to curl inward towards the golden heart. The yellow-green of the under-section of the petals now began to reappear as they folded together. Soon the golden mushroom-like center became hidden by the enfolding petals, then disappeared in the ball of white with its pale yellow under-side. The flower seemed to shrivel and shortly after the sinking sun threw the last glorious tinge on the summer twilight sky, the white globe which had been the lovely flower of the famous Gordonia dropped off the stem, leaving only a pale green scar in the heart of leaves, a scar scarcely seen, but eloquent relic of one of nature's dramas.

EDWARD S. SHORTER

ANTI-EVOLUTION IN NEW ENGLAND

THE following letter coming from Hartford, Connecticut, and signed by a well-known New England name may be of interest to readers of SCIENCE:

You may discontinue my subscription to Ecology.

Ecology now has articles from the standpoint of evolution; for instance Further Views on the Succession-Concept, H. A. Gleason, July, 1927. It is with regret that I do this. I have found a great deal about ecology in it. I have taken it ever since the beginning as I was one of the subscribers to the Plant World. I have no use for evolution and do not see how any intelligent person can have.

BARRINGTON MOORE

AN ANTI-VIVISECTION SCREED

THIS anonymous note reached me a few days ago following a very simple operation that I had. I thought possibly the readers of SCIENCE would be very much amused at this ebullition of temper. I take it that it is from a woman, and if so I pity her possible husband.

Why didn't you have the operation without anesthetic, so you could see how the animals feel, that you have tortured all these years? You will have an awful body in the next incarnation!

That notorious old French vivisector at the age of eighty in Paris, has acknowledged that no good has come of it, and that he knows it is not good for the students minds. You could do much good before you die, by expressing your self in like manner. You have one foot in the grave now, and the other on a banana peel, you old fiend.

The fun of the thing is that I have *never* been a research worker. The first laboratory of Medical Research was established in connection with Bellevue Hospital Medical School by Andrew Carnegie in 1884. By that time, my career was marked out for me very clearly as that of a clinical surgeon. I have never experimented on *any* animal, not even a mouse or a frog.

I shall keep my eye on that banana peel you may be sure.

W. W. KEEN

SPECIAL CORRESPONDENCE

THE STUDY OF GEOLOGY BY AEROPLANE

ON January 12, 1929, my class in "Sedimentation" at the University of Southern California took an aeroplane trip along and over the Whittier Hills and Santa Ana Mountains, east and southeast of Los Angeles, California. The plane, a four-passenger type, was supplied through the kindness of the Stoody Company. It is believed that this was perhaps the first use in the United States of an aeroplane by an entire geology class. Since each student was aloft an hour and a half, it has seemed worth while to record their impressions and to ask for suggestions from other schools that may be planning flights, or may perhaps have antedated this one.

The students had already spent a semester in studying the peneplained Triassic basement complex of quartzites and slates, shot with Jurassic intrusives and partly overlain by Jurassic (?) extrusives; as well as the Cretaceous and Eocene formations, chiefly heavy sandstones where exposed in the Santa Ana region. All the formations are tilted into an unsymmetrical anticline with its gentler dip to the southwest and complicated by a dome-like anticline striking north-south on the western flank of the major structure.

We were uncertain as to how much could be observed from the air during the time each student was allotted. Accordingly, directions were given to center attention on four points:

(1) A fault which runs along the entire southern front of the Whittier Hills.

(2) Terraces, due to the latest uplift, along the canyons of the Santa Ana Mountains.

(3) The contacts between Triassic and Cretaceous, Lower? Cretaceous and Upper Cretaceous, Upper Cretaceous and Martinez Eocene, Martinez and Domengine? Eocene.

(4) The great Perris peneplain to the northeast of the Santa Ana Mountains. This plain had never seemed to the students a base-leveled region, because, observed from the earth, the flatness is obscured by elevations, numerous, highly irregular in shape, and often five hundred feet high.

I accompanied each group of three. After the first gazing at the ground was over—some of the students had never been aloft—the three began to take notes. Note-taking, as well as use of topographic maps, proved easy for the better students. I made occasional suggestions, but most of the time confined myself to observing the elevation and the effects of

differing elevations on accuracy and range of vision. The following comments upon what could and could not be well observed are based chiefly on papers (one and a half pages, typewritten) required later from each student.

(1) Observation of faults: Physiographic evidences of faults seemed to be noted by all. Though the particular Whittier fault suggested for consideration was merely guessed at by all but two students, who connected a scarp behind the Brea oil field with the fault, another fault, the San Jacinto line, which bounds the Perris peneplain to the northeast of the Santa Ana Mountains, was observed by about two thirds of the students of their own initiative.

(2) The river terraces, due to uplift, were not well located; at least, statements concerning them were vague. On the other hand, a partially dissected and uplifted fan-terrace, never observed from the earth except as the students dutifully "knew" it was there, attracted their eyes as something plainly discernible and "new."

(3) The contacts were variously estimated as "clear" to "obscure." A color change between the red of the Lower? Cretaceous and the gray of the Upper Cretaceous was rather generally located. Frequently, also, mention was made of "being able to see the continuity of a contact across canyons and divides." Such observation strikes me as very valuable, even if the exact bed was wrongly allocated.

(4) The Perris peneplain was observed with enthusiasm and very early. "From 1,900 feet the hills on what we had been told on auto trips was the peneplain looked like bumps on a wide stretch of flatness."

Students seemingly were able to observe, though scatteringly, more than the required four points. Straightness of certain streams, youthful and mature topography, springs along fault lines, braided rivers, arrangements of oil wells, the shape of Santa Catalina Island far to the west, the asymmetricality of the Santa Ana Mountains from an elevation of 4,500 feet, silver mines in a dike ("I see now it *is* a dike," wrote one student)—these and other details drew comment in one or another paper. Average strike and dip of formations were often determined, though Brunton compasses were unusable.

On the whole, then, the experiment was a success, particularly in giving a bird's-eye instead of our ordinary ant's-eye view. The visibility was excellent; at 1,900 feet, our average elevation, gas station signs were entirely legible. The speed was about 100 to 115 miles per hour.

We plan, in connection with a field geology course for the same group of students next semester, to fly over a region unknown to them. If, as seems probable, this flight can be preceded by another over known territory, so that the students become more accustomed to note-taking in the air, the results of the third flight should be very interesting.

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SCIENTIFIC BOOKS

THE OPUS MAJUS OF ROGER BACON[1]

The Opus Majus of Roger Bacon: A Translation by ROBERT BELLE BURKE, Professor of Latin and Dean of the College, University of Pennsylvania. 2 volumes. Philadelphia: University of Pennsylvania Press, 1928.

AMONG the records of scientific thought we find here and there, separated usually by long intervals of time, certain books which stand out like landmarks. Broad and general in their scope, written by men who attracted unusual attention from their contemporaries, each book may be taken as a fair representation of the state of scientific thought at its best at the time the book was written. To the understanding reader such works present a picture of the intellectual life of their time as full and clear as Hogarth's drawings of the daily life of the eighteenth century London which he loved so well. Among such books may be mentioned Newton's "Principia" (1687), Gilbert's treatise "On the Magnet" (1600), and the writings of Roger Bacon (1266).

Taken jointly, these three books illustrate, for one thing, in graded succession a steady tendency away from the occult and the supernatural in scientific thought. The writings of Bacon are deeply tinged with the superstition of the Middle Ages, but by Gilbert's time, three centuries later, this element had become of minor importance, and in the "Principia," less than a hundred years after, it had practically disappeared.

It is easy for the twentieth century to be impatient with Roger Bacon; with his prolixity, his endless citation of ancient authority, and above all with his superstition. To our thinking, this latter seems inconsistent with a type of mind that delighted in the study of the anatomy of the eye, in optical principles and in their application to the rainbow. Indeed, the suggestion has not been lacking that he who upheld experiment and observed the stars from his tower at Oxford, who knew at least the pyrotechnic properties of gunpowder, must have been insincere in his monastic profession, desiring only the loaves and fishes

[1] Publication approved by the Director of the Bureau of Standards of the U. S. Department of Commerce.