

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

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, koeleruteria, 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.

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

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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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