompanied by the excretion of enzymes associated with the penetration of the tissue of the host by the pollen tube, would presumably immediately set up the characteristic irritation of the mucous membrane, and through the pollen tube the proteins of the pollen spore would be discharged into the tissue of the host.

The germination of pollen is a routine experiment in the botanical laboratory, where in an ordinary sugar solution of about ten per cent. many species will germinate promptly, the protrusion of the pollen tube sometimes occurring within a few minutes.

Assuming that the above theory is correct, it may be inferred that the pollen grains falling on the moist mucous membrane of the nasal passages might in a few minutes send out the pollen tube, exactly as a fungus spore germinates, and quickly initiate the characteristic symptoms of the disease.

The demonstration of the presence or absence of germinating pollen should not be a difficult matter and, if germination does occur, it certainly should offer a wide field for experiment.

It seems hardly possible that experiments along these lines have not been made, and I should very much appreciate any information on the subject.

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# QUOTATIONS

## SCIENCE'S MAGNA CHARTA

IT took the British Association for the Advancement of Science a decade to realize that a biologist, a physicist or chemist is not an anchorite of the laboratory but a responsible member of society. The realization bore fruit at the historic Blackpool meeting of 1936. There English men of science awakened socially. Possibly the present Indianapolis meeting of the American Association may be equally significant. A symposium on "Science and Society" will give our

leaders in research an opportunity to interpret their relation to a stricken world which is trying desperately to adapt government to this age of science and invention. It is therefore gratifying to note that the open letter addressed a few months ago by Mr. Ritchie Calder of *The London Daily Herald* to Lord Rayleigh, president of the British Association, on the part that science should play in saving democracy and itself, has inspired Dr. F. R. Moulton to lay before the Council of the American Association the proposition that science has a social task to perform and that it can no longer remain indifferent to the rising tide of totalitarianism. If democracy falls, science falls too—science of the type with which the names of Galileo, Newton, Darwin and Einstein are linked.

Dr. Moulton sees the American Association entering a new phase of its evolution because of the many special societies that have split from it by a process of fission. Yet, powerful as it ever was, it represents organized science as a whole. It is the one body in this country that can speak for the ideals, the internationality, the objectivity that have made science an irresistible culture force, the one body that can tell us "what matters may be of the greatest immediate importance for the future of civilization," to use Dr. Moulton's words.

With the British Association already convinced that the mere accumulation of scientific knowledge does not in itself guarantee the continued welfare of mankind and the American Association listening to Dr. Moulton, the time seems ripe to carry out Mr. Calder's proposal for a Magna Charta, a declaration of independence which shall state the function of science in modern society and the need of freedom of research, freedom of theorizing, freedom of discussion. If the councils of the two associations will together formulate and announce the simple principles that guide scientific men and proclaim the might and sanctity of scientific thought, the world is bound to listen and to profit. Scientific men in all countries are spiritually welded together by a community of interest and an idealism which contrasts markedly with fascistic nationalism and communistic class hatred. They set an inspiring example of devotion to a cause that knows no country, no creed, no race. They prove that collective thinking for the common good is possible. The time has come to let their voices cry out in unison on both sides of the ocean. A spiritual message needs to be conveyed which is not yet understood of all men.—*The New York Times.*

## THE PROBLEM OF THE SCIENTIST

THE American Association for the Advancement of Science opened its annual meeting in Indianapolis yesterday. If the sessions fulfill the promises which have been made for them they should have an unusual importance. It has been planned to use this meeting to consider first steps toward creating, in cooperation with the British Association for the Advancement of Science, an "International Democratic Commonwealth of Intellectual Resources." Its purposes would be to integrate and focus the knowledge of a great court of scholars in order that this knowledge might be more consistently applied to world problems and also to defend the freedom of the scientist.

The movement seems to have originated at the Harvard tercentenary conference of scholars and the meeting, in the same year, of the British association. More recently, impetus was given by a letter addressed by an English journalist to the president of the British group, asking that the proposals of last year now be implemented, and an editorial in the New York *Times* of October 17, calling for "an organization which shall indicate how the objective attitude of the laboratory may be applied in governing a people, in breaking down prejudices, in preventing war, in solving problems that mean progress not in one country alone but the world over."

In the past we have frequently remarked the increasing concern of men of science with the contemporary socio-economic problems on the one side and, on the other, the growing popular feeling, under the impact of a variety of political failures, that it would be desirable to try to adapt the techniques and methods which have worked well in the sciences to promlems rarely touched in the past by the learned man. These two trends of opinion apparently motivate the present undertaking.

However, there is great difference between organizing to protect the freedom of science and organizing with the intention of placing science's resources more fully at the service of government. About the former there would be no disagreement among reasonable men in democratic countries, and a strongly knit body of scientists of eminent reputations and militant dispositions might do much to strengthen the bulwarks of the liberty they have won through the centuries.

It will be quite another thing to carry out the second part of the program if it is accepted in principle. That would call not only for a higher degree of the unification of knowledge than has yet been achieved but for the formulation as well of basic political attitudes—a task that would open the way for violent clashes of opinion. It remains to be seen whether, with the best will in the world, even the scientists, who, after all, are citizens, too, will be able not only to pool their intellectual resources but agree upon how these resources are to be used, and who is to use them and for what ends.—*The Baltimore Sun.*