Letters to the Editor

Terrestrial Thermodynamics of an Ice Age

In the article by the late Gilbert N. Lewis, entitled "Thermodynamics of an Ice Age: the cause and sequence of glaciation" (*Science*, 1946, **104**, 43–47), no mention is made of the theory proposed by Dr. Edward O. Hulburt, namely, that the warming and cooling of the earth is controlled by the proportion of carbon dioxide in the earth's atmosphere. This theory is important in relation to the growth of vegetation, which removes the carbon dioxide from the air and consequently can explain the alternate cooling and warming of the earth, and the Carboniferous ages and their sequelae.

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Effect of Streptomycin on Budwood Infected With *Phytomonas pruni*

Streptomycin, both crude and crystalline, has been used successfully in freeing plum budwood from infection with *Phytomonas pruni*. The crude streptomycin was produced in this laboratory by a culture of *Streptomyces griseus* supplied by Selman A. Waksman, New Jersey Agricultural Experiment Station; the crystalline streptomycin was supplied by Schenley Laboratories, Inc.; and the budwood came from hybrid plum trees sent to us by a large nursery company. The nursery supplying the infected trees stated: "Until we can obtain disease-free trees it seems that the propagation of this otherwise valuable variety will be impractical." Unless the budwood could be disinfected without injury, the bacterial disease (black spot and canker) would be transmitted to the new tree.

Budwood used in the experiments consisted of infected pieces of branches 5.5 to 6.5 inches long, on which bacterial lesions ranged in length up to 1 inch; in width, up to those almost girdling the branch, and in depth, up to those reaching inward to the stele. Some lesions had cracked open.

The pieces of budwood were placed in a vertical position in beakers, with the basal 1½ inches immersed in the streptomycin solution; other pieces were placed in a horizontal position and completely submerged in the solution. The budwood thus arranged was then placed in an enclosed chamber and submitted to negative pressure by connecting the chamber to an ordinary laboratory-tap aspirator. The pieces of budwood were carefully cultured before and after the treatment. The experiments were run at room temperature, 22°–25° C. Controls were likewise handled with sterile distilled water taking the place of the streptomycin. After treatment the pieces of budwood were also tested for injury to the buds by giving them a chance to sprout and develop.

Time has not permitted definite determination of the minimum length of treatment or the minimum concentration of streptomycin necessary for complete disinfection. However, crude streptomycin showing a strength of 6–8 Oxford units (as tested against *Staphylococcus aureus*) and a strong concentration of the crystalline drug in sterile distilled water, acting overnight as described, resulted in budwood from which no organisms whatever could be cultured. The treated budwood produced clean leaves, and no visible evidence of injury was apparent. Controls in culture gave abundant growth of *P. pruni* that was carefully checked against a standard culture of the plum-strain of the bacterium from the American Type Culture Collection.

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Isolation of Type A Influenza Virus in Recent Epidemic in Chicago Area

Type B influenza virus has been reported (*Epidemiol. Inf. Bull.* (*UNRRA*), 1946, **2**, 105) as the cause of the mild epidemic which reached its peak in December 1945 in this country and a month or two later in England. So far we have seen no reports of the isolation of Type A virus during the past winter in the United States.

Only 30 specimens were examined in our laboratory and from only one of these was virus obtained. Since it was identified as a Type A virus, however, we feel that its isolation is worth reporting. Failure to obtain virus from a larger proportion of cases may have been due to the conditions under which specimens were delivered to the laboratory.

Preliminary experiments in our laboratory had indicated that influenzal virus in throat washings might be expected to survive transmission through the mails if not delayed too long in transit. It did not prove possible, however, to carry out arrangements with three local hospitals whereby duplicate specimens of throat washings were to be sent to our laboratory, one by messenger and the other by mail. Most of them were transmitted by mail only and were sent during the period of congested mail service around Christmas and New Year's Day. From one specimen which had been stored in a dry-ice refrigerator until it could be delivered by messenger virus was isolated as mentioned above.

Four serial passages through 10-day eggs were made of each specimen, three eggs at each passage. For the first passage a portion of the specimen was treated for 15 minutes with enough penicillin to provide 100 Oxford units/0.1 cc., the amount inoculated into each egg. Previous tests in our laboratory had shown that several times this amount would not retard multiplication of PR8 virus in eggs.

Serial mouse passages, usually four in number (two to four mice each passage), were carried out on the first 17 specimens received. Single hamsters were injected intranasally with each of the 13 remaining specimens. For

the animal inoculations treatment of the specimens with penicillin was omitted. All animals after inoculation were kept in a separate room so that chance exposure to infected stock could be excluded.

The successful isolation was made in mice. Slight pulmonary lesions occurred in one mouse of the third passage and in the fourth passage a scant 2-plus hepatization was produced. These lungs were inoculated into 10-day eggs and on first egg passage the pooled allantoic fluid possessed a CCA titer of 1/640.

This allantoic virus was identified as Type A by means of the agglutinin-inhibition test, using sera produced in rabbits against the PR8 strain of Type A and the Lee strain of Type B influenza virus.

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Initiation of Geological Investigations in the Panama Canal Zone

A letter received by me from Viscount Bryce more than 25 years ago seems to possess more than passing interest. A copy follows:

"Aug. 31, 1920
Hindleap, Forest Row 6, Sussex

"I thank you cordially for sending me the Smithsonian Institution volume relating to the geology & paleontology of the Panama Canal, which I shall read with the greatest interest, though the little geological knowledge I learnt long ago from my father has, in the process of years, left little more than an unabated interest in the subject.

"I may mention that when I visited the Canal in 1910 I found that no proper geological examination of the Isthmus was being made, & wrote at once to President Taft, pointing out the importance of improving the opportunities which the excavation of the Canal afforded. He promptly thereupon had a competent geologist sent there to take the matter up. I have forgotten the name, but it was probably Dr. D. F. Macdonald mentioned in your preface.

"I often think of the pleasant times I had in Washington with the scientific groups at the Cosmos Club & wish the Atlantic were not so wide.

"With our kind regards to Mrs. Vaughan & yourself
Very truly yours
[signed] James Bryce"

The volume to which the letter refers is entitled *Contributions to the geology and paleontology of the Canal Zone, Panama, and geologically related areas in Central America and the West Indies* (*U. S. nat. Mus. Bull. 103*, 1919–20. Pp. xviii + 613. Illustrated). American geologists were aware of the excellent opportunity afforded for a study of the geology of the Isthmus of Panama, but were uncertain as to how to establish contact with the Isthmian Canal commissioners. The effect of the letter from Lord Bryce to President Taft was to establish contact between the commissioners and the U. S. Geological Survey. The "competent geologist" mentioned by Lord Bryce was C. Willard Hayes. After the latter's return to Washington Donald F. MacDonald was recommended and appointed Commission Geologist in 1911. In October and November 1911, I spent a full month in the Canal Zone working with Mr. MacDonald, and after my return to Washington organized, as a cooperative enterprise between the Canal Commission, the Smithsonian Institution, and the U. S. Geological Survey, the studies the results of which appeared in the volume above mentioned.

In this connection another investigation of phenomena exhibited by the Canal should be mentioned. Early in 1915, because of the serious landslides along the sides of and in the Canal, the engineers in charge of the project wished help in understanding the causes of the slides. In response to the desire of the engineers President Wilson referred the matter to the president of the National Academy of Sciences, William H. Welch, who appointed a committee of 13 under the chairmanship of C. R. Van Hise to study and report on the problem. The full report, entitled "Report of the Committee of the National Academy of Sciences on Panama Canal slides," was published in 1924 (*Mem. nat. Acad. Sci.*, Vol. 18). This report is a valuable addition to the literature of engineering geology.

Lord Bryce had many friends in this country, which he understood so well and to whose welfare he was so devoted. The role he played in initiating geological investigations in the Panama Canal Zone has not been generally known. It extends the basis of the high esteem in which our fellow citizens hold him.

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On the Term "Normality Factor"

The term "Normality Factor" is occasioned in a few biochemical texts (laboratory manuals). According to one author, "A normality factor is a number which expresses the strength of a solution in terms of its normality. Thus if a solution is 0.2N, it is 0.2 as strong as a normal solution."

In effect, this statement says that there is no difference between the original term, normality, and normality factor (NF). Then why introduce it? The universal terminology and concept of normality is accepted and used in practically every analytical text published.

It is difficult to see either the logic or convenience in the interpolation of such a term. An example of the calculation of NF is as follows: 25 cc. base : 50 cc. acid : x NF acid : 0.010 N (NF) base

$$x = \frac{25 \times 0.010}{50} = 0.005 \text{ NF acid}$$

In the usual interpretation this is simply the normality of the acid.

In using the NF the following typical formula is employed:

$$\frac{\text{cc. acid} \times \text{NF acid} \times \text{mg. eq. of } x \text{ substance} \times 100}{\text{wt. of sample}} = \text{per cent } x \text{ substance}$$

The use of NF here is similar to using normality—which it would have to be, since it is *the same value.*