Cotton-wilt is much more restricted in its range and prevalence on different kinds of soil than certain other vascular diseases caused by species of Fusarium, as, for example, tomato wilt or stem rot of sweet potatoes. Barring the presence of nematodes, if a grower reports that he has considerable cotton-wilt, it can reasonably be predicted that his soil is rather poor or worn out, lacking particularly in organic matter. If nematodes are present, then the use of organic matter in such soil will not remove the possibility of wilt development, although it may partially alleviate the losses that might be incurred by stimulating the growth of the plant. Thus, as with wilt-resistant varieties, the presence of nematodes interferes with the ability of the plant to ward off infection.

To explain these phenomena, the following theory is at present held by the writer. *Fusarium vasinfectum* is a wound parasite and invades only after some injury has occurred to the roots. This injury may be caused by various agents, including diverse microorganisms, nematodes or other soil-inhabiting metazoa, or by chemicals. Having once gained entrance into the vascular system of the root, it lives a semi-parasitic existence within the water-conducting tubes, confining itself for a large part to the non-living material within the dead vessels. Only after the living tissues are killed or greatly weakened in advance of mycelial invasion will the fungus grow and fructify in those parts. This theory is in part borne out by the fact that no amount of inoculum applied to the top of a plant will induce infection on living parts.

Because of the importance of cotton-wilt, attention is directed in this preliminary note to the possibility of its control by the use of organic fertilizers. Orton's findings (U. S. Dept. Agr. Farmers' Bul. 333, 1910), which have doubtless acted as a deterrent in the use of organic fertilizers for the control of wilt, are based on very little experimental data, and his results are contradicted by the work of Fulton (La. Agr. Exp. Sta. Bul. 96, 1907). The writer has some data which seem to confirm Fulton's work.

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EDITORIAL ETHICS IN SCIENTIFIC PUBLICATIONS

SOME weeks ago I was honored by an invitation to give a short address on "The Rôle of Wave Length in Modern Theories of Radiation," this being part of a program in connection with a joint meeting at Schenectady of the Union and Rensselaer Chapters of Sigma Xi. The address was broadcasted by WGY. For publicity purposes, an advance copy of the address was furnished to the Associated Press.

In the issue of *Telegraph and Telephone Age* for May 16, 1927, on page 225, there appears what purports to be an article contributed by me to that periodical under the title, "The Rôle of Wave Length in Modern Theories on Phenomena of Radiation." This article contains certain parts of my address, but, in addition to the change of title, certain unfortunate omissions were made.

This material was published over my name, but without my permission having been first obtained; without advising me in advance that the article was to be thus published, and, what is of far more significance, *no acknowledgment whatsoever was given of the occasion for which the material was prepared.* The casual reader will assume, of course, that the article was prepared specially for *Telegraph and Telephone Age.*

In view of the fact that I have experienced previously several other incidents of this kind and know that others have had similar experiences, I am recording these facts in the nature of a protest against such a practice as this, which is becoming all too common. It seems to me that the ethics of the editorial profession should be based upon the ordinary courtesies which ought to be extended to an author or speaker.

F. K. RICHTMYER

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A MICRO BLOOD SUGAR METHOD AND THE BLOOD SUGARS OF INSECTS

CHEMICAL analyses of the constituents of the blood of insects have been largely neglected because of the lack of suitable quantitative micro-methods. Biological fluids, especially of insects, are always present in minute quantities, and analyses of these fluids must necessarily be made by micro methods. This is especially true if the insect, after the extraction of the blood, is to continue living. Recent work on insect blood seems to have been largely qualitative in character.[1,2] Bishop,[3] however, gives quantitative data for the blood of honey-bee larvae, using blood collected from fifty animals. Considering the variations among individuals, such results can hardly be compared.

[1] Muttkowski, R. A., 1923, Bull. Brooklyn Ent. Soc. Vol. 18, p. 127; 1924, Bull. Brooklyn Ent. Soc. Vol. 19, p. 4.

[2] Haber, V. R., 1926, Bull. Brooklyn Ent. Soc. Vol. 21, p. 62.

[3] Bishop, G. H., 1925, *Jour. Biol. Chem.*, Vol. 66, p. 77.

In attempting to determine the blood-sugars of single insects, the writer was faced by the necessity of procuring a method requiring less than 0.5 cc of blood for a single determination. Various modifications of existing macro-methods, which use 0.1 cc of blood, have been described.[4,5,6] However, 0.1 cc of blood is more than can be safely, if at all, extracted from a single insect, and an attempt was made to reduce one of the most popular blood-sugar methods, Folin and Wu,[7,8] so that only 0.03 cc of blood is necessary for a single determination. The method is a reduction rather than a modification of the original one, and the original technique is retained throughout. The changes made have to do with the quantities of solutions used rather than with the nature of the reagents or the method of procedure.

Capillary pipettes with rubber bulbs attached are drawn out to deliver thirty drops per cc. The capillary portion should be long enough to hold at least one drop of liquid, and the length which will exactly hold one drop should be etched at that point. The reagents are then added in drops instead of cubic centimeters as is done in the macro method.

The reagents used in this method have been fully described by Folin and Wu and improved upon by Folin and Svedberg[9] and the reader is referred to those papers for their preparation. The method, as has been stated, is also the same, except that volumes in the macro method are to be interpreted as drops in this method. The final volumes for colorimetric comparison are diluted to 2.5 cc.

The following readings were obtained when known concentrations of glucose were used as unknowns:

TABLE I

Original mg/100 cc	Obtained	Per cent. difference
350	365.4	5.0
300	308.4	2.8
275	265.8	3.4
225	228.3	1.4
190	185.0	2.6
175	173.0	1.1
175	180.1	2.9
150	148.0	1.3
150	156.1	4.0
150	149.5	0.4
130	124.9	3.9
125	122.0	2.4
125	124.4	0.4
100	98.1	1.9
95	93.5	1.2
85	82.0	3.5
70	66.3	5.0
70	70.5	0.7
55	56.2	2.1
50	48.3	3.4
50	46.3	7.4
40	39.1	2.5
25	23.7	5.2

As a preliminary check on the practical applicability of this method, a number of grasshoppers were tested for blood-sugars. In every case, but one insect was used for each determination, and after withdrawing 0.03 cc of blood, the insect remained alive and apparently normal. As stated above, this is only a preliminary work on the blood sugars of Orthoptera. No attempt was made to keep conditions, dietary or environmental, under control. Below are given values for blood-sugars obtained from several species of grasshoppers and Japanese beetle larvae.

TABLE II

Grasshoppers	Blood-sugar mg/100 cc	Average	Range
Romelea microptera (nymph)	42.4 40.4 36.0 48.0 34.2 49.4	41.7	34.2 – 49.4
Melanoplus femur rubrum	35.2 33.3 30.6 } same individual 31.6 } 41.8 } same individual 41.9 }	35.3	30.6 – 41.9
Melanoplus differentialis	36.1 31.4 31.0 36.1 38.7 45.9	36.5	31.0 – 45.9
Chortophaga virdifasciata	35.2 32.8	34.0	
Encoptolophus sordidus	36.4	36.4	
Japanese beetle			
Popellia japonica (larvae, 3rd instar)	68.8 56.3 63.0 69.2 57.7	63.0	56.3 – 69.2

[4] Byrd, T. L., 1925, *Jour. Lab. and Clin. Med.*, Vol. 11, No. 1.

[5] Foster, G. L., 1923, *Jour. Biol. Chem.*, Vol. 55, p. 291.

[6] Höst, H. F., and Hätlehol, R., 1920, *Jour. Biol. Chem.*, Vol. 42, p. 347.

[7] Folin, O., and Wu, H., 1920, *Jour. Biol. Chem.*, Vol. 41, p. 367.

[8] Folin, O., 1926, *Jour. Biol. Chem.*, Vol. 67, p. 357.

[9] Folin, O., and Svedberg, A., 1926, *Jour. Biol. Chem.*, Vol. 70, p. 405.

The data, although limited, suggest that taxonomically related species may have blood-sugars quantitatively similar. This point is to be further investigated.

The writer is indebted to Dr. J. H. Bodine for valuable advice given toward the completion of this paper.

REUBEN BLUMENTHAL

SPECIAL ARTICLES

THE STUDY OF AN ULTRAVIOLET TRANSMITTING MATERIAL

THE beneficial effects of sunlight have long been known, but the discovery that the ultraviolet portion of the sun's radiation is of value in the prevention of rickets in the human being, leg-weakness in chickens and leg-stiffness in swine, is of recent date. Furthermore, data are being accumulated from different sources which point to the conclusion that the portion of the ultraviolet spectrum which is concerned with normal bone formation lies between 2,800 Å and 3,200 Å.

For the measurement by chemical means of the relative amount of ultraviolet light which passes through a given material, the acetone-methylene blue method described by Webster, Hill, and Eidinow[1] was selected. The acetone-methylene blue reagent is decolorized by radiations shorter than 3,200 Å. Although this reaction has not been studied critically, and the exact limits of the spectrum between which it is sensitive are not known, it is significant that the maximum chemical susceptibility[2] of acetone is between 3,000 Å and 2,470 Å, and that this section of the spectrum lies in the physiologically active range. When the reagent is placed at a distance of three feet from a quartz mercury lamp, the change in color caused by the light filtered by ordinary window glass is less than 5 per cent. of that noted when no filter is used. Measurements made by Coblentz and Fulton[3] show that window glass permits the passage of little or none of the radiations of wave length less than 3,200 Å. Hence the acetone-methylene blue reagent is apparently sensitive only to wave lengths shorter than about 3,200 Å.

Fundamental and practical studies of the ultraviolet transmitting properties of a glass substitute, Cel-O-Glass, are under way. According to the acetone-methylene blue reaction, 47 per cent. of the light from a quartz mercury lamp, of wave length less than 3,200 Å, is transmitted when the reagent is at a distance of three feet from the lamp. Daily readings by the colorimetric method, of the total ultraviolet portion of sunlight, less than 3,200 Å, made over a period of five months, show that 50 per cent. of this radiation passes through the material.

In view of the use to which the ultraviolet transmitting material would be put, it was desirable to determine whether or not the percentage transmission, as measured by physical and chemical means, could be confirmed physiologically. A series of experiments is under way, using the chicken as the experimental subject, to determine the percentage of light, effective in the normal formation of bone, which is passed by Cel-O-Glass. The basal ration[4] used is 99 per cent. yellow corn, 1 per cent. sodium chloride and skimmed milk *ad libitum*. The birds in one set of pens receive a daily dosage of light from a quartz mercury lamp (Uviarc Poultry Treater Lamp), while those of another set are exposed to the light which has been filtered by the glass substitute.

The ash, and in some cases the calcium and phosphorus, of the dry, alcohol-ether extracted femurs and wing bones, are determined in four to eight birds selected from each pen, each week, for an eight- or ten-week period, and these values are used as a measure of the effectiveness of the rays in bone formation. Preliminary results indicate that the percentage of the effective rays which pass through Cel-O-Glass is between 33 per cent. and 40 per cent. A detailed report will be made in the near future of experiments with about 900 birds.

Further experiments are to be conducted which seek to express hours of ultraviolet light of sunlight in terms of hours of this radiation from a quartz mercury lamp. The comparison will be made by the physiological method mentioned above, and the results will also be expressed in methylene blue units.

A critical study of the acetone-methylene blue method and of its modification for use in a colorimeter is being made in the department of chemistry of Rutgers University.

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[1] Webster, Hill and Eidinow, *The Lancet*, April 12, 1924, p. 745.

[2] Henri and Wurmser, *Comp. rend. 156*, 230 (1915).

[3] Coblentz and Fulton, Bur. Stds. *Sci. Paper No. 495*, Fig. 4 (1924).

[4] Wisconsin Agric. Expt. Sta. Bull. *371*, 21 (1925); Hart, Steenbock and Lepkovsky, *J. Biol. Chem. 65*, 572 (1925).

[5] Cel-O-Glass Industrial Fellow. This investigation is being conducted on a fellowship grant from Acetol Products, Inc., New York.