the enlargement of the lymph nodes was due to simple hyperplasia and that there were no metastases. Details of this morphological study will be published later.

The interpretation of these findings must await the outcome of further analyses on the nitrogen content of other compartments in these animals. The relatively small increase in the nitrogen content of the lymphoid tissue of mice bearing adenocarcinoma of the breast suggests that in this case the lymphatic hyperplasia may be of a different nature than that observed in the mice bearing sarcoma 180.

The data of Murphy and Sturm (*6*) showed opposite trends in the weights of cervical lymph nodes of rats bearing a lymphosarcoma. This discrepancy of data obtained in different species emphasizes the complexity of the problem.

The findings of Savard (*7*) of adrenal hypertrophy in mice with sarcoma 180 and the parallelism between the observations of Dougherty and White (*1*) in adrenalectomized mice and our own data suggest the adrenal as a possible mediator of the phenomenon. However, other nutritional and hormonal factors must be investigated.

The experiments revealed a systemic effect on protein metabolism caused by transplanted tumors not usually considered to mediate endocrine mechanisms, and the observations may provide a new approach to the tumor-host relationship in animals and man.

TABLE 2

ANALYSIS OF VARIATIONS BETWEEN NORMAL AND TUMOR-BEARING MICE

	Mean	SEM	t value	P value
Nitrogen in lymph nodes and thymus (mg/100 gm body wt.)				
Normal	6.2	0.736		
Sarcoma 180 (6 day)	23.9	2.73	4.88	< .01
Sarcoma 180 (12 day)	14.2	0.87	5.54	< .01
Breast adenocarcinoma (EO 771)	11.5	0.82	3.74	< .01
Weight of lymph nodes and thymus (mg/100 gm body wt.)				
Normal	287	25.5		
Sarcoma 180 (6 day)	779	60.2	5.92	< .01
Sarcoma 180 (12 day)	588	22.9	5.61	< .01
Breast adenocarcinoma (EO 771)	713	28.3	7.55	< .01

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Zeeman Effect and *g*-Values for Neutral Nitrogen and Oxygen

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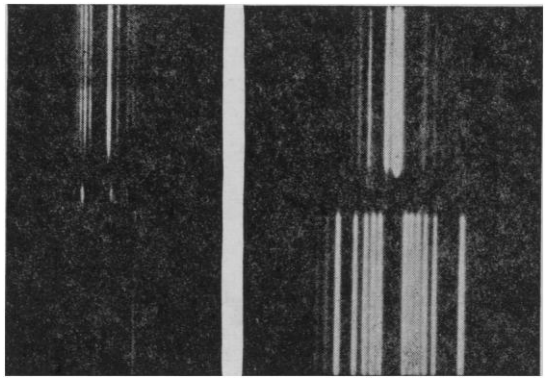
No *g*-values are available for the energy levels of atoms below 10, neon, except in the case of the ionized nitrogen and oxygen atoms. The reason for this is that the Zeeman patterns that have been reported are, for the most part, qualitative, or they are distorted. Recent Zeeman-effect observations of the red and infrared lines of various metals, made at the National Bureau of Standards and at the Massachusetts Institute of Technology, show the patterns of atmospheric nitrogen and oxygen lines as well. The nitrogen lines represent transitions from the terms $3p\ ^4D°$, $3p\ ^4P°$, and $3p\ ^4S°$ to the lower term $3s\ ^4P$, while those of oxygen result from transitions from $3p\ ^5P$ and $3p\ ^3P$ to $3s\ ^5S°$ and $3s\ ^3S°$, respectively.

On the spectrograms made at the National Bureau of Standards, with magnetic field-strengths of 35,000 gausses, and on the MIT spectrograms, with fields in excess of 85,000 gausses the nitrogen and oxygen Zeeman patterns exhibit various degrees of distortion both in the positions and in the intensities of the magnetic components. The nitrogen patterns exhibit only slight distortions or none at all. With the oxygen patterns the case is different: the quintet group, at 7,771–75 A, illustrated in Fig. 1, shows marked distortion at two different fields and bears no resemblance to either a weak-field pattern or to a Lorentz triplet; the triplet group, at 8,446 A, however, shows a nearly perfect Lorentz triplet pattern with very weak π-satellites also at the normal triplet separation.



A B

Fig. 1. Zeeman patterns of the oxygen lines at 7,771–74–75 A: A—34,660 gausses; B—85,400 gausses.

The interpretation of these patterns has afforded an interesting application of quantum theory to the elucidation of the Paschen-Back effect. Because the splitting of the atomic energy levels in the field is of the same order of magnitude as the level separations when no field is acting, it is found that the magnetic sub levels of the same

quantum number push each other away from their normal positions and alter each other's transition probability. A calculation of the amounts of these shifts and intensity changes by means of the quantum formulas yields magnetic patterns in close agreement with those observed. The g-values that we have derived for the N I and O I energy levels conform, within observational error, to those required for LS-coupling, despite the fact that the term-intervals, except those of $3p\ ^4D^\circ$ of N I, do not conform to the Landé ratios.

Multicellular Hairs in *Gossypium*[1]

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The seed hairs of cultivated cotton (*Gossypium* spp.) are of two types: long fibers, which constitute the lint of commerce and which are removed in the ginning process, and short hairs, closely adherent to the seed, which are known as fuzz or "linters." The seeds of wild species of *Gossypium* differ from those of cultivated types in that they bear only one type of hair which varies considerably in length from species to species.

The developmental histology of lint and fuzz hairs in cultivated varieties has been studied by several workers.

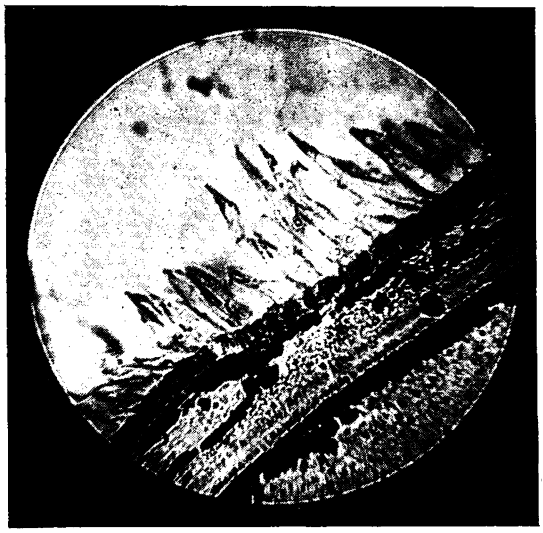

FIG. 1. Binuclear elongated epidermal cells of *G. hirsutum* ovules, fixed at 60 hrs after the flower opened (× 675).

In 1881 Bowman reported that lint hairs were multicellular. Later, he (*2*) and all subsequent workers have indicated that both lint and fuzz hairs are unicellular outgrowths of the seed coat epidermis. Since the comparative morphology of lint, fuzz, and wild type seed

FIG. 2. Multicellular elongated epidermal cells of *G. klotzschianum* var. *davidsonii* ovules, fixed at 48 hrs after the flower opened (× 1,050).

hairs is of considerable evolutionary and technical significance (*3–5*), a comprehensive study of the *Gossypium* genus as a whole has been begun at the Texas Agricultural Experiment Station.

This study was initiated during the summer of 1947 on upland (*G. hirsutum*) ovules taken every 2 hrs, beginning 16 hrs before the opening of the flower. Ovules were fixed in Navashin's solution as modified by Longlet (*6*) and embedded in paraffin. Microtome sections, 12 μ in thickness, were stained with iron gentian violet and mounted in Canada balsam. Studies were continued in the greenhouse during the winter of 1948 on 4 different species, samples being taken every 12 hrs. The results, which will be published in detail elsewhere, suggest a new interpretation of structure and development of seed hairs in *Gossypium*. They may be summarized briefly as follows:

(1) Both lint and fuzz originate at the same time and are distributed at random over the surface of the ovule, their initiation being independent of both pollination and fertilization (cf. *1*).

(2) Differentiation between fuzz and lint, based upon the diameter of the epidermal cell (*3*), general shape of the hair, and number of nuclei present, can be made as early as the time of flower opening.

(3) Examination of sections taken before flower opening suggests that the lint hair originates as a binuclear

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