on June 30, the Smithsonian Institution loses, through enforced retirement, a number of its staff, most of whom have served the Institution for many years. The list of those retired follows: Richard A. Allen, B. A. Bean, C. A. Carlsson, De Lancey Gill, W. H. Holmes, Lewis Jones, William Jones, W. H. Lanham, James S. Peyton, W. de C. Ravenel, Albert Strong, H. C. Taylor, J. G. Traylor (retired as appointment clerk), B. C. Tuckson, C. S. Washington and A. L. Young. The following who would have been retired under the provisions of this act have been continued by the President for various reasons: W. H. Blackburne, Frank H. Cole, J. N. B. Hewitt, Walter Hough, C. W. Shoemaker and Leonhard Stejneger. Owing to vacancies resulting from the enforced retirements, the following administrative changes have been made: R. P. Tolman has been appointed acting director of the National Gallery of Art. J. E. Graf is serving in the capacity of director of arts and industries. The division of fishes is under the direct charge of Dr. Leonhard Stejneger.

NATURE reports that the British Medical Research Council announces that, on behalf of the Rockefeller Foundation, it has made the following awards of traveling fellowships for the academic year 1932–33; these fellowships are awarded to graduates who have had some training in research work either in the primary sciences of medicine or in clinical medicine or surgery, and who are likely to profit by a period of work at a chosen center in America or, in special cases, in Europe, before taking up positions for higher teaching or research in the British Isles: Mr. C. P. Beattie, Bacteriology Department, University of Edinburgh; Mr. W. D. W. Brooks, St. Mary's Hospital, London; Dr. Eleanor M. Creak, Maudsley Hospital, London; Mr. I. G. W. Hill, Royal Infirmary, Edinburgh; Mr. W. A. Mackey, Department of Surgery, University of Glasgow; Mr. D. J. Macmyn, King's College Hospital, London; Dr. J. C. Moir, University College Hospital, London.

THE new legislature of Mississippi has enacted legislation creating a board of trustees in charge of higher education in the state. These trustees are now undertaking to repair the disaster caused two years ago by the then governor of the state by which more than 150 teachers in these institutions were dismissed. Chancellor Alfred Hume has been reinstated in the chancellorship. Professor D. H. Bishop has returned to the professorship of English and has been made vice-chancellor. Dr. A. L. Bondurant has returned as dean of the graduate school and Dr. J. N. Swan as head of the department of chemistry.

ATTORNEY GENERAL SCHRADER of Pennsylvania has ruled recently that there shall be a 24.16 per cent. reduction in appropriations to non-preferred institutions on account of reduced state income. He included the Pennsylvania State College on this list. The ruling applies to the total appropriation in the present biennium amounting to $4,000,000. Since the college has used approximately $2,000,000 or half the total appropriation, during the past year, it has only $1,000,000 coming from the state this year under the decision.

THE Shenandoah National Forest, lying approximately 100 miles southwest of the nation's capital in a region frequently traversed by the first president, has been renamed the George Washington National Forest. The Secretary of Agriculture, upon recommendation of Major R. Y. Stuart, chief of the forestry service, chose the forest as the most fitting to be named as a perpetual memorial to George Washington. It lies in Virginia and West Virginia and was in part surveyed by Washington. The George Washington National Forest stretches for nearly 100 miles along the summit and slopes of the Shenandoah Mountains and for a shorter distance along the Massanutten Range. Other existing national forests named for presidents are the Lincoln in New Mexico, the Cleveland in California and the Roosevelt in Colorado.

ACCORDING to the *Journal* of the American Medical Association, at the Victor Emanuel Library in Rome, a national bureau of bibliographical information has been established, the object of which is to furnish to Italian and foreign students such information as will aid in their research and to point out the libraries in which they can find the publications and manuscripts that interest them. The organization will also function as an intermediary organization for the exchange of information of a bibliographic nature. The Italian libraries are under obligation to comply with the requests for information submitted to them by the newly established center.

DISCUSSION

PRATT AND AIRY AND ISOSTASY

SCIENCE NEWS LETTER has done a real favor in reprinting the clear statements by Pratt and Airy of their respective theories as to the density and thickness of the earth's crust. Both of them were well worth considering at the time.

It may be well to call attention to some of their arguments in view of our present light. It will be noticed that Airy in discussing the fluid earth says it may be "little more than that degree of yielding which (as is well known to miners) shows itself by changes in the floors of subterraneous chambers."

On this, of course, much evidence has been gathered and there are deeper mines than in his day.

He refers to the crust lying on the lava as comparable to the "state of a raft of timber floating upon water; in which, if we remark one log whose upper surface floats much higher than the upper surfaces of the others we are certain that its lower surface lies deeper in the water than the lower surfaces of the others." This would, of course, be true of logs of the same material, say pine, but as I pointed out in a talk which I gave in Washington, if some of the logs were pine and others oak, we might have logs of pine projecting higher than those of the oak, while the bottoms were all at the same level, and this would be as Pratt pictures it.

Pratt does not agree with the hypothesis for the following reasons:

(1) That the hypothesis "supposes the thickness of the earth's solid crust to be considerably smaller than that assigned by the only satisfactory physical calculations made on the subject—those by Mr. Hopkins, of Cambridge. He considers the thickness to be about 800 or 1,000 miles at least."

We now know from the calculations of the seismologist that there is a much thinner crust than this.

(2) "It assumes that this thin crust is lighter than the fluid on which it is supposed to rest. But we should expect that in becoming solid from the fluid state, it would contract by loss of heat and become heavier."

But it is now generally accepted that there is a lighter layer, the thickness of which has been given by various recent writers from ten to fifty kilometers, but practically all recent writers, including Daly and Holmes, accept some such lighter layer.

(3) The third point that he makes is that if for every "protuberance outside this thin crust there must be a protuberance inside it would be equally true that wherever there was a hollow as in deep seas, in the outward surface, there must be one also in the inner surface of the crust corresponding to it."

This is the region which Meinesz has recently been investigating.

Finally, it will be noticed that Pratt assumes that "as the crust formed, and grew thicker, contractions and expansions may have taken place in any of its parts, so as to depress and elevate the corresponding portions of the surface." If then, he goes on to say, these changes "took place chiefly in a vertical direction, then at any epoch a vertical line drawn down to a sufficient depth from any place in the surface will pass through a mass of matter which has remained the same in amount all through these changes."

Obviously, this is not in harmony with the tremendous overthrusts which geologists are now finding, not to mention such ideas as continental drift.

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THE DELUSIVENESS OF FILTERING COMPOUND SOUNDS

THE invention of electric filters to cut out of a compound current certain frequencies, while the others are but inconsiderably weakened, has opened the way for the convenient study of certain phenomena in the psychology of hearing. But caution is needed. Electric filters are not sensation filters.

The ambiguity of interpretation dates farther back than the few years ago when electric filters were put in practice. The old Ohm-Seebeck controversy of 1841, in *Poggendorff's Annalen,* will never die until experimental actuality triumphs over mathematical beauty. The highly musical Seebeck emphatically stated his observations that the fundamental tone of a compound is heard more strongly than it should be heard if the ear were a harmonic analyzer. The totally unmusical Ohm (he compares himself with the color blind) emphasized that, if the ear performed a Fourier analysis, it would *only moderately deviate* from Seebeck's experiments. The physical brotherhood has supported Ohm's rationalization until to-day.

In 1898, I published[1], among numerous other experimental facts, the following: A whistle tone "8" is made so weak, that while clearly audible alone, it is completely masked by a lower tone "5" of constant intensity and rather strong. "5" is now sounded first. At the moment when "8" is physically added, it is *not added* to the sensation; and clearly observable are now the physically *non-existing* tones "2" and "1." And yet we assert that the cochlea performs a Fourier analysis.

A few years ago the Bell Telephone Laboratories distributed a series of highly interesting filter records for the phonograph. I quote from "Record BTL-5-A, Vocal Tones, Illustrating the Recognition of Pitch." "This record is to show how *the ear supplies* tones actually not present. The sung vowel ah is heard with its fundamental eliminated. You notice a quality difference, but the pitch remains the same." Nevertheless, Dr. Fletcher[2] says: "The . . . *brain* may aid in making interpretations." Needless to say, no one has published any conception of a brain function adequately analyzing sound.

But there are dissenters. W. C. Beasley[3] experimentally attacked the stronghold of Ohm's defenders, the alleged irrelevance of phase shifts of the com-

[1] *Zeitschrift für Psychologie,* 16: p. 6. 1898.

[2] Harvey Fletcher, "Speech and Hearing," p. 122. 1929.

[3] *Jour. Gen'l. Psychol.,* 5: pp. 331, 347, 348. 1931.