
Letters to the Editor

Soviet Scientists

The newly founded Institute of the History of Natural Sciences, USSR, has announced a publication program including such journals as *History of Russian Natural Science*, *Outstanding Leaders of Russian Science*, *Great Contributors to Russian Science*. This trend in science reporting is apparently the result of the wartime success of the Russian scientific work underlying industrialization of the USSR. Through this, the interest of the world has been awakened, not only in current Russian research, but in earlier work which was insufficiently known to contemporary scientists outside Russia at the time it was being done and has only come to be recognized in the light of recent more familiar achievements in which it culminated.

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Thromboplastic Studies on Hemophilia

In an article by Moldavsky, Hasselbrook, and Cateno, entitled "Penicillin effect on blood coagulation" (*Science*, 1945, 102, 38-40), the authors described some interesting findings, to wit: that after parenteral injections of penicillin in a series of patients under their care, there was noted a marked shortening in blood coagulation time after administration of that antibiotic drug. Inasmuch as we have been engaged in the study of various physical and chemical agents in respect to their thromboplastic action on the blood of both lower animals and human beings and were especially interested in the study of hemophilia, we have repeated the observations of Moldavsky, *et al.*, first on experimental animals and afterwards on hemophiliac patients. By courtesy of Dr. Howard Kern, chief of the Surgical Service, Sinai Hospital, we have confirmed Moldavsky's findings on normal-blooded clinical patients.

Employing Howell's method of studying coagulation time of whole blood, we found that injection of 2,000 to 5,000 oxford units of penicillin in medium-sized rabbits and cats produced definite shortening of coagulation time within two to three hours after administration of the drug, either by intravenous route or by intramuscular injection, thus corroborating the very valuable discovery of Moldavsky, *et al.* We have then made some studies, on two hemophiliac subjects, with intramuscular injections of penicillin. One of these subjects is a young man of 18 years, the other a man of 43 years, both of them having a normal coagulation time ranging from two to three hours.

To our great surprise we discovered that in neither subject was there noted any appreciable diminution in coagulation time after injections of quite massive doses of penicillin. One of the men received 50,000 oxford units, while the other subject was studied on two occasions, receiving 50,000 and 70,000 oxford units, respec-

tively; in neither case was any effect produced on blood coagulation two and one-half hours after injection of the penicillin. In view of the clinical findings of Moldavsky, *et al.* on the one hand, and our own animal experiments on the other, these findings in hemophilia may be of interest in regard to its mechanism, which as yet remains an inadequately solved physiological problem.

We have, however, been much more successful in powerfully accelerating coagulation time of hemophiliac blood by means of suitable deep X-rays. The most efficient radiations in this respect were obtained by rays from 200-K.V. apparatus operating on 20 M.A. and passed through a composite filter of 2 mm. Cu at a target distance of 50 cm. Specimens of hemophiliac blood *in vitro* exposed to from 60 r to 80 r, clotted in one-half to one-third of the original time. Similar results *in vivo* were obtained in the two hemophiliacs mentioned above by giving them deep X-ray radiations over the splenic region. The thromboplastic effect of the irradiation persisted for as long as 10 days. A detailed report of these studies is to appear in the *Southern Medical Journal*.

Of interest also are experiments performed by us *in vitro* with certain snake venoms on hemophiliac blood. It is already known that the venom of Russell's viper (*Daboia*) hastens coagulation of such blood. We have found in addition that the venom of the South American viper (*Bothrops jararaca*) is equally efficacious in this respect. Both of these venoms *in vitro* in concentrations of 1:100,000 to 1:200,000 may produce a solid clot with hemophiliac blood in five minutes. Of course these venoms cannot be employed therapeutically by parenteral injection, but they may prove useful for local application.

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The Presumptive Identification of Antibiotics

In the field of antibiotics a problem exists, the solution of which would, we believe, benefit all those engaged in it. This problem concerns the presumptive identity or nonidentity of an antibiotic with one already reported in the literature.

The most satisfactory way of determining the nature of an unknown agent is to determine its physical and chemical properties and compare it with known agents. Unfortunately, for reasons well known to workers in antibiotics, it is frequently not feasible to do this. In the first place, the required data for comparison are rarely available. In the second place, the necessary purification may be extremely laborious. It is, moreover, of crucial interest to the investigator to determine the presumptive identity or nonidentity of his antibiotic in a very early stage in the investigation.

At the present time, the only general means available for establishing presumptive identity or nonidentity of an antibiotic with reported agents, disregarding the special cases where some unique property of an antibiotic can be utilized, is the so-called bacterial spectrum. We believe that the use of the bacterial spectrum for this purpose has a number of disadvantages: (1) It requires a considerable number of different types of organisms; (2) unless the organisms are standard, easily obtained strains, a comparison of literature values of the known antibiotics with the values for the unknown agent is subject to much uncertainty; and (3) as a result, a satisfactory comparison of the unknown antibiotic with known agents requires the test to be carried out simultaneously with the known antibiotics. The latter, however, are frequently unavailable. With these considerations in mind, the following approach is suggested as a possible solution to the problem presented.

In describing a new antibiotic, the investigator should determine, under defined conditions, the relative inhibitory effect of his antibiotic on two strains of each of two species of bacteria. One strain of each species should be the parent, susceptible to the antibiotic. The other should be a strain "made" highly resistant to the agent. The two species should preferably originate from standard bacterial strains. If possible, one species should be a representative gram-negative organism, such as *E. coli* (A.T.C.C. 9637), and the other a gram-positive organism, such as *Staph. aureus* (A.T.C.C. 6538). The four strains should then be filed with a central agency such as the American Type Culture Collection so that they would be readily available.

An investigator confronted with an antibiotic whose identity with certain reported agents is in question could then compare the relative effect of his antibiotic on the parent and the various indicated resistant strains obtained from the central agency. For example, an antibiotic is discovered which resembles subtilin in certain respects. If the unknown antibiotic is as active against a strain of *Staph. aureus* (A.T.C.C. 6538) highly resistant to subtilin as against a normal strain of *Staph. aureus* (A.T.C.C. 6538), the conclusion is justified that the two agents are not identical. In many instances, however, it would be necessary to compare the inhibition ratio of the unknown antibiotic with the published value for the known antibiotic in order to interpret the results. If necessary, the test could be extended to eliminate other reported antibiotics. Armed with this knowledge, the investigator would be in a more favorable position to report on the possible nature of his antibiotic while the investigation is still in a preliminary stage.

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Regional Research Stations in Basic Science

The proposals for federal support of scientific research embodied in S. 1850 should have the hearty support of all scientists. Senators Kilgore and Magnuson, and

their colleagues, the sponsors of these proposals for the expansion of scientific research in the United States, are to be congratulated on the able way they have developed the program. I venture to propose, however, a slight addition, which I believe will help to achieve the objectives desired.

A station for research in basic science should, in my opinion, be organized in each state and territory. These basic science research stations should be supported both by federal and by state funds. They should receive the monies apportioned to the states under the present provisions of S. 1850. In addition, each state research station should receive from the state concerned an annual amount at least equal to that received from the Federal Government.

In each state where there is a state university the state basic science research station should be associated with the state university in the same way that the state agricultural research stations are now associated with the state agricultural colleges. Each basic science research station should be under the control of the same body that administers the state university. In a state where there is no state university the basic science research station could be administered by a state agency established for the purpose or assigned that duty.

The scope of the basic science research stations should embrace the whole field of science. Research in the social sciences would therefore form a proper part of the program of each station.

Substations for basic research could be maintained, if desired, at research centers situated at places within a state other than at the state university. Research grants also could be made to research workers at other institutions.

These proposed basic science research stations would serve to coordinate those researches sponsored by the National Science Foundation with the researches in progress at the universities. Possible duplication of effort would thus be avoided. Such stations also would tend to prevent the possibility or suspicion that the Foundation might come to dominate too greatly the scientific research of the nation. At the same time the Foundation would serve as a coordinating agency and would act in an advisory capacity to all the state research stations.

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Science—A Means to What End?

Suddenly—the "instinct" of self-preservation has invaded the field of physics. A physicist nowadays is like a small boy who has been playing baseball in the back yard of a friend and who has knocked a home run through the big window of the living room in the house of his friend's father. His triumph at baseball is suddenly confronted with another and quite different system of values, in terms of which his triumph is no more than a misdemeanor.

In the social, unlike the physical, sciences we have