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RESEARCH AND THERAPEUTICS[1]

By Dr. AUSTIN E. SMITH

SECRETARY, COUNCIL ON PHARMACY AND CHEMISTRY, AMERICAN MEDICAL ASSOCIATION

DURING the year 1942 nearly one tenth of the entire population became a hospital bed patient. One person entered a hospital in the United States as a patient every two and a half seconds. Surgical operations were performed at a rate of one to each 5.6 seconds and the hospital birth rate exceeded three live babies to the minute.

This represents only a part of the total illness in this country and is, of course, only a fraction of the illness prevalent throughout the world. By the time the war is over such figures when compared to world-wide statistics will be infinitesimal. At the recent National Conference on Planning for War and Post-war Medical Services a number of papers were presented to show post-war medical needs. Obviously the papers could not be specific in details as exact estimates for post-war needs are impossible to determine at this time, but they did give an indication of the future enormous requirements from the drug manufacturers. Will the demands be met entirely by current drugs or will there be available a host of new agents? With American medicine encountering diseases alien to these shores through participation in world-wide health problems and the return of infected troops, new and more effective agents will have to be provided.

At present the drug-manufacturing industry is faced with many problems—two major ones are increasing reductions of certain basic materials and increasing demands for Lend-Lease, armed forces and civilian use. The probable needs in the early post-war period stagger the imagination. As each manufacturer will have to give careful thought to the optimal use of his supplies, there is afforded a good opportu-

[1] Read before the 1943 Annual Convention of the American Drug Manufacturers Association, Chicago, May 3, 1943.

anti-Rh sera. Thus, it is now possible to anticipate the behavior of a post-transfusion anti-Rh serum if the Rh subtype of the donor is known, while the quality of the anti-Rh agglutinins in sera from mothers of erythroblastotic babies may be predicted by tests on the blood of the husband or infant.[17] On the other hand, the uniformity in specificity of the guinea-pig antisera is most likely due to the corresponding uniformity of the Rh-like antigens in the red cells of different rhesus monkeys.

ALEXANDER S. WIENER

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE DEMONSTRATION OF THE PROTOZOAN PARASITE OF QUAIL MALARIA BY FLUORESCENCE MICROSCOPY

THE favorable results which have been obtained in development of diagnostic methods for detecting acid-fast bacteria by fluorescence[1] (Hagemann and others) and the results obtained by Bock and Oesterlin[2] in their studies of the action of anti-malarial drugs have suggested the potential value of this method for the diagnosis of malarial infections from blood smears. Subsequent work by the authors has demonstrated that the human parasite, *Plasmodium vivax*,[3] and the organisms of bird malaria, *P. nucleophilum*,[4] and *Haemoproteus* sp.[5] (from California Valley quail) can be stained in a satisfactory manner with fluorescent dyes.

Due to the large size of the parasite and the supply of the *Haemoproteus*, the bulk of the work in these laboratories has been done with this organism.

During the course of investigation positive staining reactions were observed with six fluorochromes. These were applied from saturated aqueous solutions to smears fixed in methyl alcohol as for Giemsa staining. The staining time is from two to five minutes. Alcoholic solutions can be substituted if the smears tend to wash off the slides with the aqueous stain. The six stains and their effectiveness in differentiating *Haemoproteus* are listed in Table 1.

TABLE 1

Stain	Nuclear color	Parasite color	Leucocyte color	Staining intensity
Beberine sulfate	Bright yellow	Golden	Yellow	+++
*Rivanol	Yellow green	Yellow green	Bright yellow	+++
Primulin	Blue	Blue white	Yellow	+++
Coriphosphine 0	Orange	Orange	Bright orange	++
Thioflavin	Yellow	Yellow	Yellow	++
Auramine 0	Yellow	Blue-white	Bright yellow	+

* 2-Ethoxy-6, 9-diamino acridine lactate.

Altering the pH of the staining medium with phosphate buffers showed a very slight increase in staining intensity in the alkaline region.

The apparatus necessary for fluorescence investigations of this nature is relatively simple. The principal innovation in equipment from ordinary microscopy is the use of a G.E. type H-4 high pressure mercury vapor lamp as the light source and a Corning filter No. 5840 which transmits the light between wavelengths of 310 mμ to 394 mμ. Ultraviolet light in this region is invisible but excites fluorescence in the fluorochromes.

The advantages of this technique if developed for the diagnosis of human malaria are many. The staining process is short, simple and reliable; the parasites, if present, stand out brilliantly as brightly fluorescent objects against a dark field; *Haemoproteus* of bird malaria and the *Plasmodia* of human malaria are readily discernible with dry lenses at magnifications not in excess of 200 ×; and the factor of eyestrain is greatly reduced.

Circumstances do not permit the full development of these techniques as applied to malarial diagnosis in this laboratory. All the results thus far obtained indicate that the method offers great possibilities in enhancing both the speed and accuracy of malarial diagnosis from blood smears. It also offers an interesting technique for the study of anti-malarial drugs (many of which are fluorescent) and their action upon the parasites.

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[17] A. S. Wiener, *Amer. Jour. Clin. Path.*, in press.

[1] P. K. H. Hagemann, *Munch. Med. Wschr.*, 85: 1066, 1938.

[2] E. Bock and M. Oesterlin, *Zbl. Bakt.*, 143: 306, 1939.

[3] Furnished by Dr. Martin D. Young and Dr. Mark F. Boyd, U. S. Public Health Service and Rockefeller Foundation, respectively.

[4] Furnished by Dr. R. D. Manwell, Syracuse University.

[5] Furnished by Dr. C. M. Herman, Division of Fish and Game, State of California.

[6] Now with the Tennessee Valley Authority, Wilson Dam, Alabama.

BOOKS RECEIVED

BILLS, ARTHUR GILBERT. *The Psychology of Efficiency.* Illustrated. Pp. xiv + 361. Harper & Brothers. $2.75.

SHAPIRO, HARRY. *Applied Anatomy of the Head and Neck.* Illustrated. Pp. xiv + 189. J. B. Lippincott Co. $5.50.

THOMPSON, W. H. and M. L. AIKEN. *1000 Preflight Problems.* Illustrated. Pp. xiv + 160. Harper and Brothers. $0.88, paper-bound; $1.20, cloth-bound.