process of organization an institute to be called the "Ronald Ross Clinique for Tropical Diseases and Hygiene," in which it is proposed that laboratory research and clinical investigation shall be combined as closely as possible in accordance with his teaching. There are already in this country two schools of tropical medicine which have done good work, but their activities are in the main educational. It is proposed that the institute shall supplement and not compete with them; that its primary object shall be research, that a clinical establishment shall be maintained in intimate conjunction with the laboratories, and that the master mind of Ross, assisted by other experts, shall have the fullest scope for the initiation and continuation of researches into the still unsolved problems of tropical medicine. There is a Pasteur Institute in Paris; a Kitasato Institute in Japan; a Gorgas Institute in Panama. It is strongly felt that Great Britain should honor one of her greatest investigators by establishing a Ross Institute in London. To initiate this, $250,000 is required. The public is invited to send subscriptions to the honorary treasurer, Lord Willoughby de Broke, 29 Queen Anne Street, London.—*The Journal of the American Medical Association.*

THE DIRECTORSHIP OF THE RECLAMATION SERVICE

SECRETARY WORK might have given a shorter explanation of the recent removal of Arthur Powell Davis, Director of the Reclamation Service, which would have been more convincing. If he had merely said that Mr. Davis was turned out to make room for a practical politician, that would have been enough.

In his long letter addressed to the American Society of Civil Engineers, Secretary Work labors the point that the time when engineering skill and experience were of first importance in the Reclamation Service is past and that the need now is for "a practical business man familiar with conditions peculiar to irrigation in the West" as Director. The facts are that Arthur Powell Davis was for twenty-one years an engineer in the Reclamation Service, that since 1914 he had been director, and during his term of service all the large storage dams of the West were constructed and others begun, and that Gov. D. W. Davis, of Idaho, who succeeds him, has been known only as a grocer and banker who entered state politics.

The charges that big power interests have conspired to bring about the removal of the distinguished engineer because they are opposed to the Government's policy in reclamation and Arthur Powell Davis's part in it under successive administrations Secretary Work passes over in silence. His answer to the engineers is lame and evasive. To confess the truth would be to admit the unworthiness of his own motives in removing from office Arthur Powell Davis to make room for an Idaho politician.—*The New York World.*

SPECIAL ARTICLES

THE VIBRATIONAL ISOTOPE EFFECT IN THE BAND SPECTRUM OF BORON NITRIDE

THE quantum theory of band spectra[1] indicates that there should be quite appreciable differences between the spectra of isotopic molecules. This is essentially because the spectroscopic frequencies, or, rather, such portions of them as are due to changes in molecular vibrational energy, should be proportional to actual molecular vibration frequencies. The expected isotope effect has already been found[2] in one of the *infra-red absorption* bands of hydrogen chloride; here the absorbed energy is nearly all vibrational.[3] A displacement of 0.055 A.U. has also been found in a comparison of certain lines in the *visible emission* bands of two samples of lead of different atomic weight. Here the emitted radiant energy is partly vibrational, partly electronic in origin.[4]

A much more favorable case than the two foregoing is to be found in boron nitride. Here the vibration frequency should be 2.76 per cent. greater for the lighter isotope $B_{10}N$ than for the heavier, $B_{11}N$, as compared with 0.08 per cent. for HCl and perhaps 0.04 per cent. for lead. The ratio of abundance, 1:5 from the atomic weight 10.83 (Baxter & Scott), is of course somewhat unfavorable. Jevons[5] has measured the heads of two systems of bands which he has satisfactorily shown to be due to boron nitride. In addition to the main "α" and "β" systems, he found certain less developed "subsidiary systems," β_1 and β_2, related to the β system, as well as some extra bands not fitting any system.

Theory predicts that for the band due to the passage of a vibrationless, but electronically excited molecule, to an electronically less excited, and still vibrationless, state, there should be *no isotope effect*

[1] See, for example, Sommerfeld, "Atombau und Spektrallinien," 3rd Ed., Chap. VI.

[2] Loomis, *Astrophys. Journal*, 52, 248 (1920); Kratzer, *Zeit. für Physik.*, 3, 460 (1920).

[3] There is also a change in molecular rotational energy involved, with a corresponding isotope effect. This is, however, usually a minor factor, and will not be considered in the following discussion.

[4] Grebe and Konen, *Phys. Zeit.*, 22, 546 (1921). The emitting molecule is probably that of some lead compound.—The effect should not be confused with those observed in the *line* spectra of lead isotopes.

[5] W. Jevons, *Roy. Soc. Proc.* A, 91, 120 (1915).