of photography describes such factors as the speed, gamma, graininess and color sensitivity of the photographic plate, and typical formulas for developers, short-stops and fixing baths.

The chapter on specimen preparation deals mainly with those mounting media which are used when the image is obtained by transmitted illumination. A few typical formulas for staining solutions are presented. At the end of this chapter, a table of 14 pages describes various etching reagents for most of the common metals.

In the final chapter many typical problems of photomicrography and their solution are presented. This chapter contains over half of the 140 photomicrographs in the book. The use of several photomicrographs of the same field to show the effect of different variables is highly commendable. The pertinent information on the equipment, illumination, film, etc., used to obtain the picture, as well as a schematic diagram showing the position of the light sources, is given for most of the photomicrographs.

As the author himself indicates in his prefatory remarks, the book suffers by the omission of such subjects as polarized light, color photomicrography, ultraviolet, infrared and fluorescence microscopy and stereoscopic photomicrography. This will make the book less useful to the experienced microscopist. The author explains the omission as an attempt to avoid undue increase in the size of the book and indicates plans to add information on such subjects at a later date. It is the opinion of this reviewer, however, that portions of the present book might well have been omitted or shortened to make room for such discussion.

In summary, the book is highly recommended for beginners and teachers in the field of microscopy. The experienced worker will want to add it to his library if for no other reason than that it contains in one place a variety of information to which he will constantly refer. A new volume or a revised edition containing information on the less common phases of microscopy and written by such an able writer will be eagerly awaited by all in the field.

W. G. KINSINGER

HERCULES POWDER COMPANY

REPORTS

RESEARCH BOARD FOR NATIONAL SECURITY

THE recently announced Research Board for National Security is the result of recommendations made by a special committee on post-war research appointed by the Secretary of War and the Secretary of the Navy under the chairmanship of Mr. C. E. Wilson and composed of high-ranking representatives of the Army and Navy together with Dr. F. B. Jewett, Dr. H. C. Hunsaker, Dr. Merrill A. Tuve and Dr. Karl T. Compton. This committee recommended the establishment of a joint Army, Navy, civilian board directed to organize and administer a forward-looking program of research in scientific matters pertinent to national security.

It was recommended that this board be composed of ten Army officers of general rank and ten Naval officers of flag rank, and twenty civilians chosen from the fields of science, engineering and industry. This large board is expected to determine general policies and to insure appropriate attention to the wide field of interests of the Armed Services and other possibilities in all pertinent scientific fields. Within the large board there is an executive committee of three civilians plus an Army officer and a Naval officer, each of whom has responsibilities for coordination of research in the respective services.

This board will be concerned with the advancement of science and the development of techniques in those directions which may have profound influence on the conduct of future warfare. It is specifically not intended that this board should participate in the improvement of existing weapons or in other developments which are the function of the various research and development laboratories operating under the War and Navy Departments. It is expected, of course, that there will be ranges of overlap in the period in which a new idea passes out of the research stage through the development stage and into production, and in such cases there will be cooperation in which the Research Board for National Security tapers off its connection with the project as the appropriate branch of the Armed Services takes it on for the final development of a military weapon.

In accordance with the recommendation of the Wilson Committee the Research Board for National Security has been appointed by the president of the National Academy of Sciences at the request of the Secretary of War and the Secretary of the Navy, and the military members of the board have been nominated by these secretaries. The Wilson Committee also recommended attention by Congress to the ultimate establishment of the Research Board for National Security as an independent agency of government, and this question has been before the Select Committee of the House on Post-War Military Policy headed by Judge Woodrum. Pending the decisions regarding permanent organization, the Research Board for National Security will continue as a special agency of the National Academy of Sciences but will operate in such manner that it can be transferred with a mini-

mum of lost motion to any other administrative set-up if this be the decision of Congress.

A great advantage of operation under the National Academy of Sciences is the immediate availability of the enormous resources and contacts of the National Research Council and the support which is inherent in the prestige which the academy and the council have achieved among scientific men and governmental agencies. The Research Board for National Security will plan to utilize the resources of the academy and the Research Council to the fullest possible extent. Another advantage of operating under the National Academy of Sciences is the flexibility inherent in the Congressional Charter of the academy, which provides, ". . . the Academy shall, whenever called upon by any department of the government, investigate, examine, experiment and report upon any subject of science or art, the actual expense of such investigations, examinations, experiments, and reports to be paid from appropriations which may be made for the purpose, but the Academy shall receive no compensation whatever for any services to the government of the United States."

In continuing its operations it is probable that the Research Board for National Security will follow substantially the pattern which has been established by the Office of Scientific Research and Development during this war. This pattern has been developed through the aggregate constructive thinking of civilian scientists, Army and Navy officers and government officials with a fine degree of cooperation and understanding in high quarters. It will serve as the best possible starting point for the new post-war organization.

In conclusion a word should be said regarding the relationship between the Research Board for National Security and the Office of Scientific Research and Development during the balance of this war. The Office of Scientific Research and Development is an emergency wartime organization which will be disbanded as soon as its affairs can be terminated after this war. It is devoted solely to scientific developments which show reasonable promise of usefulness in this war. Every one concerned has agreed that the Research Board for National Security shall not, during this war, engage in activities which are the proper function of the Office of Scientific Research and Development or which will in any way detract from the activities of the Office of Scientific Research and Development or any other war agency through competition for the services of personnel or for research facilities which are needed for the prosecution of the war. The Research Board for National Security is definitely a post-war and long-range agency. In order, however, that it may be prepared with some experience to take over from the Office of Scientific Research and Development any important research projects of continuing long-range importance at the time when the Office of Scientific Research and Development is ready to terminate its activities, it is likely that a few non-competitive long-range research contracts will be entered into in the near future so that the Research Board for National Security may be an actual going concern when the time comes for it to become active on a substantial scale.

All evidence to date indicates that this post-war project has hearty endorsement by leaders in government, in the Armed Services and among civilian scientists and engineers. It should be one of the significant factors in maintaining that degree of future preparedness which will help to insure this country against attack and which would equip it to conduct a future war with a maximum degree of effectiveness and a minimum loss of life and of economic cost in case, unhappily, another war is forced upon it. For these reasons the continued support of this enterprise by the public and the wholehearted cooperation of the Armed Services, the civilian scientists and the industrial and academic laboratories is confidently anticipated.

The membership of the Research Board for National Security as initiated constitute the following:

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KARL T. COMPTON,
Chairman of the Executive Committee

SPECIAL ARTICLES

ORAL PENICILLIN[1]

As a result of Libby's demonstration[2] that appreciable concentrations of penicillin in the serum of dogs and man may be attained following the oral administration of suspensions of penicillin in oil, we have investigated the administration of penicillin by the oral route by four methods. On successive days a series of normal subjects ingested (*a*) penicillin in corn oil, (*b*) penicillin in water, (*c*) penicillin in water preceded by a buffer, and (*d*) penicillin in peanut oil and 4 per cent. beeswax. The penicillin was dissolved in 30 cc of water. Magnesium trisilicate was the buffering agent used. A 4-gram dose was administered every hour for 3 hours before the ingestion of the penicillin. It has been shown[3] that the dosage will raise the pH of the gastric content to approximately pH 8. All subjects were kept in a fasting state throughout the period of observation. Three doses of penicillin, 315,000, 100,000 and 50,000 units, were studied. The bioassays of penicillin were performed by the Rammelkamp method.[4]

Serum concentrations of penicillin which were attained following the ingestion of 315,000 units of penicillin by the four methods described above may be seen in Fig. 1. Penicillin concentrations attained following the intramuscular injection of 300,000 units

[1] The work described in this paper was done under a contract, recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and Cornell University Medical College.

[2] R. L. Libby, SCIENCE, 101: 178, 1945.

[3] W. N. Mann, *Guy's Hospital Reports*, 87: 151, 1937.

[4] C. H. Rammelkamp, *Proc. Soc. Exp. Biol. and Med.*, 51: 95, 1942.