advanced types flourishing in inorganic media containing nitrates and ethyl-alcohol have been described by Hohl[4] and by Burri and Stutzer.[5]

Because a group has not been extensively studied is no proof that it is not common. It is sufficient that representative types have been described. The group may well be common and yet not well known. The diphtheroids, the aciduric bacilli, the cellulose fermenters, are quite common, but were not well known five to ten years ago.

The resemblance between the red and yellow bacilli and the red and yellow cocci is only a superficial one. They produce pigments of the same chrome, but the pigments produced by the two classes of bacteria are *not* of the same type. The pigments produced by the cocci belong to the lipochrome group, give the typical lipocyanin test and their production is not affected by temperature. The pigments produced by the red bacilli do not give the lipocyanin test and their production is markedly affected by temperature. There are in addition marked metabolic differences between these two groups of organisms. The *B. prodigiosus* and related bacilli are more actively fermentative and many produce gas—largely CO_2. They as a rule liquefy gelatin actively while the red cocci as a rule do not. The bacilli are facultative anaerobes, the cocci are almost strict aerobes.

The ability on the part of *B. aerogenes* to fix nitrogen was reported by Lohnis[6] who studied the behavior of a considerable number of bacteria in this respect.

In conclusion I grant that my thesis has not been proved. Neither has it been disproved. If it stimulates investigation along these lines the paper will have been justified.

I. J. Kligler

ORGANIC CHEMICALS FOR RESEARCH, OR THE NEED OF A PHILANTHROPIST

Professor Roger Adams has recently published in these columns[1] an account of the admirable work which the laboratory of organic chemistry at the University of Illinois is doing to keep up the supply of certain organic chemicals for research and industrial needs. However, when one compares the limited list which that laboratory is manufacturing with the lists in the catalogues of German chemical firms, the realization comes home that the rarer organic preparations are no longer available and probably will not be available as long as the war lasts, and that, unless some measure is taken to prevent such an occurrence, Germany will again regain her trade in this line after the war.

It is well enough to *say* that we will not use German-made goods, but there would appear to be only one alternative, *i. e.*, the cessation, or at least the slowing up of research in organic chemistry if these essential starting materials are not available, or if they are available at relatively enormous prices.

The question therefore arises in my mind: "Why can not some man of wealth make his name blessed by endowing a laboratory which shall prepare these rarer organic chemicals against the needs of research work?" Undoubtedly the German supply houses sold many of these products at a loss before the war, counting the loss as a necessary part of their advertising propaganda, which was meant to build up the idea that Germany was the great chemical center of the world. Our commercial firms, unfortunately, do not see things in that light, and usually refuse to follow paths where a sure and handsome profit does not lead them.

If some man of wealth can not be found to whom this suggestion would appeal, what is there to prevent one of our research foundations from supplying the need? How could research and discovery be better furthered in this particular field of science than by furnishing the essential basic materials to a host of research workers in our colleges and universities? If such a plan as is herein proposed were adopted the United States would without doubt secure and retain first rank in the field of organic research. The initial cost would be comparatively small as measured by the scientific results, for the in-

4 *Land Jahr. der Schweitz,* 1906, 510.

5 *Cent. f. Bakt.,* II. Abt., 1895, I., 257.

6 *Cent. f. Bakt.,* II. Abt., 1907, XIX., 87.

1 Science, 47, pp. 225–228, March 8, 1918.

vestigators' salaries would be borne by the colleges and universities and where now a research foundation is giving to scientific investigation the services of one man, the same sum would assist a score or more of investigators.

In my own laboratories approximately half of the time of the investigators' laboratory work must of necessity be devoted to the preparation of essential starting-materials, pure amino acids, proteins, organic compounds, etc., in order to later use these for investigational purposes. These compounds are not available on the market except at exorbitant prices, tyrosine, for example, being quoted at $5.00 a gram (when obtainable), a price utterly out of proportion with the cost of preparation.

When one considers the limited funds available for research apparatus and chemicals in our colleges and the excessive cost of these materials, it is not surprising that no more research work is done; the surprising thing is that so much is done. The chemistry budget for our smaller colleges is usually $350–$600 per year and will probably not exceed $3,000 in many of our larger institutions. From this sum is first purchased the necessary equipment of apparatus and chemicals for the undergraduate laboratory courses and *if any funds remain* research chemicals or apparatus are secured. Unfortunately in many instances no funds remain for research work, the instructor can not prepare the compounds needed, for his time is too largely taken up by teaching, with the result that his research aspirations slowly die, for they have no soil upon which to grow. The question may arise: "Why does not such a man prepare his basic materials even if his time is limited?" In the first place there is no glamor in such work. In the second place, there are often eight or ten synthetic steps from raw products to finished material, and the necessary chemicals and apparatus for certain of these steps are not available. The rarer chemicals of which I am thinking represent in themselves end products of research (already published) and many of our college laboratories are not equipped for these steps, although they may be equipped to use the final product as the starting material for another investigation. It may be that the production of an intermediate product depends on a distillation in a vacuum of 0.01 mm. and no high-vacuum pump is available, etc.

Such an endowed laboratory as I have in mind would be in charge of an organic research chemist and would prepare and keep in stock all sorts of organic compounds for research workers. If an investigator desired a certain compound he could obtain this without cost or for a nominal cost providing that he first convinced the director of the laboratory that there was an actual need for the compound and that it would be used in bona fide research work, acknowledgment of such a grant to be appropriately made in the published results. If, on the other hand, an industrial demand for the chemical should arise (such as that which did arise due to the depleted supplies of dimethylglyoxime after the war began), the laboratory should charge a fee at least large enough to cover the cost of preparation. This would prevent the possibility of exploitation and in any event it should be definitely specified that there should be no resale of the article in question and any supply remaining after the completion of the approved research should revert to the endowed laboratory.

The above plan is probably not perfect, but I feel that there is in it at least a suggestion worthy of the serious thought of our scientific men or scientific societies, and I only hope that in some manner it may bear fruit. We must not again be dependent upon Germany for our research needs and unless some such endowed laboratory is brought into existence I can see no other alternative.

ROSS AIKEN GORTNER
DIVISION OF AGRICULTURAL BIOCHEMISTRY,
UNIVERSITY OF MINNESOTA

SCIENTIFIC BOOKS

Electrical Measurements. By FRANK A. LAWS. New York, McGraw-Hill Book Company, Inc., 1917. xiii + 719 pp. Price $5.00.

During recent years, writers of laboratory manuals have exhibited a constantly increas-