a shabby kind of trick. Nevertheless, he hopes that certain cognitive emotions can open the gateway to the realm of objective values, but he admits that he is not very sanguine about the prospects of such an endeavor. The European scholar, familiar with the shortcomings of Meinong and Scheler, is likely to share his skepticism rather than his hopes.

ERNST TOPITSCH
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Analytical Pathology. Treatises in the perspective of biology, chemistry, and physics. Robert C. Mellors, Ed. McGraw-Hill, New York, 1957. 477 pp. Illus. $12.

Contrary to what might be suggested by the title, *Analytical Pathology* is not a procedural manual. Rather, it is a collection of separate monographs by well qualified investigators, each of whom has made notable contributions to his subject. In his preface, Eugene Opie, preaching from what he has practiced long and well, states, "The clinician and the pathologist must in very large part borrow from the physicist, the chemist, and the physiologist the methods that can be hopefully used to solve their problems." It is this approach, championed by Virchow, but forgotten by some of his followers, that the editor has called "analytical pathology." Three of the seven major subjects have been covered by five men who do not hold appointments in pathology, but they are nevertheless students of pathology to the extent to which they are investigators of the mechanisms of disease.

Many other topics might have been chosen, but all that are included are indeed ripe for critical appraisal. This they have received in varying degree. The many-sided approach is well exemplified, as is to be expected, in Robert Mellor's own massive review of cancer. The consideration is of relevant work from ancient, as well as from the most recent, sources. Gofman's chapter on "Arteriosclerosis and hypertension" is largely a discussion of his own study of lipoproteins and the relationship that he considers it to bear on the pathogenesis of arteriosclerosis. "Hypertension" is a gratuity in the title and receives practically no attention. Jones' interesting section on "Inflammatory and vascular disease of the glomerulus" likewise is based largely on a single, although excellent, technique. Both writers are at pains to defend their own concepts and to demolish others. Neither of their chapters has the scope of a general review, but each possesses the merit of an extensive personal exploration of difficult terrain.

Ratnoff's contribution on hepatic failure is a consideration of the disturbed chemistry and physiology of cholemia, ascites, and hemorrhagic phenomena. This chapter is notable not only for its wide and judicious coverage but also for its excellent literary style.

Agnes Burt Russfield's summary of the "Adenohypophysis" is as outstanding for today as was Severinghaus' article in *Physiological Reviews* of 1937. There are doubtless some who would disagree with some details of her presentation—for example, with the statement that "castration cells" do not exist in man.

Mueller and Vilter have contributed a valuable survey of the macrocytic anemias, and their associate, Will, an equally timely consideration of abnormal hemoglobins. Wagner's account of hypersensitivity is directed specifically to the role of the connective tissue. The knowledge of the chemistry of this tissue is well summarized. Many will take exception to this writer's statement that the cellular production of antibodies is intimately associated with the lymphoid elements. His use of the term *lupus erythematosus "disseminata"* leaves something to be desired on grammatical grounds. There is a critical summary of recent important work, including Wagner's, on the nature of "fibrinoid."

However one might view the title, this volume will serve to inform and to stimulate all workers in the biological and allied sciences as applied to man.

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Route-Mapping and Position-Locating in Unexplored Regions. Wilhelm Filchner, Erich Przybyllok, and Toni Hagen. Academic Press, New York; Birkhäuser, Basel, Switzerland, 1957. 288 pp. Illus. $9.

Exploration by camel caravan in Tibet and western China is the primary subject of this book. The title may mislead some, since in the United States the term *route-surveying* means surveys of proposed routes of communication (highways, railroads, pipelines, power lines), whereas Filchner uses the term in its European sense of reconnaissance surveys made along the traveler's route. Filchner's references to route-planning are strictly a matter of the planning of *his* route.

It is important to realize that, although the total number of persons who have ever engaged in route-mapping is small, yet such surveys underlie the maps of most of the land area of the globe, including most of Canada, Central and South America, Siberia, central Asia, central Australia, and much of Africa. Anyone who wishes to use maps at any scale larger than a school atlas is immediately confronted with the question of their reliability. This in turn is a very complex question, answerable only in terms of the method used. From this comes the significance of the present work.

The book is in three unequal parts, bound together, consecutively paged, but with separate numbering for the chapters in each part. The first, longest (166 pages), and most important is by Filchner, one of the two or three most important explorers of central Asia. Filchner conducted four expeditions to central Asia between 1900 and 1941, and one to Antarctica. The second section, by Przybyllok (80 pages), covers the standard methods of spherical astronomy and the use of the theodolite. The third section (30 pages), by Hagen, is concerned with the application of photogrammetric methods to aerial reconnaissance surveys. It also follows more or less conventional lines; it is interesting as showing that the techniques of route-surveying are probably no longer needed, since most of the purposes can be met by photomosaics, controlled and uncontrolled.

Filchner's section, which is the meat of the book, emphasizes strongly the most important part of all ground surveys—namely, the problems of staying alive and moving about, of pack animals, food, tents, clothing, and relations with the natives as well as the techniques of field surveying. Few books of travel give as close and intimate a picture of the caravan, its animals roped nose to tail with woolen ropes, packs fastened to boards with holes cut for the humps, a layer of felt under the pack to prevent chafing, leather guards on the feet of some of the camels to prevent scuffing, a leader who must walk, not ride, and even the procedure for collecting camel's dung for fuel.

Filchner's mapping procedures contain some surprises for those accustomed to topographic surveys. The emphasis is on the compass and the watch as the fundamental tools—the compass for direction and the watch, in combination with estimates of speed, for distance. It should be pointed out, of course, that Filchner makes every effort to correct the survey so obtained by frequent astronomical fixes, and by taking bearings as often as possible to mountain peaks; but the backbone of the survey is still compass and watch.

A second important point is that the end-result of the survey is a logbook rather than a plane-table sheet. In the logbook are recorded all times and directions, sketches, and small sketch maps. The final map must therefore be built up from the logbook. Obviously, this means that in the final map there will

be an enormous difference in accuracy between points along the route and points even a mile or so off it, not to mention points 10 or 20 miles away. This fact must be constantly kept in mind by the compiler as he struggles to reconcile various surveys into a map.

The problems of chronometric longitudes are not much discussed in this book, which takes the point of view of the 1930's, when radio time signals became available. In some ways, this is unfortunate, since the most serious errors in the older surveys are often those in longitude, owing to the lack of accurate time.

The style of the book is lively, though marred by occasional Teutonisms. A theoretical example of carrying a survey across a wide expanse of marshy country suddenly develops into a galloping narrative as the reeds catch fire, the camels panic, and the whole caravan stampedes. The problem is intended to illustrate, and does illustrate, the extremely uneven nature of the problem and the resourcefulness required.

This book is recommended for those who must either make or use maps of areas where there is no topographic survey, and especially for those whose interest is in central Asia.

JOHN A. O'KEEFE
Army Map Service

Optics. The science of vision. Vasco Ronchi. Translated from the Italian and revised by Edward Rosen. New York University Press, New York, 1957. 360 pp. Illus. $10.

Vasco Ronchi, well-known among astronomers, amateur telescope makers, and those who must test optical devices for his grating test, announced in 1925, is director of the National Institute of Optics in Arcetri, Italy, a suburb of Florence. Much excellent optical research has been published from this center of Italian optics, and the workers at the institute enjoy a well-deserved reputation for scientific competence.

As the term is universally used today, *optics* embraces all but a very few phenomena associated with radiation, and such a discipline would exist without eyes to see. The term is a convenient carryall when the common characteristics of radiation phenomena are in question.

In this discursive, polemical book Ronchi proposes to limit the term to those aspects in which the eye—and the eye of sentient, sensing man only—is involved. This regressive step is made in all seriousness, and those limited parts of optics in which the eye is involved are carefully, logically, and clearly, though largely nonmathematically, explained and developed from a few principles. Ronchi characterizes the optics which to him constitutes the heart of the subject as "anthropomorphic optics," the same field that was understood until the 17th century to be all of optics.

Ronchi develops this viewpoint with great skill, but he inevitably produces a false impression of the richness of the discipline he is discussing. It is very doubtful that any idea of this fullness can be conveyed without detailed physical, physiological, and psychological explanations. For these there is no room in the book, and no hint that the old saw "the eye receives light, but the mind sees," has a profounder meaning than that exemplified in the "effigies," the mental constructs from sense data defined on page 70, and in the examples Ronchi discusses.

The position adopted by the author leads to some surprising conclusions, of which the most startling is in the following statement, taken from page 288: "The virtual image is purely a mathematical fiction. It may be useful as an intermediate solution in the study of complex optical systems. . . ." This is indeed unsound doctrine, unsupportable by any argument known to me, and refuted every time a man shaves the man in the mirror (virtual man, beard, and razor), or a woman powders the nose of the virtual woman with a virtual puff loaded with virtual powder, or an ametrope puts on his spectacles.

The book is well printed and bound, and the errors that I caught are relatively few in number. The translation is smoothly done, no traces of the original Italian remaining, unless it be in the unusual term *centric,* used for Airy disk, or *effigy,* the mental construct alluded to in a preceding paragraph. Lines 9, 10, 11 on page 231 seem to be an incomplete sentence; the figure illustrating astigmatism, on page 268, is unclear and misleading; and Fig. 20, on page 78, is inverted: the trochlear pulley is actually above the globe of the eye.

It is difficult to identify the intended reading public. As a textbook or a reference work, the book is limited in scope, and the controversial features would mislead the casual reader whose knowledge of physics or optics is an insufficient guide to the good that is in the book. The lack of any bibliographic references whatever makes impossible the verification of questioned statements and seriously impairs the value of the book. Nevertheless, I found it interesting reading.

The book falls into two parts. The first, of six chapters, constitutes approximately three-quarters of the volume and deals with the history of optics, elementary physiology of seeing, and the arguments centering around "anthropomorphic optics." The second part deals with wave motion. This section is notable for the clear physical arguments the author advances for the elementary wave phenomena he discusses. Very little mathematics is required to understand the arguments, though trigonometry and differential calculus are sparingly used.

ALLEN E. MURRAY
Bausch & Lomb Optical Company

Lectures on Rock Magnetism. Being the second Weizmann Memorial lectures, December 1954. P. M. S. Blackett. Weizmann Science Press of Israel, Jerusalem, 1956. 131 pp. Illus. $5.

In this engaging little book, P. M. S. Blackett reviews the present state of knowledge in a new and very active field of research. The abundance of data that is rapidly accumulating on the intensity and direction of the natural "permanent" magnetization of geologically dated rocks has shown that rock magnetism may become a powerful tool to trace the history of the earth's magnetic field and of the movement of land masses over its surface. Although he is one of the chief investigators in this field, Blackett has maintained an admirable objectivity in discussing the various controversial hypotheses that are being so avidly championed. The three chapters of the book—the general discussion of rock magnetism and its application, the description of the experimental work, and the synthesis of the recent results—are succinct and lucid expositions which are sufficiently complete to introduce any technical reader to rock magnetism and are "meaty" enough to be of interest to those already acquainted with it.

The first chapter is a review of the historical development of the subject and includes straightforward descriptions of how rocks acquire their magnetism, of the various mechanisms by which this magnetism can be reversed by physical-chemical changes, and of the observed reversals in rocks and their possible significance in terms of reversal of the earth's magnetic field.

The second chapter discusses the various laboratory measurements that can be made on rock and mineral samples and the pitfalls that are inherent in them. Blackett's conclusion is that much can be learned from such laboratory tests, but, because many of the mineralogical and chemical properties of the rocks change in the course of these tests, great care must be taken before the results are applied to natural phenomena.

The first part of the third chapter is a synthesis of the results of measurements of rock magnetism, throughout