# DISCUSSION

## THE HIGH WAX CONTENT OF GREEN LINT COTTON

THE lint from *Gossypium hirsutum* (var. Arkansas green lint),[1] described by Ware,[2] differs from that of ordinary strains of upland cotton not only in its bright green color and soft feel to the touch but also in its remarkably high wax content. Whereas the wax content of most cotton lint varies within the range of from 0.4 to 0.7 per cent.[3] that of green lint cotton, based on the dry weight, has been found to vary within the high limits of from 14 to 17 per cent. This high wax content was discovered accidentatlly by the writer in connection with some inquiries into the source of different hues of fluorescence when cotton fiber was irradiated with ultraviolet light.

The wax may be removed readily from the lint of green lint cotton with hot ethyl alcohol, chloroform and other organic solvents. It is also quite soluble in hot acetic acid and cold pyridine. With alcohol as well as with most other solvents the hot extract is colored deep amber in transmitted light but fluoresces a deep velvety green in reflected light. However, the green color of the lint is not changed appreciably, if at all, by the extraction. Thus, it has not yet been ascertained whether the green fluorescence of the alcoholic extract is related to the green color of the lint or is entirely independent. When the hot alcoholic solution cools to 50–55° C. most of the wax separates out in poorly defined yellow crystalline flakes. Between crossed nicols the crystals are quite noticeably anisotropic.

By means of 95 per cent. ethyl alcohol and ethyl ether at room temperature it is possible to separate the crude wax into at least three fractions of different properties (Table 1):

TABLE 1

| Fraction no. | Approx. per cent. of total | Solubility at room temperature | Melting point of solid ° C. | Transmitted color of hot alcoholic solution | Velvety green fluorescence in reflected light |
|---|---|---|---|---|---|
| 1 | 30 | Moderate in alcohol | 85–89 | light green | inappreciable |
| 2 | 50 | Slight in alc., large in ether | 86.5–90 | golden brown | moderate |
| 3 | 20 | Slight in both alc. and ether | 93–95 | very dark brown | very strong |

It seems quite likely that fraction 2 contains small amounts of the substance responsible for the dark color and deep velvety green fluorescence of fraction 3. The latter fraction is practically insoluble in ethyl ether, even at boiling temperature and thus can be readily separated from the other two fractions. The very deep color of its solutions is not removed by wood or animal charcoal. A Salkowski test for phytosterol in this fraction was negative. All fractions have a remarkably high melting point compared with other naturally occurring waxes.

X-ray diffraction patterns show that a least a part of the wax occurs in a crystalline form in the fiber and is quite highly oriented, the most prominent diffraction arcs arising from crystal planes perpendicular to the fiber axis; this is the same as Berkley[4] found for the primary wall patterns of white upland varieties. The green lint cotton differs from the other varieties, however, in that a strong wax pattern persists even with the mature fiber.

Microscopic observation of the fibers in longitudinal mount or of their cross-sections does not reveal definitely the location of the wax. In cross-section an outer greenish translucent ring which constitutes one third to one fourth of the thickness of the wall may be observed on sharply focusing. When the fiber cross-sections are strongly swollen with cuprammonium solution a number of similar greenish translucent concentric rings may be seen throughout the wall. Thus far it has not been possible to identify any definite layer of the wall in which the waxy constituents may be considered to be concentrated.

A larger quantity of the wax has been collected for identification of the components.

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[1] The samples were furnished by Dr. J. W. Neely through Dr. J. O. Ware, both of the Bureau of Plant Industry, U. S. Department of Agriculture.
[2] *Jour. Amer. Soc. Agron.*, 24: 550, 1932.
[3] Shirley Institute Memoirs, 4: 107–113, 1925.
[4] *Textile Research*, 9: 355–373, 1939.

## POLIOMYELITIS IN A LABORATORY WORKER EXPOSED TO THE VIRUS[1]

ONE of our associates, a woman 35 years old, has developed paralytic poliomyelitis under circumstances which make it highly probable that the infection was contracted in the laboratory. The purpose of this preliminary report is to inform investigators, who may be engaged in work with poliomyelitis virus of human or recent human origin during the next two or three months, of the possibility of laboratory infection in order that they may take precautions which ordinarily might not have been observed. In the more than thirty years of experimental work on poliomyelitis there has not been a single instance of infection as a result of exposure to the virus in the laboratory. Since adults are relatively resistant and since most of the work has been done with rhesus monkeys and with monkey-adapted strains of virus, it is possible that the

[1] Aided by a grant from the National Foundation for Infantile Paralysis, Inc.

conditions were not especially conducive to laboratory infection. In recent years, however, an increasing number of investigators have turned to the study of the human disease and of the behavior of virus of recent human origin in chimpanzees and monkeys of species other than rhesus. It was during the course of work on cynomolgus monkeys which had developed poliomyelitis following the oral feeding of a strain of virus isolated from a child in 1940, that our associate, B. J., contracted poliomyelitis. We have discovered in recent weeks that in these monkeys readily demonstrable virus was present in the buccal, lingual, pharyngeal and intestinal tissues and contents, and B. J.'s duties included the washing and grinding of these tissues in preparation for inoculation into other monkeys.

The circumstances of the illness are as follows: B. J. was working with these infected tissues until June 14, when she left the laboratory to go on her vacation. On June 25, she first felt indisposed with slight headache and nausea. On June 27 and 28 she went to bed because of general malaise and severe backache. On June 29, partial paralysis of the right leg appeared. In the next few days the temperature varied between 102 and 104 degrees Fahrenheit, and there was extension of paralysis involving the entire right lower and upper extremities, the urinary bladder, part of the left lower extremity and partial ptosis and small pupil on the right side with transitory diplopia. Spinal puncture revealed 192 cells per cu mm of cerebrospinal fluid. On July 3, the temperature returned to normal and no further progression of paralysis occurred. Virulent poliomyelitis virus was isolated from her on two occasions; first from a stool specimen obtained 24 hours after the onset of paralysis and the second time from the rectal and colonic washings, containing almost no solid matter, 3 days after the onset of paralysis. Extensive flaccid paralysis with typical histological changes in the spinal cord was produced in both cynomolgus monkeys and positive passage was obtained in each instance. The virus was not pathogenic for mice or guinea-pigs. It may be added that no outbreaks of poliomyelitis had been reported either in Cincinnati or the other places visited by her.

While other studies are still in progress, we believe that the balance of probability in this case is that the infection was contracted in the laboratory. Therefore, we wish to caution other investigators to observe the greatest care not only in handling tissues or excreta of human beings with poliomyelitis but also in working with monkeys (especially cynomolgi or related species) infected with virus of human or recent human origin. This may particularly apply when such virus is given by mouth or reaches the alimentary tract following nasal instillation, which is part of the method now commonly used in testing for the virus in human stools.

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## ANOPHELES (KERTESZIA) BELLATOR D. & K., FOUND NATURALLY INFECTED WITH PLASMODIUM

IN the cocoa-raising districts of Trinidad, *Anopheles bellator* is the most abundant *Anopheles* mosquito; it breeds in the epiphytic Bromeliads which grow in great numbers on the lofty immortelle trees that shade the cocoa trees. The malaria rates in these areas are often high, and this mosquito has been suspected of being the vector. It is active during the twilight hours, and at that time attacks man in houses as well as out of doors. Unlike many other anthropophilous Anophelines, *A. bellator,* although it will enter houses and even bed-nets to feed on man, does not remain in houses after it has fed, but returns immediately to its resting places in the forests. Because of this habit, it is impossible to obtain freshly engorged specimens for determining the natural malarial infection rates among these insects; the females must be caught while they attack either the collector or another person being used as bait. Almost all the specimens captured by the authors appeared to be young females taking their first blood meals, but the 398th specimen dissected was infected with a single large oocyst, which ruptured as a result of slight pressure upon the coverslip, and liberated large numbers of motile sporozoites. The mosquito had been collected while it was attacking a native boy, near the Canadian Mission School on the St. Marie Immanuel Road, on July 11, 1941.

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## THE PLACE OF MICROFILM COPYING IN LIBRARY ORGANIZATION

THE recently perfected process of making photographic copies of printed pages upon moving picture film is the most economical method so far devised for rendering available to larger numbers of research workers the collections of source material contained in scientific periodicals. It is evident that microfilm copying constitutes a very real improvement and extension of library service and is destined to become an ever-increasing activity in the larger reference libraries. It is fitting, therefore, to discuss the basis upon which it should be undertaken in order to pro-