of geology at the University of Utrecht. Dr. Brouwer will not leave the chair of geology at Delft, but will go to Utrecht to give his courses.

PROFESSOR HANS RADEMACHER, of the University of Hamburg, has been appointed professor of mathematics at the University of Breslau.

DISCUSSION AND CORRESPONDENCE

PROJECTION OF ULTRA-VIOLET LINES

RECENTLY, when attempting without quartz lenses or prisms to demonstrate the existence of ultra-violet lines in the spectrum of mercury, I projected the image of a slit in front of a "Laboratory Standard" mercury vapor lamp onto a "day-light screen" (Trans-Lux), using only a flint prism and a single crown lens. I expected to use a fluorescent screen to pick up the ultra-violet lines but found that the trans-lux screen showed these lines up, though not brightly. The lines were easily visible at a distance of five feet.

I could only convince myself that these were ultra-violet lines by these arguments: (1) the lines were not at all the correct color for the violet end of the spectrum; (2) they were not due to stray light; (3) when falling on anthracene they produced fluorescence, even when the slit was covered with an ultra-violet wave-filter.

Perhaps a more powerful source of light, with proper lenses and prism, would bring these lines out strongly enough for a large lecture room, especially when the wave-filter cuts off the visible spectrum.

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INFLUENCE OF AIR AND SUNSHINE ON THE GROWTH OF TREES

A CASE came under my observation this past summer that will furnish an example of some value to teachers of botany and crop production of the advantage of ample air and sunlight for growing plants.

Mr. A. L. Rogers, of Waterville, Washington, in order to study past variations in climate in that locality, made a section of a forest tree for the purpose of studying the thickness of the annual growth rings and correlating variations in this thickness with known variations in rainfall for the past thirty-three years—the records of rainfall being available for that period. I recently had the opportunity of examining the section. Assuming that a ring of growth has been made each year, the tree was a seedling in the year 1820. Up to, and including the year 1898, the average thickness of the annual rings was approximately one sixteenth of an inch. Beginning with the year 1899, and extending to 1924, when the tree was cut, the rings had an average thickness of approximately three sixteenths of an inch. I suggested to Mr. Rogers that the region must have been logged off in the winter of 1898–9; that previous to that time the tree had been closely surrounded by other trees and thus was unable to secure the necessary air and sunshine for maximum growth; that after the logging off, the rate of growth of the tree had been about tripled.

Investigation revealed that this suggestion was in accordance with the facts. Several stumps, much decayed, were found in the immediate vicinity of the tree, and the date of the logging off operations proved to be the date suggested by the change in rate of growth of the tree.

Additional moisture available to the tree after the logging operations may also have been a factor in the increased rate of growth.

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U. S. DEPARTMENT OF AGRICULTURE

AN UNUSUAL STRAIN OF SERRATIA MARCESCENS BIZIO

A STRAIN of *Serratia marcescens* which, so far as we have any knowledge, has been kept in the laboratory of the department of botany of Wellesley College for at least four years, has developed characteristics unusual for this species. It seems worth while to make a brief note of these variations.

The following culture reactions were obtained with this organism: agar streak varying from white to pink and red, taking on a very bright color and metallic luster with age, *the pigment sinking into the agar,* in some instances for several millimeters; *pigment formed at 35° C.–37° C., soluble in water* and alcohol, slightly soluble in chloroform; gelatin liquefied rapidly, the medium becoming red; nutrient broth turbid after two days, then becoming *red throughout* and showing a thin pellicle; no gas in *dextrose,* sucrose or lactose broths after two weeks, dextrose and sucrose acid; the reaction in lactose broth was rather peculiar and necessitated more extended experimentation which can not be reported at this time; indol not produced; nitrates reduced to nitrites; potato agar showing a very luxuriant, rose-colored growth; growth on starch agar as on nutrient agar and the color bright red; 30 per cent. peptone agar, producing a very light pink growth; litmus-milk acid and coagulated with little or no peptonization. The form is Gram negative, and motile with peritrichous flagella. The italics indicate the deviations from the description given in Bergey's Manual.[1]

[1] Bergey's "Manual of Determinative Bacteriology," Williams and Wilkins, Baltimore, 1923.

The variability of this species has been noted repeatedly by observers, and there has been much discussion as to its ability to form gas in carbohydrates. Miss Hefferan,[2] who has done the most comprehensive work on this group, found in eight strains of *S. marcescens* (*B. prodigiosus*) gas formation in dextrose in seven, in sucrose in four and in lactose in one. Her *B. prodigiosus* VIII formed no gas in any of the three sugars used. In this respect our form agrees with VIII and differs from all the rest of her series and from the type described by Bergey.

Miss Hefferan also found among the eight strains variations in viscosity, in the amount of color in broth, and in the presence of a pellicle on broth cultures. *B. prodigiosus* I, II, III, IV, VI and VII produced slight color in liquids and a red surface ring; V produced a heavy orange-red membrane and VIII only a pink, or violet, surface ring. Our strain colored bouillon a brilliant rose red throughout, with a thin pellicle, thus differing from any strain previously described. This excessive pigment formation is the most striking characteristic of this form. In a few days agar streaks become a most brilliant red, varying from scarlet to crimson, while the upper layer of agar becomes deeply stained with pigment. In the solubility of this pigment in water this form differs from all descriptions of *Serratia* species which have come under our notice. Pigment formation takes place at high temperatures—30° C. to 37° C.—which is also a variation from *S. marcescens,* but is characteristic for related species.

The suggestion that the excessive pigment formation might be due to contamination with some other form was tested by repeated platings and a study of many slides. The white colonies, which were considered as possible contaminations, invariably, upon being streaked on agar, produced red growths, and the slides showed apparently pure cultures with Gram's stain and carbol fuchsin. Single-cell isolation would have made this point certain, but time has not been available for this work.

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THE CLEARNESS OF THE OHIO RIVER

IN the body of the interesting address by Dr. Alexander Findlay on "The twilight zone of matter"[1] is a statement which seems too indefinite to be taken broadly, in view of the nature and importance of the matter under discussion. The comparative clearness of sundry river waters as affected by the presence or absence of colloids is under discussion, and the statement is made:

"The water of the Ohio River, on the other hand, is at all times clear, owing to the absence of protective colloids and the presence of lime and other salts which act as precipitating agents."

The Mississippi and Nile are the rivers included in the reference to "on the other hand" in the above quotation. Taking the statement as made we would first of all point out that the analysis of no great river such as any of those mentioned can safely be taken at any point as truly representing the colloidal or any other condition of the whole stream; certainly not in the case of the Ohio. As the writer can testify from personal observations of his own, and as might be inferred by an inspection of the geological nature of the regions drained by the Ohio, such a statement as the one made above becomes meaningless unless restricted to a particular stage of the river. The two separate rivers forming the Ohio at Pittsburgh, *viz.,* the Allegheny and the Monongahela, are not in themselves at all times clear nor does the resulting river, the Ohio, become so or remain so during its entire course. As a matter of fact, one of the muddiest rivers I have ever seen is this river at Cincinnati, even after it has received the limestone waters of the several streams, Miami, etc., from its course along the southern boundary of the state of Ohio, and after it has been the recipient of all sorts of factory and industrial refuse matter, mine waters, sewage, etc. In short, the Ohio, like its sister, the Mississippi, is not a hydrographic unit, nor are sweeping assertions as to its colloidal behavior to be accepted as at all times, or at all stages correct; there are other factors involved in the discussion besides the relation of lime to colloids. Very probably the quotation as used did not originate with Dr. Findlay, but is to be taken rather as typical of certain general assertions, lacking carefully coordinated data. The statements have been going the rounds for many years that limestone drainage acts as a clarifying agent in natural waters; it may be true that it does up to a certain point. But there are streams in southern Ohio so saturated with lime salts that freshwater mussels flourish in them; the pebbles become in time coated by lime, as do also submerged tree trunks, but at the same time the waters are seldom clear; clays, "muds" in general, all the usual inwash of a cultivated and populated region. Probably most scientific persons who have given any time and ob-

[2] Hefferan, Mary, "A comparative and experimental study of bacilli producing red pigment." *Centrbl. f. Bakt.* Abt. II., Bd. XI, p. 311–540, 1904.

[1] SCIENCE, LXII, 1600, p. 195.