invariably amputated. The limb on the opposite side of the body was thus given every possible advantage with regard to growth, in order to see whether this chela could be made to differentiate into a crusher. The data so far obtained for these specimens is in the table given above.

From this table it will be observed that in over 90 per cent. of the specimens the chelæ have already differentiated asymmetrically, but in no case for group A did a crusher develop on the right side, or in group B, a crusher on the left side. The evidence for specimens Nos. 3 and 9 is at present neutral, for they still appear to retain their embryonic symmetry, and it remains to be seen at the next moult, which will occur during the spring, whether they too will finally develop a crusher on the right side or not. At any rate, this experiment clearly shows that *in all cases where the chelæ have differentiated far enough to display asymmetrical characters, the crusher has developed on the chela which was given the greater opportunity for growth; i. e.,* on the side which was not mutilated.

The results so far attained, therefore, establish a strong presumption that the "right- or left-handedness" of the lobster may not be entirely predetermined in the egg. If these results are confirmed by further experiments, it ought to furnish convincing proof that the asymmetrical relation of chelæ in the lobster may under certain conditions, at least, be determined by other than hereditary factors.

This result is especially interesting in view of the fact that in the adult lobster we do not seem to meet with the phenomenon of reversal or compensatory regulation which Zeleny[19] and Przibram[20] have found in other crustacea. In the course of my experiments I have mutilated over 200 adult lobsters in which the normal asymmetrical limbs were autotomously removed and preserved for each specimen, but in no case did a crusher ever regenerate on the side which had originally carried a nipper and at the same time *vice versa* for the nipper. It has been suggested that possibly one reason why we do not get a typical reversal in the lobster is because the asymmetry of chelæ consists in a greater qualitative differentiation than in the case of the crabs and some other decapod crustacea, consequently, a true reversal in the lobster would involve more fundamental morphological transformations than in the case of these other forms. On the other hand, in the larval lobster the chelæ are very similar both qualitatively and quantitatively, and the results of our experiments seem to indicate that the symmetrical relations of the organisms are at this stage in a much more plastic condition.

We may summarize, then, this discussion of regeneration and the origin of symmetry as follows: First, positive evidence has been advanced that the process of regeneration is an important factor in the origin of symmetrical chelæ. Second, the results of the foregoing experiments on the larval stages establish a strong presumption that the right- or left-handed asymmetry of the lobster, instead of being entirely hereditary, may be influenced during ontogenetic development by external factors.

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March 6, 1907

[19] *Loc. cit.* (17).
[20] *Loc. cit.* (7).

DIE BACK OF THE PEACH TREES

(*Valsa leucostoma* Pers.)

DIE back is a serious enemy of the cherry orchards of Germany. It is especially destructive in the districts along the Rhine. It is also reported as being parasitic on the stone fruits of Australia. Professor F. C. Stewart, of the New York Agricultural Experiment Station, was the first American to call attention to the parasitic nature of this fungus. Ellis and Everhart in their 'North American Pyrenomycetes' state that this organism is found on peach, plum and almond trees in Carolina, Pennsylvania, New Jersey and probably throughout the country where the trees are found.

Experiments at this station show that it

is an active parasite attacking the twigs, limbs and trunk of the peach, plum, apricot and cherry trees.

On the peach, infection occurs through the buds and wounds at any time during the growing season, but its development is most noticeable during the spring months. Alternating freezing and warm periods during late winter appear to bring about favorable conditions for the growth of this organism. It often makes considerable advancement during the warm weather in winter. The young shoots are frequently killed back from two to fifteen inches during the months of January and February. As many as three hundred diseased twigs have been counted on a single tree. Twigs killed during the winter months at first have a dark purplish skin, but later the skin on the infected areas becomes leathery and shades into scarlet and purple, giving the twigs a characteristic appearance. The leathery colored areas finally change to drab, and the skin on the diseased tissue becomes loose and wrinkled. Black fruiting bodies (*Cytospora rubescens* Nitschke) soon appear below the epidermis on the drab-colored areas. These bodies gradually enlarge and push a white disk-like cap through a transverse slit in the epidermis. The entire dead portion of the twig gradually changes to drab in color and becomes more or less dotted with the black silvery capped pustules. During wet weather these black *Cytospora* bodies push out very fine red threads which are composed of masses of spores. These spores are soon scattered by the rain and insects and start new points of infection.

The diseased portion of the twig soon becomes constricted, making the division between the dead and living tissue very marked. Gum pockets also form at this point, which frequently rupture the epidermis and produce a copious gum flow.

During the spring and summer months the foliage of infected twigs frequently wilts suddenly and takes on a brown blighted appearance. This blighting is due to the fungus girdling the stem. A gradual killing back also occurs, but the injury in such case is not so noticeable.

Infections on the older branches during the winter and early spring months produce oblong wounds extending up and down the stem. The epidermis covering such wounds cracks and falls away exposing the wood. Callus soon pushes out from the edge of the injury and finally covers over the exposed tissue. The lips of the newly-formed bark, when they meet, do not unite and often leave a slit or opening through which gum exudes. Injuries of this sort finally produce slightly elevated, oval-shaped scars on the branch, and it is not uncommon to find from fifteen to twenty wounds and scars on a limb five or six feet long. In the more severe cases there is constantly an enlargement of branch about the point of injury, frequently producing rough, black barrel-shaped enlargements.

On the larger limbs and trunk, especially on the southwest side, large cankers or so-called sun scald wounds are formed. Such injuries are gradually extended, often girdling the limbs and even the trunk of the tree. The gumming is also constantly associated with these cankers.

Large limbs or even whole trees in different states of vegetation and at different times of the year die suddenly. The foliage of limbs or trees which die late in the spring and summer takes on an unhealthy, starved appearance and wilts suddenly and shrivels. The leaves of those that will die during the following winter in most cases also take on a yellowish color and fall prematurely.

On the infected areas of the limbs and trunk *Cytospora rubescens* Nitschke and *Valsa leucostoma* Pers. usually develop. Inoculations made with pure cultures of *Valsa leucostoma* on peach and plum trees produced wounds on which *Cytospora rubescens* invariably developed. Spores of *Valsa leucostoma* placed on sterilized peach twigs also produced *Cytospora rubescens*. Inoculations made with pure cultures of *Cytospora rubescens* on peach and plum trees produced wounds on which *Cytospora rubescens* constantly developed. *Cytospora rubescens*

spores placed on sterilized peach twigs soon reproduced the *Cytospora* form. From our experiments it is quite safe to conclude that *Cytospora rubescens* Nitschke is the pycnidial form of *Valsa leucostoma* Pers. The pustules of these two forms are constantly intermingled, except on the twigs where the perithecia seldom develop. These forms resemble each other so closely in size, shape and color that it is usually impossible to distinguish one from the other without the aid of a microscope. When the epidermis of diseased tissue is peeled off, these bodies remain attached to it and appear like blisters on its inner surface.

The disease injures the Japan plum in much the same way as the peach. A full account of this disease will be published in bulletin form by this station some time during the present year.

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QUOTATIONS

THE IMPERIAL CANCER RESEARCH FUND

THE report of the Imperial Cancer Research Fund for the year 1906–7, presented to the general committee at their meeting under the presidency of the Prince of Wales on Monday, is calculated to impress different sections of the community in a somewhat different manner. By those who are uninstructed in scientific methods, and unacquainted with the caution necessary for the successful conduct of scientific inquiries, it is likely to be received with some impatience at the continued absence of definite results of a preventive or curative character; while those of better qualifications for the exercise of judgment will recognize that foundations are being laid which afford reasonable hope of a successful and permanent superstructure. The general summary of the superintendent, Dr. Bashford, states that, "during the past year, the hopes of advancing knowledge of cancer have become more and more centered in experimental investigations. We have learned from experiments more of the nature of the local and of the constitutional conditions associated with the origin of cancer; and we have been able to form more definite conceptions of the nature of the change responsible for the rapid multiplication of cancer-cells." The earlier conclusions that cancer is universal in vertebrate animals, without reference to the nature of their food, that its prevalence differs greatly in extent among different races of men, that it is frequently developed in parts of the body which are subjected to continued irritation, either from industrial pursuits or in association with native customs or religious rites, that it is often consecutive to some direct local injury, and that no single form of external agency is constantly associated with its development, have all been confirmed by subsequent observation and experiment. On these grounds it is pronounced to be futile to seek for a hypothetical something common to all the external agencies associated with cancer, and to be necessary to direct attention to the common intra-cellular change which, in conformity with the biological similarity of cancer throughout the vertebrates, must intervene in the transformation of normal into cancerous tissue. As there is no evidence to justify the assumption that the disease is communicated from one person to another, the search for the clue to cancer in any species of animal must take account of peculiarities in the individuals which are attacked and in those which escape. Hence, questions of individual and of family liability have received increased attention during the year.—The London *Times*.

CURRENT NOTES ON METEOROLOGY AND CLIMATOLOGY

LIGHT AND HEALTH

SURGEON CHAS. E. WOODRUFF, of the United States Army, in some notes on "Actinophysiology and Actinotherapy," published in *American Medicine* (Philadelphia) for April, calls attention to the injurious effects of excessive sunlight, a subject on which he has already written several articles and one book. Among the points mentioned are the retardation of vegetable growth by sunlight; the injurious effects of sunlight upon animals; the retardation of human growth by sunlight, so