morphologically and culturally. These were obtained from the throats or sputa of patients with primary atypical pneumonia, as well as from persons with other acute respiratory infections without pneumonia. As yet, none of these strains has yielded results similar to those obtained with streptococcus 344 in agglutination tests. Agglutination has either failed to occur or has occurred to an equal degree in both acute-phase and convalescent sera. However, when some of these strains were extracted, it was found that soluble substances were obtained which gave results very similar to those observed in precipitation tests with streptococcus 344.

There is as yet no satisfactory explanation for the positive serological reactions which have been observed with streptococcus 344. The available evidence does not warrant the conclusion that this bacterium is a factor in the etiology of primary atypical pneumonia.

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THE ADRENALS AND SUSCEPTIBILITY TO TRANSPLANTED LEUKEMIA OF RATS

IT was demonstrated some years ago by Jaffe[1] that removal of the adrenals was followed by regeneration of the thymus in old rats and a stimulation of the gland in young rats. A transplantable lymphatic leukemia under investigation in this laboratory has as its most characteristic manifestation an extensive infiltration of the thymus.[2] In the investigation to be reported, the effect of adrenalectomy with its accompanying stimulation of the thymus has been tested on the susceptibility of rats to inoculated leukemia.

Two groups of experiments have been completed. The object of the first was to determine the result of adrenalectomy on the leukemia susceptibility of middle age rats, this being an age when normally the thymus has almost completely atrophied. Even the most receptive strain of rats at this age show a natural resistance, as illustrated by the fact that only 46.9 per cent. of 32 inoculated animals developed the disease. As a contrast to this, rats of the same age and strain subjected to adrenalectomy 15 days before inoculation developed leukemia in 90.3 per cent. of the 31 rats included in the group. The average survival time of the intact rats with the disease was 9.7 day, whereas the adrenalectomized animals averaged only 6.2 day.

In the second group of experiments tests were made of the effect of adrenalectomy on induced resistance of young rats. This state may be brought about by the injection of homologous defibrinated blood two weeks prior to inoculation.[3] In experiments involving 250 rats the following results were recorded. Intact young rats which received the blood injection alone developed leukemia in only 33.9 per cent. of the 59 inoculated. Among the 43 rats adrenalectomized before the injection of defibrinated blood 76.8 per cent. were susceptible and in 42 rats subjected to the reverse procedure, *i.e.*, the blood injection preceding the removal of the adrenals, 92.9 per cent. developed the disease following inoculation. Control rats which received no treatment before inoculation were 96.5 per cent. receptive, and untreated adrenalectomized inoculated rats all died of the disease.

Certain hormones are known to influence malignant conditions in such organs as are normally subject to control by the individual hormone. While in general it is not justifiable to draw conclusions as to the origin of a malignant state from results of a study of transplantation, yet in the present case it may not be amiss to call attention to the fact that the activity of the lymphoid tissue can be influenced by hormones. Therefore it is not unlikely that such hormones play a role in the malignant condition of this tissue, and this likelihood is suggested by the reported results. More direct evidence of this possibility is being accumulated from an extension of the investigation.

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LOW LIGHT INTENSITY AND COTTON BOLL-SHEDDING

MANY reasons have been given for the shedding of flower buds (squares) and immature bolls by the cotton plant. Aside from insect injury, such factors as drought, fluctuations in soil moisture, impaired fertilization in the flower and load of fruit on the plants have all been shown to be related to the problem of excessive shedding. The studies of Mason[1] in the West Indies and those of Knight[2] in the Sudan, as well as the paper by Canney,[3] suggest that periods of cloudy weather may have considerable effect on the fruiting and shedding of cotton.

In studying the causes of shedding in cotton, recent experiments at the Texas Agricultural Experiment Station indicate that interruptions for two or three days in the high sunlight intensities often causes undue shedding of fruiting forms. For example,

[1] H. L. Jaffe, *Jour. Exper. Med.*, 40: 325–342, 1924; 40: 619–625, 1924; 40: 753–760, 1924.
[2] J. B. Murphy and E. Sturm, *Cancer Research*, 1: 379–383, 1941.
[3] E. Sturm, *Cancer Research*, 1: 627–628, 1941.
[1] T. G. Mason, *Annals Bot.*, 36: 457–484, 1922.
[2] R. L. Knight, *Empire Jour. Exp. Agr.*, 3: 31–40, 1935.
[3] E. E. Canney, *Shirley Inst. Memoirs*, 3: 281–290, 1924.

upland cotton plants in jars of soil two months after planting were subjected to low daylight intensity of around 50-foot candles by keeping the plants in a laboratory room for a single 4-day period. Five weeks later, these plants had on the average only 5.4 good-sized bolls per plant and each plant had shed an average of 30 squares and young bolls. At the same time, the control plants had 21.2 bolls per plant with only 17.5 squares and bolls shed. This represents a reduction of 75 per cent. in the number of mature bolls, associated with the low light intensity treatment. Most of those fruiting forms were shed during the third and fourth days while the plants were indoors. Similar increases in rates of shedding have been obtained by shading cotton plants in the greenhouse and in the field with black cloth. Such shading has reduced the direct sunlight intensity at midday from around 12,000 foot candles to 300–1,000 foot candles. In connection with these studies at College Station, light intensities of less than 1,000 foot candles have been measured at noon on cloudy days during the growing season for cotton.

In addition to the abscission of young bolls just after flowering, at which stage most of the shedding in the field takes place, these low light intensities for as short a period as two days caused the shedding of many cotton squares. These effects are equal to results obtained by prolonged severe wilting, which is recognized as providing a strong stimulus for shedding. Presumably, the accelerated rates of shedding following shading were associated with interrupted photosynthetic activity and low carbohydrate nutrition. Increased vegetative growth followed the shedding of buds and bolls.

Evidence of varietal differences in the response of cotton to conditions of low light intensity has been obtained.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

USE OF ENZYMES TO IMPROVE CYTOLOGICAL TECHNIQUES

DURING the last few years cytological studies on a tetraploid form of *Lilium longiflorum* Thunb. have been in progress at the Plant Industry Station, Beltsville, Md. It was found very difficult to analyze chromosome associations during the first meiotic metaphase because they tended to form clumps. To overcome this difficulty a number of treatments designed to digest the cell wall and destroy the gel properties of the cytoplasm were used. If this could be accomplished without injury to the paired chromosomes, well-spread figures could be secured in which analysis of polyvalents would be possible. Among the treatments herein described, several with enzymes gave definitely beneficial results.

The plants used for these experiments were a tetraploid clon of *Lilium longiflorum,* several diploid forms of the same species and a triploid clon of *L. tigrinum* Ker Gawler. Buds were collected in which most of the pollen mother cells were at the first meiotic metaphase. The perianth segments were removed and the buds then fixed in a solution composed of 3 parts absolute alcohol to 1 part glacial acetic acid. After overnight immersion the buds were run through 95 per cent. alcohol to 70 per cent., where they were held until wanted.

The anthers, as needed, were cut into small pieces, about 1 to 2 mm long, thus making it possible to give a series of different treatments to portions of the same anther. All slides were stained with aceto-carmine.

In the first series of tests only inorganic chemical treatments were used. These were: a cellulose solvent, copper oxide ammonia; a pectin solvent, 1 per cent. ammonium oxalate; and a suberin solvent, 10 per cent. alcoholic potassium hydroxide. All the slides from the treatments were poor in comparison with the untreated.

These unsatisfactory results led us to try a biological approach, and 1 per cent. solutions of three enzyme preparations were tried: Malt diastase; Polyzime "P," which is used in desizing fabrics; and Clarase,[1] a proprietary enzyme complex. For these treatments the fixed anthers were first run through lower strengths of alcohol to water and thoroughly washed. Use of the first two preparations produced little if any benefit in comparison with the check slide which in this instance was made following the washing in water. The Clarase treatment, however, brought about a partial softening of the cell walls and digestion of the cytoplasm so that in most cells the paired chromosomes were well spread out, thus making it possible to determine the types of chromosome associations present. Several periods of exposure were tried and as little as 15 to 20 minutes was about as effective as several hours.

Since the diastatic enzymes were ineffective it was thought that possibly the beneficial effects of Clarase

[1] Manufactured by the Takamine Laboratory, Clifton, N. J.