of a sine grating, and Kirchhoff's diffraction integral.

This book can be very strongly recommended to any worker who has the curiosity to wonder about the how and why of image formation at the diffraction limit, as it occurs in a high-power microscope. The effort to follow the author's very clear explanations will be well rewarded. The numerous diagrams are unusually good, and the whole publication is an excellent achievement.

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Armchair Field Experience

Geology Illustrated, by John S. Shelton (Freeman, San Francisco, 1966. 446 pp., illus. $10), presents 382 figures, mainly excellent aerial and ground photographs taken by the author or clever pictorial sketches and diagrams drawn by his brother, Hal Shelton. But the real value lies in its text, which is thoughtfully organized, clearly presented, and replete with modern ideas.

The outline includes six principal headings: materials, structures, sculpture, time, case histories, and implications. Thirty-seven secondary headings are subdivided into 150 parts, each of which is a short essay that typically raises questions, identifies evidence, and considers arguments that might be useful in explaining features displayed in a photograph on the same or an adjacent page. Skillful mastery of English and absence of jargon characterize the text. A few definitions are stated conventionally, but most technical terms are explained. Starting with simple observations and concepts, the text advances methodically into more complex problems. An interested layman or a student fortunate enough to use the book as a text will acquire the essential vocabulary of geology, intimate familiarity with the field, and background for discriminating between fact and speculation.

Now that earth scientists are inclined to keep their boots unmuddied and turn to speculation and analysis as a panacea, it is refreshing to find a text emphasizing the necessity for field observations. Using the case method, Shelton presents a landscape photographically and raises questions concerning its origin. He pinpoints essential features, suggests possible explanations, indicates associated evidence, and, without dogmatism, furnishes guides for arrival at rational explanations. In many cases successive photographs are used to focus attention on critical evidence. Some of these are closer views from the air, most are closeups taken on the ground, but where need arises microscopic details exhibited in rock thin-sections (ordinarily with 10-power magnification) are used, mainly to explain rock structures and textures. The result is probably the most successful substitute for field experience ever presented in a book, and also one that demonstrates the necessity of and whets a desire for field work.

Emphasis is placed on the American West for valid reasons: other parts of North America lack the variety and interest of the area where so many of our geologic concepts originated, and also it is the region most familiar to the author. High relief and relative absence of soil and vegetational cover render western landscapes particularly photogenic. But other parts of the continent are not unduly neglected, and some discussions involve other parts of the world. The acknowledgments constitute a list of most living leaders in geological research, but throughout the text one may identify above all the influence of Alfred O. Woodford, who for some 30 years was closely associated with the author.

The publisher deserves congratulations for accepting an outstanding manuscript, for skill in book manufacturing, and for keeping the price within the range of students. The treatment is so up-to-date and original that an instructor adopting the text faces the challenge of having to revise his course considerably. If many have sufficient interest and energy, we may look forward to students in more advanced courses with greatly improved backgrounds.

I, or anyone else, might prefer slightly different interpretations of some processes, but it seems picayune to fault a text with which I am in such complete agreement and would adopt enthusiastically should I return to teaching elementary geology. In future printings, it might be desirable to enlarge slightly the numbers used to identify individual formations in the Grand Canyon and elsewhere.

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Radiation Heat Transfer

In recent years, under the stimulus of the space program, there has been a growing interest in radiation heat transfer. Since the publication of the second volume of *Heat Transfer* by the late Max Jakob (Wiley, New York, 1957), no comprehensive account of the theories and experiments connected with this subject has been available. To a limited extent, **Engineering Radiation Heat Transfer**, by J. A. Wiebelt (Holt, Rinehart, and Winston, New York, 1966. 278 pp. $9.50), provides such an account.

The book covers the following four major topics: thermal radiation laws, the radiation properties of opaque surfaces, radiation interchange between various types of surfaces separated by a diathermanous medium, and radiation heat transfer in gases. The presentation on the first three topics is satisfactory, although rather brief and somewhat limited in scope. The chapter on gaseous radiation is disappointing. This subject is not readily accessible to the engineer because of the special notation and nomenclature developed over the years by the physicists and chemists; therefore a chapter introducing the basic physics of gaseous emission and absorption would have been most helpful. The author discusses, in some detail, the gray gas and band approximations for an isothermal gas, but the technically important case of the nonisothermal gas is treated only very briefly. The book closes with a useful chapter on radiation equipment.

Problems and exercises are provided for each chapter except the last. A number of appendixes giving radiation properties, configuration factors, and digital computer procedures applicable to radiation problems are provided. Printing, binding, and general appearance of the book are excellent.

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