in another dog also brought about an increase in the content of total fat and cholesterol in the blood serum to over 100 per cent. of the original amount.

Conclusion: The tubular apparatus of the kidneys of dogs possesses a regulatory influence on the blood lipids such as has hitherto been unknown and is still unexplained. It is probable that the human kidney exerts the same function, but this has not yet been proved. A disturbance of this function would explain the hyperlipemia observed in nephrosis better than any hypothesis thus far advanced.

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ASSOCIATION OF TOBACCO LEAFSPOT BACTERIA WITH ROOTS OF CROP PLANTS[1]

SINCE the discovery, more than 20 years ago, of the causal agents of wildfire (*Bacterium tabacum* W. and F.) and angular leafspot (*B. angulatum* F. and M.) diseases of tobacco, no satisfactory explanation of the sources of inoculum in tobacco plant beds has been advanced. Even if a new plant-bed site is used, the plant-bed soil steamed or burned, a new cotton cover used, and disease-free seed planted, angular leafspot and, to a less extent, wildfire may appear throughout an entire Burley tobacco bed or large sections of it after a few hours of cool, wet weather. The fact that the amount of disease is usually so great seems to eliminate the possibility that the bacteria might have originated in trash from a previous infected tobacco crop. One fact is known which has a bearing on the source of inoculum; namely, that one or two applications of Bordeaux mixture sprinkled on the surface of the soil when the plants are very small or even before the seeds germinate will completely protect the leaves from infection in the bed.

In searching for the source of inoculum we found that,[2] in field soils naturally contaminated with these organisms from a previous infected crop, the organisms survived the winter at least until plant-bed time, and could be isolated by proper technic. The same was true of plots of soil out-of-doors artificially inoculated in the fall. Attempts to isolate the organisms from plant-bed soil in the spring of 1941, however, where subsequently one or the other disease developed, resulted only in failure. Occasional failure also resulted in attempts to isolate the organisms from artificially and naturally contaminated soil in which cover crops were growing. These erratic results suggested that the bacteria might be living on or in the roots of cover crops in the contaminated soil and that infection of leaves in the plant bed might follow multiplication of the bacteria on the roots of young tobacco or other plants growing in the bed.

In testing this hypothesis it was found that heavy infection frequently resulted when the roots of cover crops, including wheat, barley, rye, crimson clover and vetch, were washed free from soil in running water, ground in a mortar, diluted with water and poured over the surface of artificially water-soaked tobacco leaves. The roots were obtained both from artificially contaminated soils out-of-doors and from fields where the diseases were known to have been severe in 1941. Roots of tobacco from plant beds naturally infected with wildfire or angular leafspot also gave heavy infection when washed and used as inoculum. *B. angulatum* has also been isolated from the roots of seedling tobacco plants before the disease appeared on the leaves in untreated beds, and has been isolated from the roots of tobacco plants in beds treated with Bordeaux mixture. It is likely, therefore, that both organisms may be carried from the plant bed to the field on the roots of "healthy" plants and be the source of sudden outbreaks in the field following a protracted period of wet weather.

A microscopic examination of tobacco rootlets from naturally infected plant beds and from artificially inoculated tobacco roots growing in sand revealed masses of bacteria, at intervals on the roots, which appeared to be embedded in a matrix, for occasional bacteria which became separated from the surface developed motility while the others showed no movement whatever. Bits of roots bearing these colonies when used as inoculum produced heavy infection of either angular leafspot or wildfire, depending on the source, on water-soaked tobacco leaves.

The causal bacteria of these diseases can maintain themselves on the roots of several unrelated crop plants for at least six months, and can under certain natural conditions cause specific leafspot diseases of several unrelated plants, such as tobacco, tomato, morning-glory and cowpeas. These results seem to give support to the belief that the senior writer has had for many years; namely, that these bacteria are not primarily tobacco pathogens. They appear to be common (but specific) organisms present on roots, perhaps of native vegetation, which can and do, under special favorable circumstances, cause specific leafspots of tobacco.

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[2] S. Diachun, W. D. Valleau, E. M. Johnson, *Phytopathology*, 32: 2, 1942.