

ested in this rather puzzling question may study it to see whether there is anything in the theory suggested here.

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PENSIONS FOR GOVERNMENT EMPLOYEES

THE American Association for Labor Legislation calls attention to the very serious evils arising from the lack of a pension system in the government bureaus at Washington. They say: "It is now reported that of a total of 878 employees in one federal bureau in Washington, 303 are over 65 years old, 104 over 75, and 29 over 80. The Treasury Department alone has 1,000 aged who average only 25 per cent. efficiency—1,000 drawing full pay for work that could be done by 250."

This is a matter which concerns scientific men. I remember several years ago calling on one of the most eminent zoologists in the National Museum. I found that he was writing all his letters by hand, because the stenographer assigned to him was too old to do the work. He explained that of course he could not, or would not dismiss her; but as a result he was left without the assistance he should have had. I recall a scientific assistant, retained by a bureau long after he had ceased to be able to do anything of value, but required to spend his days at his desk. No one would have thought of turning him away unless he could be adequately provided for. The effect of these conditions on the progress of science is obvious and lamentable.

It appears that there is now a bill before Congress, providing for retirement on part pay at 65, the employee contributing $2\frac{1}{2}$ per cent. of wages, the government the rest. It should certainly be supported.

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March 1, 1920

THE RECENT AURORAS

THE Weather Bureau is compiling observations of the auroras of March 22-23, 23-24,

and 24-25, 1920, as seen in the United States, or elsewhere, with a view to publishing a detailed account of this remarkable display in the March, 1920, issue of the *Monthly Weather Review*. It is hoped that those who observed an aurora on any of the dates mentioned will notify the bureau, and if details were noted will send copies of their notes. Information about any display which may be seen on April 18, 27 days after the brilliant night in March, or auroras observed on other dates in 1919 or 1920 will also be appreciated. Communications should be addressed to "Editor, Weather Bureau, Washington, D. C.," and should reach Washington by the end of April.

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QUOTATIONS

CIVIL SERVICE PENSIONS

AFTER years of half-hearted consideration Congress seems about to pass a bill for the retirement and pensioning of employees in the federal service. It will be applicable only to those in the classified service, about 300,000 in all. It is a measure of justice and at the same time a measure of economy, for the government hasn't been heartless enough to turn the superannuated loose. Thousands of them retain their places, but do little or no work.

The government retires employees in the military and kindred services. It ought to set a similar standard for faithful civil employment. The retirement age in the army is sixty-four, and in the navy sixty-two. Taking into consideration the easier conditions of civil employment, the bill which has just passed the Senate fixes seventy as the civil retirement limit. The allowances will vary according to length of service, from thirty years down to eighteen years. Persons disabled through disease or injury in the line of duty may be retired before reaching seventy.

Another distinction is to be made between civil and military beneficiaries. An annuity assessment of $2\frac{1}{2}$ per cent. will be levied annually on the salaries of civil employees until a retirement fund is accumulated. This assess-

ment is expected to pay about half the cost of the system.

There are now about 9,000 superannuated civil servants, most of them in Washington. They will go out in a body. The retired list will eventually reach about 30,000. But with the moderate annuities allowed, the maximum being \$720, the government's experiment will cost little. The efficiency of the working force will be increased. More work will be done by a smaller staff.—*New York Tribune*.

THE ECOLOGICAL RELATIONS OF ROOTS¹

PROFESSOR J. E. WEAVER has recently put out an extensive study on roots which comprises observations made in the "prairies of eastern Nebraska, chaparral of southeastern Nebraska, prairies of southeastern Washington and adjacent Idaho, plains and sandhills of Colorado, the gravel-slide, the half-gravel-slide, and forest communities of the Rocky Mountains of Colorado." The roots of about 140 species are described. The species include shrubs, grasses and other herbs. With a description of the roots is presented a characterization of the physical environment. Among other features of the latter are given the rainfall and evaporation, the temperature of the air and to a certain extent the temperature of the soil and its moisture content. The work is abundantly illustrated with root maps and reproductions of photographs.

The study by Weaver is a continuation and an extension of his well-known work along similar lines. It is wholly observational and must be considered as constituting a very noteworthy contribution to our knowledge of the habits of roots. It touches elbows with so many features associated with the habits and relations of the plants of the regions studied that it is not practicable to present a summary of the results. However, it may not be amiss to point out certain of the more interesting of the facts presented. For detailed information the reader is referred to the work itself.

¹ Carnegie Institution of Washington, Publication No. 286, 1919.

Without attempting to summarize exactly it can be said that in a general way the root systems of plants in the communities studied are fairly characteristic. Thus in the prairies and the plains also the roots usually extend widely and penetrate deeply, but more deeply in the former than in the latter community. And the tap root is the principal feature. In the sandhills the roots of several species are confined to the surface 2 feet, and practically all show a striking "profusion of long, widely spreading laterals in this surface-soil stratum." In the gravel-slide and forest communities of the Rocky Mountains, adjoining Colorado Springs, the roots are confined to the surface 18-24 inches. In the half-gravel-slide, however, the root penetration is deeper, although the root systems develop widely spreading shallow roots as well. Finally, in the case of species growing in more than one habitat it was found that in most cases the direction and extent of roots developed corresponded very well to the "community root habit."

Roots of different species may be so unlike in the extent and direction of their development, as well as in other morphological features, as to be readily identifiable. They also undoubtedly exhibit quite as distinct physiological characteristics, although such can not be told from inspection. For these reasons a knowledge of the roots of any habitat gives a very good clue to many of the striking features of that habitat, just as the nature of the shoot of a plant reveals much regarding the subaerial conditions under which it has developed. It consequently follows that through the study of roots of native plants, much can be learned in advance of culture of the possibilities of agricultural lands. Such, however, is a possible economic application of this and similar root studies and was suggested, but not developed, by the author.

The most striking root figure by Weaver is that of *Ipomœa leptophylla* of the sandhills about forty miles southeast of Colorado Springs. The soil absorbs all of the rain and there is practically no run-off. Through a