allowed to stand overnight on a steam bath. In the surface horizon where the hydrous mica was dominant, the basal spacing was 13.6 A. The amount of hydrous mica decreased consistently with depth until it was barely present in the fresh parent material. To prove that this spacing is merely the hydrated form of mica and not chlorite or montmorillonite, as sometimes reported, the same clays were then similarly treated with 1 *N* KAc. In all cases, the 13.6 A spacing was contracted to 10 A. Fig. 1 is a diagrammatic representation of this weathering sequence.

An application of this criterion may be of interest to geomorphologists and soil scientists. Thorp *et al.* (*3*), Schultz *et al.* (*4*), and others are using ancient soils (called paleosols by Hunt and Sokoloff [*5*]) as evidence of periods of stability and weathering during the deposition of river alluvium and loess. Under certain conditions, a paleosol buried by later deposition may be recognized in the field by dark bands. A technique such as the one described here should prove useful in differentiating bands that are the result of pedogenic processes from bands that may be caused by stratigraphic sequences of materials of varying texture, color, or consolidation.

Studies of kaolinite development in soils indicate a similar trend. Weathering and base depletion are greatest at the surface, and this is the zone of greatest kaolinite formation. Kaolinite thus serves as a corroborative check on hydrous mica with respect to weathering.

Application of the weathering criterion to a large number of agricultural soils in the U. S. has been made, and a detailed study will be published in a forthcoming paper.

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Comments and Communications

Sympathetic Blocking β-haloalkylamines

In 1949 (*1*) we reported the synthesis of a quaternary derivative of dibenzyl-(β-chloroethyl)-amine with a very high adrenergic blocking activity. Of special physiological interest was the rapid onset of the block, which was complete within a few minutes after intravenous administration in animal experiments (*2*). Further investigations on the substance supposed to be dibenzyl-(β-chloroethyl)ethyl-ammoniumbromide revealed that it must have another structure. The doubt concerning the quaternary nature of the compound was expressed in a communication by F. Lund (*3*) in connection with the delivery of an investigational sample, and quite independent of the observations made by J. F. Kerwin *et al.* (*4–6*). These authors stated that the compound (which we have called "Q") is identical with the hydrobromide of dibenzyl-(β-bromoethyl)-amine, when it is mixed to a slight degree (8%) with the hydrobromide of the corresponding chloro compound.

Elementary analyses on Q showed that it was not the expected quaternary derivative. Attempts to determine ionogenic Br^- failed, as it was impossible to obtain reproducible results.

Infrared spectrograms were then made by the Nujol mull technique. These showed a strong absorption around 3.9 μ that was unquestionably due to an amino salt grouping. Such an absorption is not shown by quaternary ammonium salts. On the other hand, the infrared spectrogram of pure dibenzyl-(β-bromoethyl)-amine hydrobromide was not identical with that of our preparation Q in the region of 7–13 μ. The bromo compound has a very strong absorption at 11.12 μ that is not at all represented in the Q spectrum. Instead, our substance Q has a spectrum that very closely resembles that of dibenzyl-(β-chloroethyl)-amine hydrobromide. In the spectra of some preparations, however, the absorption of the bromo compound at 11.12 μ (899 cm^{-1}) is obvious. It seems reasonable, therefore, to assume that our Q compound is chiefly dibenzyl-β-chloroethylamine hydrobromide mixed with the hydrobromide of dibenzyl-β-bromoethylamine. After several recrystallizations from a series of solvents, the end product is the bromo compound, dibenzyl-(β-bromoethyl)-amine hydrobromide.

In our animal experiments, both this compound and the Q-substance display very high adrenergic blocking activities. The temperature of the solvent used in the animal experiments, however, has a great influence on the activity; hence, a separation on a physiological basis seems very difficult.

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The observations of Nyman, Plantin, and Ostlund on the reaction of dibenzyl-β-chloroethylamine with ethyl bromide are in substantial agreement with the results we reported, except with regard to the relative amounts of chloro and bromo compound in the mixture obtained from the reaction. Our mixture which, on the basis of analyses, we estimated to contain 92% of bromo compound absorbs at 11.12 μ (Nujol mull), as did some of the preparations of Nyman and co-workers. One recrystallization with a recovery of 86% gave a compound which possessed an infrared absorption spectrum identical with that of an authentic specimen of dibenzyl-β-bromoethylamine hydrobromide. Evidently Nyman, Plantin, and Ostlund found that the composition of their mixtures, as determined by absorption at 11.12 μ, varied from one preparation to another. It seems reasonable that the preponderance of chloro compound in one instance and of bromo compound in our mixture may be accounted for by a difference in the ratio of ethyl bromide to amine or in other reaction conditions.

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The National Science Foundation and the Scientific Manpower Problem

THE National Science Foundation has now passed into its second year of organized activity. Already its planning and functional accomplishments are evincing trends that are significant of its future course. What is this course in theory and in practice? Does it give promise of achieving its principal goal, which is the broadest possible development of the nation's scientific potential through the critical years ahead?

The foundation's early actions give rise to great hopes for its future—as an agency through which this scientific potential can be directed toward effective ends. Its early grants for basic research have been distributed over the nation on a more equitable population basis than has been the case with any other public or private granting agency. Its first year's fellowship awards show an active and intelligent effort to encourage development in scientifically backward areas of the nation. Certain distributional dangers and pitfalls need sharp re-emphasis, however, if the foundation's efforts are to result in maximal scientific progress in all areas of the nation.

Previous articles (*1, 2*) have dealt with the pitfalls of past distributional techniques, in which current research potential was given much more weight than the longer-term development of the nation's scientific manpower and research possibilities. Funds granted for research will naturally bring greatest immediate results when put to work in institutions best equipped in physical facilities and trained manpower to attack particular scientific problems. Even here there is dependence upon the second and larger aspect of the scientific problem, however, for those institutions best equipped to pursue basic research are already encountering a critical shortage of scientific manpower. All along the line—in industry, educational institutions, and elsewhere—this shortage is becoming steadily more acute.

It is now quite generally agreed that our best efforts must be focused upon the manpower problem and upon its maximal development in all areas of the nation and in all sections of the population. At best, only a small percentage of the total population will be inclined toward a scientific career and especially gifted individuals are as likely to exist in backward areas as in the most progressive. In order that latent talents be discovered early in life, it is necessary that exposure to science be widespread and adequate. Encouragement in the form of fellowships and other grants must be available, but this phase of assistance can come into play only after the gifted individual's interest in science has already been aroused.

The basic attack must thus stem from a broadened exposure (from high schools upward) to *living* science, which can be taught and demonstrated only by those teachers who have had intimate contact with—or participated in—research. Science lives and stimulates interest through research, which thus acquires unique importance to the nation.

Let us, then, analyze the NSF research grants and fellowship awards to June 30, 1952, to see how well it is accomplishing its stated objectives and whether it is falling into past distributional pitfalls. Since the Public Health Service has been the largest granting agency in recent years and has published a comprehensive review (*3*) of research grants by public and private agencies broken down on a geographic basis, we shall use its division of continental USA into seven major areas:

New England: Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, and Connecticut
Middle East: New York, New Jersey, Pennsylvania, Maryland, Delaware, District of Columbia, and West Virginia
Southeast: Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, Tennessee, and Kentucky
Southwest: Texas, Oklahoma, Arizona, and New Mexico
Central: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, and Missouri
Northwest: North Dakota, South Dakota, Nebraska, Kansas, Colorado, Wyoming, Montana, Idaho, and Utah
Far West: Washington, Oregon, California, and Nevada

Table 1 shows all NSF research and fellowship grants to June 30, 1952, classified on a regional basis. This breakdown does not include applications from, or grants to, those residing or attending colleges outside the continental United States. Two research grants to the National Academy of Sciences could not be classified by region of use and are not included.

Certain significant facts stand out sharply. The scientifically backward Southeast and Southwest are still faring most poorly under the NSF program, whereas the Northwest shows signs of stimulation (more fellowship applications and greater research