clock work from upper air temperatures. It was found that such an inclosure, as has been reported by Regner and Pfotzer,[3] remains above +35° C. throughout the ascent.

We succeeded in securing a record also of the falling apparatus, attached to a parachute, down to an altitude of about 1 kilometer, when it apparently fell below the horizon for our antenna. From the cessation of signals at this altitude we estimate that the apparatus fell about 50 miles from the receiver.

The sharp step in the pressure curve at about 61 minutes is probably caused by a sticking and sudden release of the pressure hand. The instrument seems to have recovered from this trouble at that point and functioned properly throughout the remainder of the ascension. This tendency to stick would have lowered the indicated altitude in any case, so that we feel fairly certain that the balloon reached an altitude above rather than below that indicated on the curve.

This ascension is of additional interest in view of the recent Russian ascension at Novosibirsk (reported in American newspapers on April 8) which reached a pressure of 4 millimeters of mercury and is claimed as a record for such ascensions. The corresponding altitude is 139,000 feet.

This work is being carried on with the cooperation of the United States Weather Bureau.

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FLOOD INJURY TO TREES

THE receding March flood waters in Massachusetts have left in their wake not only physical suffering, soil depletion and financial loss, but also considerable severe and some devastating and irreparable damage to trees.

In any attempt to classify the types of tree injuries observed there would, of course, be many instances of overlapping. Some uprooted trees are now a total loss, resting on the river banks far from their original site. Snatched from their anchorage in the path of rising rivers of the Connecticut and Merrimac Valleys, these trees were carried along by the swift current causing untold damage to bridges and other structures as well as to cultivated land along the river banks. Trees which withstood the raging torrents of the flood and were not uprooted in some cases are also a total loss because of the severity of the injuries received. These injuries include the girdling of trees and the destruction of the cambium by the ice floes beating against the bark. It may be possible to save certain of these trees by bridge-grafting if proper methods are adopted. Frequently, injury from ice floes is limited to one side of a tree and the employment of sanitary, sterilizing and protective measures offers possibilities for saving these trees.

Pruning out of diseased, injured, twisted, gnarled and debris-filled smaller branches will assist tree owners in discovering the problems of repair on individual trees and will at the same time afford the trees opportunity for a more vigorous growth in many instances. Where some of the bark has been stripped from trees, care should be taken to cut back the remaining bark on the tree trunk to the limits of the loosened bark at which points the uninjured bark should be observed as being firmly attached to the supporting layer. After this preliminary cutting back of the bark has been accomplished, an attempt should be made to round out the edges of the debarked wound, leaving an oval wound, of which the longest diameter is approximately parallel with the grain of the wood. The polar extremities of the wound may be brought to points if feasible. Such a symmetrical wound not only contributes to the appearance of the repaired tree, but also it affords the maximum opportunity for wound-healing and recovery. A coating of shellac may be applied to the exposed edges of the cambium, following which treatments of the wound should be given with creosote and asphalt, for sterilization and protection, respectively. The creosote should be applied directly to the entire debarked, clean surface of the wound and the asphalt may later be spread over the same surface to form a rather thick, protective covering, which fits tightly at the edge of the wound. In most cases no excavation of wounds is necessary on flood-injured trees.

Still another type of injury suffered by trees as a result of the floods is injury from chemical or toxic materials which the floods engulfed in their swift currents. In some places a heavy deposit of crude oil settled, in varying degrees, over the landscape. It would appear that this oil was liberated into the rivers at some time during the height of the floods, since small evergreens which were considerably below the high level of the water escaped the sure death of the taller and now completely blackened and destroyed trees. Most of the taller evergreens affected by the oil can not possibly be salvaged as ornamental trees of the future. Many of the deciduous trees which were in a dormant condition during the floods, however, especially those with pendulous or weeping branches, were protected from complete destruction by the smaller branches acting as seines to catch the oil before it reached the larger branches and trunks. In such cases the smaller branches and twigs which are now dead should be promptly pruned out in order to eliminate the possibility of the oil's spreading to other parts of the tree during the warm weather.

[3] E. Regner and G. Pfotzer, *Phys. Z.*, 35: 779, 1934.

A rather sinister possibility of injury to trees in flooded areas, which at the present time may only be speculated, is injury from chemicals such as gasoline, which would leave no perceptible trace on trees, but which nevertheless might effectively kill all plants.

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FISH MORTALITY

IN the issue of SCIENCE dated November 1, 1935, Mr. David Tomlinson reported a case of sudden death of fishes in a shallow pool under the title "Rare Aquatic Phenomena" and stated that the phenomenon has been "only recorded in a very few places throughout the world during the past 50 years." I may state that in the plains of India this phenomenon seems to be of frequent occurrence. In Calcutta, when the writer was working there, a sudden epidemic of fish mortality occurred in an acute form twice (and in mild form several times) in the same pool within five years (1926–31). Though on both occasions the epidemic was investigated and the results obtained were published, Mr. Tomlinson apparently does not seem to be acquainted with this happening. In 1926 it was investigated by Seymour Sewell,[1] who concluded that the cause of the epidemic was the sudden accumulation of CO_2 brought about by abrupt changes in the meteorological conditions. In 1931, when the phenomenon occurred again in a severe form, the writer of this note investigated its various aspects and published the results.[2] It was concluded that the epidemic of mortality in the pool was due to the complete exhaustion of dissolved oxygen in the bottom layers of the water as a result of the rapid decay of the accumulated organic matter there. The writer is therefore very much interested to learn that the cause of the catastrophe observed by Mr. Tomlinson in Connecticut, U. S. A., though only superficially investigated, was also associated with almost complete exhaustion of the oxygen content of the water.

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SCIENTIFIC BOOKS

INSECT MORPHOLOGY

Principles of Insect Morphology. By R. E. SNODGRASS. 667 pages, with 319 figures, the majority of which carry two to several illustrations. Published by the McGraw-Hill Book Company, Inc., New York and London. 1935. Price $6.00.

THIS is a volume of interest to zoologists as well as to entomologists. From the wealth of material it contains will be drawn a few samples of interest to both.

The work opens with a forty-page synopsis of the more general features of insectean embryology. In the Collembola, a primitive, wingless group which some authors set off as a class, cleavage of the egg is holoblastic. This is probably not the primitive type of cleavage for other insects as the Collembola are further peculiar in having but six segments in the abdomen, though otherwise their body-structure is insectean. In all other orders, excepting some highly specialized parasitic forms, the egg is loaded with a dense yolk which conditions a meroblastic or superficial cleavage. Cleavage is further evidenced distinctive in the early differentiation of the germ cells at the posterior pole. As a result, insect eggs have been one of the favorite subjects of study by students of the differentiation and migration of these cells. In many insect eggs they can be easily recognized as they are slightly different from the surrounding cells in structure of nucleus and in the presence of dark-staining granules.

Gastrulation, because of the dense yolk, deviates from the terms of the general gastrulation theory, for in most insects the endoderm is formed from anterior and posterior rudiments which arise at the ends of the mesodermal rudiment. In a few instances a strand of endodermal cells may connect these temporarily. Usually the strand cells migrate very shortly into the yolk and become vitellophags. The coelomic sacs are formed by a splitting of the mesoderm, which later by fusion form a haemocoele. The body-wall of the embryo is a single layer of cells which later become glandular and secrete the exoskeleton.

In the basic plan of the insect body Snodgrass, following Holmgren and Hanström, takes the view that it is composed of a preoral or prostomial region followed by eighteen segments enervated from as many pairs of ventral ganglia and ending in a periproct (telson in the Malacostraca) which bears the anus. Thus the procephalon, which bears the compound eyes and antennae, has been derived from a prostomial region enervated from a supraoral brain (protocerebrum plus deutocerebrum). The tritocerebrum is a distinct pair of ganglia arising laterad of the oral opening and with a commisure behind the mouth. The tritocerebrum enervates the oral and labral regions and the second antennae (embryonic). By this theory,

[1] *Jour. Asiatic Soc. Bengal,* 22: pp. 177–201, 1926–27.
[2] *Internat. Rev. Hydrol. Hydrog.,* 26: 1932.