depths of 5 and 10 in., respectively. The magnetic dips of the inducing fields were taken to be $I = 0°$, 20°, 30°, 45°, 60°, 75°, 90°.

All the experimentally derived field maps will be made available in a "normalized" form, that is, one that is independent of the susceptibility of the model and the strength of the inducing field, and dependent only on the geometry of the prism. In this manner, complicated bodies may be built up by the proper combination of prismatic blocks, and the total normalized field computed by arithmetically summing up at each point the normalized fields due to each of the prismatic slabs. Multiplication with the susceptibility of the known rock and the inducing field strength will result finally in the desired anomalous magnetic field.

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Oligocene Plants and Correlation

A SMALL area of freshwater shale at Florissant, Colorado, has long been noted for its outcrops containing abundant and well-preserved plants and insects and less well known for its scarcer mollusks, fishes, birds, and mammals. The isolation of these fossiliferous strata has caused much speculation about their correct position in the geologic column, but most opinion has fluctuated between Oligocene and Miocene assignments. Within the last 20 yr paleobotanists have reasoned that the flora could not be very much younger, relatively speaking, than that in the middle Eocene Green River formation, because the two have many identical or closely related species in common. A confirmation of this view came with the discovery of an opossum whose affinity was considered to be with Oligocene forms; and more recently, an Oligocene oreodon jaw was taken from beds lying just above the plant-bearing shales. The Oligocene age of the shales, therefore, seems no longer in doubt.

The Florissant flora, according to a restudy by MacGinitie,[1] approximates 150 species, which include pine, spruce, fir, sequoia, white cedar, poplar, willow, hickory, oak, elm, zelkova, Oregon grape, hydrangea, mountain mahogany, hawthorn, rose, redbud, ailanthus, cedrela, smokebush, sumac, maple, dipteronia, koelreuteria, grape, linden, and many others. Can this rich flora now be used for dating other floras in the Rocky Mountain province?

In 1952 my assistant and I spent two days in the hilly area west of the south end of Ruby reservoir, 12 mi south of Alder, in southwestern Montana. From fissile, pinkish shales, somewhat like those at Florissant, we collected many fine leaves, seeds, and insects. The insects include craneflies, bugs, beetles, wasps, ants, mayflies, and grasshoppers, many of which, it appears to me, can be matched in the Florissant fauna. The most startling correspondence, however, is in the floras, although some species present at Alder are absent at Florissant, and vice versa, a circumstance that is not particularly surprising. The species of *Chamaecyparis, Pinus, Picea, Sequoia, Typha, Cercocarpus, Cotinus, Ailanthus, Mahonia,* and *Fagopsis* are, in my judgment, identical in both floras. *Cotinus* and *Fagopsis,* until now, have been unique in the Florissant flora. They have characteristic features that make them readily recognizable. That the Alder locality is in Oligocene deposits is attested by fragmentary mammalian remains from nearby correlative, or slightly higher, whitish strata.

In 1953, together with a U.S. Geological Survey field party, I examined the shales intercalated with ashy and tuffaceous deposits on the west side of the Canyon Ferry reservoir, east of Winston, Montana. These strata had already been dated as Oligocene on the basis of mammalian remains. The shales yielded leaves, seeds, and insects, but these were not as well preserved as those at Alder and Florissant. The plants include species of *Chamaecyparis, Picea, Pinus, Sequoia, Alnus, Betula, Tilia, Zelkova,* and others. Except for the conifers, there is no close tie with the Florissant flora, but most of the dicotyledons are the same as those at Alder. Although these three floras are thus linked together by substantial agreement in composition, they may not have been exactly contemporaneous and the strata containing them may occupy somewhat different positions in the Oligocene series.

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[1] MacGinitie, Harry D. Carnegie Inst. Wash. Pub. 599 (1953).

Scribing as a Substitute for Drafting in the Preparation of Maps for Reproduction

A NEW technique of drafting with special tools on coated plastic, known as *scribing,* is rapidly supplanting pen-and-ink drafting in the final stages of map production. An adaptation and refinement of negative engraving used in photolithography, the new method produces a more legible map with neater and sharper line-work in a shorter time and at less cost.

In the older method the printer's copy, the drawings from which printing plates are made, is the product of skilled freehand inking. The map detail is reproduced photographically on metal-mounted paper and traced in ink by the draftsman. A separate drawing is required for each color, the line-weight and registrations must be very precise, and the appearance of the printed map depends largely on the talent and patience of the draftsman. Because of the shortage of competent draftsmen, the operation is frequently a bottleneck in the production line.

With scribing, more dependence is placed on mechanical aids; therefore the result is more uniform. A

clear plastic base sheet to which the map copy is photographically transferred is first coated with an opaque material, usually yellow paint. Using a metal stylus ground to the width of line desired, the draftsman traces the copy, cutting out the opaque coating along the lines that are to be printed. The product is a line negative that the photoengraver can use directly to make the printing plate.

The principal advantage of scribing is that the width of a line is determined entirely by the scribing tool used, in contrast to pen-and-ink drafting where line-weight depends on the size of the pen point, the fluid qualities of the ink, the surface paper, and on the pressure on the pen. The map scriber has few critical factors to control, and he can devote his full attention to productive work. The training period for new employees is relatively short, and their output is superior, both in quantity and quality, to pen-and-ink drafting.

For the "gadgeteer," scribing has opened up a new field of activity—the design of special tools for the various symbols and types of lines on topographic maps. The usual tool is made from a phonograph needle ground to a chisel-shaped point and held in an ordinary pen-holder, but many others have been developed for particular purposes. A swivel-head scriber cuts two parallel lines at the same time to trace double-line roads; a special templet is used to cut rectangular building symbols; and there is even a motor-driven scriber to produce small circles representing oil or water tanks. There is still an unfilled need for a device to scribe dotted lines conveniently and accurately.

The most critical problems in the introduction of scribing techniques concern the materials—the base sheets and the opaque coatings. The base sheet must be transparent, dimensionally stable, and have a smooth surface hard enough to prevent scratching by the scribing tool. Glass is the ideal material so far as these qualities are concerned, but it is fragile and heavy, and the problems of transportation and storage are formidable. After considerable experimenting, a type of vinyl plastic sheeting was selected as the most satisfactory, although there is still room for improvement.

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Book Reviews

Geology of India. Rev. ed. D. N. Wadia. London: Macmillan; New York: St Martin's Press, 1953. 552 pp. Illus. + plates. $10.00.

This reviewer, quite lacking in knowledge of India, found the revised edition of *Geology of India* by Wadia, both pleasant to read and instructive. Persons acquainted with Indian geology perhaps could find gaps in the descriptions and might disagree with some of the interpretations offered or with the emphasis given certain topics. After all, India is nearly half the size of the United States and it would be next to impossible to obtain agreement about the items that should be emphasized in 550 pages describing the geology of half this country.

The first 57 pages describe the physical features, including the physical geography of the three great physiographic divisions of India, the drainage system, lakes, glaciers, coasts, true volcanoes, mud-volcanoes, earthquakes, tilt records, isostasy, climatic conditions, soils, erosion, and résumé of the history of major drainage changes.

The main part of the book (354 pp.) is devoted to a description of the formations, geological history they record, and some of their unsolved problems. This description is apportioned as follows: General introduction to the stratigraphy, 17 pages; pre-Cambrian formations, 62 pages; Paleozoic formations, 95 pages; Mesozoic formations, 58 pages; Deccan trap, 13 pages; and Cenozoic formations, 109 pages.

Following the stratigraphic descriptions and history is a 26-page chapter on physiography. The last chapter (76 pp.) describes the mineral resources and soil.

Accompanying the book is a 1 : 6,000,000 geologic map of India in colors. It would have been helpful to have had additional larger scale maps showing the locations of the many places referred to by name in the text. Too, this reviewer would not share Wadia's pessimistic view (p. 439) that "Chances of discovery of new mineral deposits of any extent and richness by ordinary geological methods are not many. . . ." The book itself refers to the gross inadequacies in knowledge about the geology of India, and as long as this situation continues we can be rather confident that major mineral discoveries are still to be made in that vast area. At least, this has been the history of progress in geological knowledge everywhere else, why not in India?

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Krankheiten und Schädlinge der Kulturpflanzen und ihre Bekämpfung. 7th ed. H. Braun and E. Riehm. Berlin, Germany: Paul Parey, 1953. 339 pp. Illus.

In 1910, Dr. Riehm published a small handbook dealing with the diseases and insect pests of crops in Germany. Since then six additional editions have appeared, each one a little larger and more detailed. The later ones had H. Braun as the senior author.

In the present edition are 28 pages of general discussion, followed by those for 23 special crops or