

of its accessibility. The Paradise Glacier, known for its ice caves, was measured from three points rather than one because it has a broad cliff-like front rather than a snout as a terminus. So heavy was the snowfall of the past winter that when the measurements were made in September one point was still covered

to a depth of several feet. Recession measurements have been made of the Mount Rainier ice fields for several years, but the records for the Nisqually Glacier date further back than any of the others. The total recession recorded for this ice field during the past 75 years amounts to 3,118 feet.

DISCUSSION

THE OLDEST KNOWN PLANT VIRUS DISEASE

THE virus diseases of plants and animals are each year attracting more attention. Modern medicine, on the one hand, and plant pathology, on the other, developed about the modern concepts of parasitism and "the germ theory of disease." Much in modern mycology and bacteriology developed in turn out of the stimulated studies of the specific parasites concerned. Naturally work with the grosser fungi antedated that with the more minute and hence more baffling bacteria. Finally the ultra-microscopic or filterable viruses were recognized, their study requiring still more refined techniques. With the aid of such, the youngest branch of biological science, "virology," is now being outlined. And just as earlier with bacteriology so now with "virology" the developments are led by those interested in the applications to pathology, whether with diseases of man, lower animal or plant.

For many purposes of experimental study, the plant offers peculiarly attractive host material for the investigator seeking fundamental information as to the nature or characteristics and distribution of viruses. This has recently been illustrated on the historical side by a publication¹ of scholarly merit and of broad interest to students of diseases of this obscure type. The authors are especially competent to find and evaluate the evidence, Professor McKay having for years been a leading investigator of virus diseases in the Pacific Coastal regions and Dr. Warner being bibliographer of the United States Department of Agriculture. Professor McKay recently demonstrated that the so-called "breaking" of tulips, which is evidenced by curiously streaked, speckled or feathered coloration of flowers with fainter foliage mottlings, is really a "degeneration" or "mosaic" disease. It is caused by an infectious virus which is readily transmitted with infected juice, either mechanically or by aphids. Once infected, the condition persists with the bulb. Hence, new "bizarre" color strains originate which have heretofore been considered "variegations" by bulb growers and so propagated and commercially distributed.

¹ "Historical Sketch of Tulip Mosaic or 'Breaking,' the Oldest Known Plant Virus Disease," by M. B. McKay and M. F. Warner, *National Horticultural Magazine*, 12: 179-216, July, 1933.

Of much immediate interest is the fact that these floral markings are so distinctive as to permit their recognition in the earlier illustrated floral catalogues and even the early herbals. The authors not only list these, with full bibliography, but reproduce the early plates from several such herbals as Clusius (1576), and from the illustrated garden manuals of Vallet (1608), de Bry (1612), etc. Moreover, some of these writers record observations upon the origin of their "broken" strains from those of pure color, exactly as now is experimentally reproducible. Clusius, in addition, notes that offsets from "broken" bulbs always have flowers of the same broken colors, whereas seedlings from the same plants reproduce the original pure color strain. The authors trace the early records of the introduction of the tulip into the gardens of western Europe from Turkey and show not only that such "breaking" was common among these earliest Turkish introductions, but also that it was probably observed by 1555 or earlier in the Turkish gardens before the bulbs were carried from these to western Europe. Thus, the evidence seems clear that this tulip mosaic is the oldest known plant virus disease, traceable through the four centuries of recorded tulip culture of western Europe to the still earlier gardens of Turkey. Incidentally, these centuries of experience point the moral that any modern tulip fancier who introduces these variegated novelties into his tulip garden should expect to find, as did Clusius four centuries ago, that the "variegation" with attendant weakening of plants will gradually spread to other pure-color tulips. He should, therefore, promptly eliminate these diseased tulips from his garden, unless he is more interested in verifying history than in maintaining the vigor and color of his flowers.

L. R. JONES

UNIVERSITY OF WISCONSIN

THE PARASITE INDUCING PEARL FORMATION IN AMERICAN FRESH-WATER UNIONIDAE

It has been known for many years that the best pearls are formed around the transparent spherical cysts of larval parasitic worms. In Europe the cysts of larval trematodes serve as nuclei for pearls, while larval cestodes induce pearl formation in the pearl oysters of the Indian Ocean. Apparently no one

has tried to determine what parasite originates the formation of pearls in North American freshwater clams, although several investigators have mentioned incidentally that cysts of larval trematodes occur in our freshwater Unionidae and that pearls are formed around them (see Clark and Wilson 1911¹; Wilson and Clark 1911²). In Central Illinois several species of clams are often heavily infested with encysted metacercariae which I have identified as the larvae of *Allocreadium ictaluri* Pearse 1924; the cysts are particularly abundant on and in the margin of the mantle. I have dissolved small pearls from *Leptodia gracilis* in acetic acid; a small metacercaria can be seen in a cyst at the center of each pearl, but not in condition to make positive identification possible. However, all the encysted metacercariae which have been found in Unionids of this locality belong to *Allocreadium ictaluri*, so there is good presumptive evidence that this is the pearl-inducing species. I have also found metacercariae of *Allocreadium ictaluri* in fresh-water clams from the Sunflower River, Miss. Professor Henry B. Ward has found encysted distomes in Unionids at New Baltimore, Mich., which I have identified as the metacercariae of *Anallocreadium armatum* (MacCallum 1895). It is possible that this species may also sometimes encyst on the mantle and induce pearl formation, but according to Professor Ward's field notes the cysts were found only in the foot. The adults of both *Allocreadium ictaluri* and *Anallocreadium armatum* live in the intestine of mollusk-eating fishes; the former has been found most frequently in the channel catfish, *Ictalurus punctatus*, and the latter in the sheepshead, *Aplodinotus grunniens*.

SEWELL H. HOPKINS

DANVILLE JUNIOR COLLEGE
DANVILLE, ILL.

TOBACCO SMOKING AND BLOOD SUGAR

HAGGARD and Greenberg have reported, as a new observation, that a rise in blood sugar follows the smoking of tobacco.¹ They infer, since nicotine produces hyperglycaemia, that "the smoker obtains from tobacco repeated minute doses of nicotine," but they do not mention that this point has been directly established by recovery of nicotine from the urine.² It is not wholly clear whether it is the physiological effect of nicotine in general, or the rise in blood sugar in par-

¹ H. W. Clark and C. B. Wilson, "The Mussel Fauna of the Maumee River," U. S. Bur. Fish. Doc. 757; 72 pp., Wash., 1911.

² C. B. Wilson and H. W. Clark, "The Mussel Fauna of the Kankakee Basin," U. S. Bur. Fish. Doc. 758; 52 pp., Wash., 1911.

¹ H. W. Haggard and L. A. Greenberg, *SCIENCE*, 79: 165, 1934.

² E. Dingemans and J. Freud, *Acta Brevia Neerland. Physiol.*, 3: 49, 1933.

ticular, that they refer to as "the source of at least a considerable part of the gratification from smoking." If the rise in blood sugar is credited with this rôle (and there seems to be no other evidence of psychological effects of fluctuations in carbohydrate metabolism within normal limits, except in connection with hunger contractions of the stomach), it may be pertinent to recall that many smokers enjoy tobacco especially after meals, when the rise of blood sugar admittedly does not occur. Finally, it should be observed that this rise in blood sugar after smoking is no new discovery, but has been described repeatedly^{3, 4} and is indeed the subject of a considerable monograph.⁵

D. L. THOMSON

MCGILL UNIVERSITY

A PECULIAR OPTICAL PHENOMENON

ON the evening of February 25 at about 6 to 7 P. M. there was visible a most peculiar optical phenomenon in the neighborhood of Bangor and Orono. The sky was nearly clear of clouds and the moon was about three quarters full. There was a very distinct halo around the moon, which was slightly colored toward the zenith. But most peculiar was the fact that a second circle of light was distinctly visible, which was parallel to the horizon, the zenith was the center of the circle and the moon was in the circumference of this circle. The circles distinctly crossed and could each be seen entire. At a short distance outward from the moon and from the points of intersection bright places appeared. This was no doubt due to the intersection of the second halo with the larger circle, although the rest of the second halo was not visible.

Considerable discussion has arisen as to the cause of the large circle with the zenith as its center. Perhaps some of your readers could explain this in a later issue if you would be so kind as to print this request.

Might this be due to the moonlight reflected from the snow-covered earth?

A. L. FITCH

UNIVERSITY OF MAINE

THE DISGRACE OF GERMAN SCIENCE

THE material and moral degradation of scientific men in Germany because they are liberals or of Jewish descent (so-called non-Aryans) continues uninterrupted, and not a voice is raised there in protest. It seems that only the religious leaders have sufficient courage of their convictions to protest against the government's infringements upon their rights and beliefs. Is it possible that no groups of scientists or technicians have courage enough to protest against

³ A. Caponetto, *Klin. Wochenschr.*, 7: 701, 1928.

⁴ A. I. Burstein and I. D. Goldenberg, *Biochem. Ztschr.*, 200: 115, 1928.

⁵ E. Lundberg and S. Thyselius-Lundberg, *Acta Med. Scand., Suppl.*, 38: 1, 1931.