I think the name *Plasmodium vivax* (Grassi and Feletti, 1890) for the tertian parasite is perfectly right. But I don't suppose it is justifiable to call the quartan malaria parasite *Plasmodium malariae* (Feletti and Grassi, 1889, 1890). It should be a very dangerous and confusing procedure for the application of the Law of Priority to include references to more than a single dated work for a name; either their 1889 preliminary communication is the correct basis for the name, and reference to the 1890 paper must be dropped, or *vice versa*. Moreover, it seems to me that Feletti and Grassi did not clearly differentiate tertian from quartan parasites on any or both contributions. It is better to accept as the first clearly limited distinction of the quartan parasite that proposed in 1890 by Grassi and Feletti as *Haemamoeba malariae*, and call the organism accordingly *Plasmodium malariae* (Grassi and Feletti, 1890).

In regard to the parasite of malignant tertian malaria, the name proposed by Sabrosky and Usinger is *Plasmodium falciparum* Welch (1897). This form, the same employed by the Malaria Commission of the League of Nations,[3] is clearly incorrect, because Welch called this parasite *Hematozoon falciparum*, and being later transferred to the genus *Plasmodium*, the original author's name must be written in parenthesis.

Coatney and Young,[4] in a very illuminating discussion of the taxonomy of human malaria parasites, propounded the same designations here supported as the proper *de facto* names to be used.

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THE GENERIC NAME OF THE SAND FLY

THE attention of the executive committee of the International Commission has been drawn to the communications regarding the generic name of the sand fly by Dr. William F. Rapp, Jr., which appeared in the issues of SCIENCE for April 28 and August 11, last, and by Dr. Charles T. Brues in the issue for May 26, last.

The proposed abandonment of the emended spelling *Phlebotomus* Agassiz, 1842, in favor of the original spelling *Flebotomus* used by Rondani when he first published this name in 1840, affects not only workers in systematic zoology but also—and perhaps especially—workers in the medical field in view of the enormous literature regarding the role played by this fly in the spread of disease. It is clearly of great importance that, in order to prevent confusion from arising, the correct spelling of this generic name should be settled as soon as possible. In view of the fact that the issue involved turns upon the interpretation of Article 19 of the International Code of Zoological Nomenclature, it appears to the executive committee that this is a matter which should be referred for decision to the International Commission on Zoological Nomenclature, as the authority officially charged with the duty of interpreting the application of the International Code in cases of difficulty. Communications in regard to this matter should be addressed to the International Commission on Zoological Nomenclature at their Publications Office, 41, Queen's Gate, London, S.W.7.

FRANCIS HEMMING,
Secretary, International Commission Zoological Nomenclature

SCIENTIFIC BOOKS

SPECTROSCOPY

Experimental Spectroscopy. By RALPH A. SAWYER. viii + 323 pp. 107 figs. 16 × 23½ cm. New York: Prentice-Hall, Inc. 1944. $3.75.

THE author states in the preface that "The purpose of this book is to discuss prism and grating spectrographs and the techniques of their use in research. It is designed for students of spectroscopy and for those in research laboratories who wish to make use of spectroscopic procedures. For this reason, extensive mathematical treatments have been avoided; a background of general physics and some physical optics should be sufficient for an understanding of the presentation."

Successive chapters and pages of the book deal with (1) "The History of Spectroscopy," 1–17; (2) "Light Sources," 18–27; (3) "Spectroscopic Apparatus—General Principles," 28–46; (4) "Prism Spectroscopes and Spectrographs: Theory and Construction," 47–83; (5) "Prism Spectroscopes and Spectrographs: Types and Use," 84–120; (6) "The Diffraction Grating: Theory and Production," 121–144; (7) "The Diffraction Grating: Mountings and Use," 145–182; (8) "The Photographic Process," 183–204; (9) "The Determination of Wavelength," 205–243; (10) "The Determination of Spectral Intensity," 244–276; (11) "Apparatus and Methods of Infrared Spectroscopy," 277–287; (12) "The Spectroscopy of the Vacuum Ultraviolet," 288–295; (13) "Spectrochemical Analysis," 296–310.

The need for a book of this kind has been growing for two decades during which extraordinary develop-

[3] Comité rapporteur de la Commission du paludisme, *Bull. Org. d'Hyg.*, 9: 139–262, 1940.
[4] G. R. Coatney and M. D. Young, *Publication No. 15 of the A. A. A. S.*, pp. 19–24, 1941.

ments (structural analyses of spectra, Raman effect, quantitative spectrochemical analysis, etc.) in pure and applied spectroscopy greatly increased the number of spectrographs and spectrographers. In recent years a considerable number of new and improved types of commercial spectrographs has become available, especially for spectrochemical analysis, which now engages many hundreds of instruments and possibly thousands of workers, but the information needed for critically adjusting, testing and operating such instruments has been scarce and scattered. In "Experimental Spectroscopy" the general principles of spectroscopic apparatus, the theory and performance of prisms and gratings are adequately presented, commercial spectrographs and auxiliary apparatus (light sources, microphotometers, comparators, etc.) are portrayed, and photographic procedures for recording spectra, measuring wavelengths and relative intensities are discussed in extensive practical detail.

For a first edition this book appears to be remarkably free from errors. A few misstatements such as (p. 19) "At ordinarily attainable temperatures, hot solids are most useful as sources in the visible and near-infrared regions, since their spectra reach their maximum in the near-infrared and fall off rather rapidly on the red side and more gradually toward the violet," and (p. 277) "500 μ (500,000A)" may be explained as inadvertences.

Four schematic diagrams, Figs. 17, 34, 54, 100, may be criticized as being unnecessarily inaccurate, or violating fundamental principles of optics, but one of these is by "Courtesy of Adam Hilger, Ltd."

Never before have so many directions, instructions and suggestions for adjusting, testing and using spectrographs been collected in one volume. Still it is incomplete in this respect. For example, no warning is given to avoid double exposures, or wasting exposures on the shutter or dark-slide, and no mention is made of attempts to prevent such accidents by automatic devices on certain commercial instruments. Again, photographic plate processing is discussed in minute detail but the ruby-lamp-reflection test, or tongue test in total darkness, to avoid loading plates upside down, are not mentioned. The importance of avoiding dust and mars on photographic plates is stressed, but specific instructions to wipe plates on the operator's shirt sleeve and handle plates *only by their edges* are omitted.

"References have been made to original sources, and chapter bibliographies have been given of some of the more useful and accessible works on each subject." Many more of these would be welcome. In the "History of Spectroscopy" (p. 16), the growing interest in chemical analysis by emission spectra is illustrated by tabulating the annual output of papers listed in the "Index to the Literature on Spectrochemical Analysis, 1920–1937." This presentation would have been more effective if the 2nd edition of this Index (1941) had been quoted instead of the first. This index is not referred to in Chapter 13 on "Spectrochemical Analysis."

Preliminary interferometric measurements on iron lines in the regions 7164A to 10216A are mentioned on p. 207, but no reference is given. On p. 210 computed values of the refractivity of dry air are quoted without credit (Trans. Int. Astr. Union 6, 87; 1938) or references, and the false impression is given that four laboratories have observed the dispersion of air for wavelengths from 2000A to 10000A.

In the opinion of this reviewer any defects or deficiencies that this first edition of "Experimental Spectroscopy" may exhibit are largely compensated by such sage counsel as the following: on page 101, "It is always well to be suspicious of test plates submitted for a spectrograph if they have been made by light exposures on extremely high-contrast plates," and on page 298, "It must be borne in mind that the absence of the detection lines of an element indicates merely that the element is not present in sufficient amount to be detected with the source and equipment used."

As a guide for the intelligent selection of spectrographic apparatus and for its best use in research and testing this book has no equal.

Infrared Spectroscopy. Industrial Applications and Bibliography. By R. BOWLING BARNES, ROBERT C. GORE, URNER LIDDEL and VAN ZANDT WILLIAMS. v + 236 pp. 11 figs. 15½ × 23½ cm. New York: Reinhold Publishing Corporation. 1944. $2.25.

IN a brief preface the authors state that "This work is presented as a partial answer to the increasing demand for information concerning the industrial applications of infrared spectroscopy. It is not claimed that this material represents a complete survey of the field or its literature or the ultimate in infrared techniques. Rather, the applications and the results discussed are based entirely on work done in this laboratory in order that a unified picture of a typical infrared research program could be available to those who may be interested." Successive sections and pages deal with "Infrared Spectroscopy," 1–42, "Library of Reference Curves," 43–113, "Bibliography," 114–236. All this material, except the bibliography, was published previously by three of the authors in *Industrial and Engineering Chemistry (Analytical Edition)*, 15: 659–709, 1943.

Figure 1, Graph of the Electromagnetic Spectrum, was correctly printed the first time, but in the second

printing one decimal point was misplaced. Both printings show 350,000A (350 μ), and $1cm^{-1} = 1/\lambda_{(cm)}$. Obviously the first is in error by a factor of 10, and the second is true only when $\lambda = 1cm$. These errors are much too trivial to damage the book; they are cited only as warnings to proofreaders.

The theory of infrared absorption and its relation to molecular structure are discussed to provide the background essential for detailed descriptions of techniques useful in analysis. A description of a spectrometer is followed by transmission curves for 363 organic compounds including hydrocarbons, alcohols, ethers, carbonyl compounds, nitrogen compounds, terpenes, organic chlorides and miscellaneous. These curves represent absorption spectra between 2,000 and 750 cm^{-1}; they may be used for studying correlations between molecular structure and spectral characteristics, for identification of unknown materials, and for determining in advance the possibilities of qualitative and quantitative infrared analysis of mixtures.

The bibliography, presumably contributed largely by the second-named author, probably represents the chief justification for the printing of this book. It contains 2,701 entries, and even though it is incomplete it is incomparable because it is the first large collection of titles associated with infrared, so far as this reviewer knows.

In the relatively new field of industrial applications of infrared spectroscopy this book will have a triple appeal, first as an outstanding example of success in a certain industry, second as a valuable catalogue of the absorption spectra of organic compounds, and third, as a source of published information of general and specific interest.

WILLIAM F. MEGGERS

SPECIAL ARTICLES

EXPERIMENTAL AND CLINICAL OBSERVATIONS ON INCREASED MECHANICAL FRAGILITY OF ERYTHROCYTES[1,2]

INTRODUCTION

SINCE the work of Meltzer and Welch[3] and of Rous and Turner[4] the liability of red blood cells to physical destruction by the motion of the circulation has received little attention. Recently, however, Dameshek and Miller,[5] Stats[6] and Tsai and associates[7,8] have observed increased mechanical fragility of agglutinated red blood cells. Shen, Ham and Fleming[9] noted the increased mechanical fragility of the red blood cells of previously heated blood. The present report is a preliminary account of a quantitative method for determining the mechanical fragility of erythrocytes, of some experimental factors affecting this property and of its relation to certain hemolytic anemias.

METHOD

The percentage volumes of red blood cells (hematocrits) of samples of defibrinated blood to be compared (including a normal control) were adjusted to approximately 40 per cent., if necessary, by removal or addition of serum. Seven cubic centimeters of each sample of blood to be tested were introduced into individual cylindrical 150 cc soft glass tonometers (permitting equilibration of the blood with gas mixtures), the length of the parallel portions of the sides of which was about 130 mm, the diameter about 28 mm. To each tonometer were added 50 glass beads uniformly 4 mm in diameter. The tonometers were then attached at each end to clips on the periphery of two wheels approximately 150 mm in diameter. These wheels were fixed at an appropriate distance apart on a horizontal axle which was rotated at 28 to 30 r. p. m., usually for 2 hours at room temperature.[10] Before rotation, an accurately measured 0.1 cc sample of blood (designated as sample *C*) was introduced into a test tube containing 1 cc of distilled water (complete osmotic lysis). At the start and at the termination of the period of rotation, additional 0.1 cc samples of the blood (samples *A* and *B*) were delivered into test tubes containing 1 cc of a 1.25 per cent. solution of

[1] From the Thorndike Memorial Laboratory, Second and Fourth Medical Services (Harvard), Boston City Hospital, and the Department of Medicine, Harvard Medical School, Boston, Mass.

[2] This investigation was aided by a grant from the John and Mary R. Markle Foundation.

[3] S. J. Meltzer and W. H. Welch, *Jour. Physiol.*, 5: 255–260, 1884.

[4] P. Rous and J. R. Turner, *Jour. Exp. Med.*, 23: 219–237, 1916.

[5] W. Dameshek and E. B. Miller, *Arch. Int. Med.*, 72: 1–17, 1943.

[6] D. Stats, *Proc. Soc. Exp. Biol. and Med.*, 54: 305–306, 1943.

[7] J. S. Lee, Y. C. Puh and C. Tsai, *Proc. Chinese Physiol. Soc., Chengtu Branch*, 2: 59–61, 1944.

[8] Y. C. Puh, J. S. Lee and C. Tsai, *Proc. Chinese Physiol. Soc., Chengtu Branch*, 2: 61–63, 1944.

[9] S. C. Shen, T. H. Ham and E. M. Fleming, *New Eng. Jour. Med.*, 229: 701–713, 1943.

[10] Recently, 50 cc rubber stoppered Erlenmeyer flasks, each containing 10 beads and 0.5 cc of oxalated blood, were found satisfactory when attached so that the beads rolled in the greatest internal circumference of the flasks.