River, was originally described in 1837 from specimens introduced into greenhouses near Vienna, Austria. Even though the climate is not unlike the native habitat, this species did not spread into the surrounding country. Sometime before 1890, *Kalotermes* (*Cryptotermes*) *dudleyi* Banks was introduced into Panama, probably from the Orient. Although now a well-known termite in houses in the Canal Zone, this species has not been able to establish itself in wild situations in the region. *Kalotermes* (*Cryptotermes*) *brevis* (Walker) was introduced into buildings in Durban, Natal, some time before 1921. The native region for this species is the West Indies and Caribbean shores. So far, the records from South Africa are all from a small area in Durban and the species has not been found in wild situations. The same species was found in buildings in Georgetown, British Guiana, in 1920 but does not seem to be established in the wild areas in Guiana. Records of this species in Louisiana and Florida are also all from buildings. Recently the writer has identified a termite as *Heterotermes philippinensis* Light, a native of the Philippines, which was collected by L. P. Regnard on October 13, 1933, in Mauritius. Dr. S. F. Light has checked this determination. No data are available concerning its distribution in Mauritius. Records of *Reticulitermes lucifugus* (Rossi), the common European termite, from the vicinity of Boston were published in 1918. This does not seem to have spread far from its point of introduction. Another case that deserves careful study is the introduction of *Coptotermes formosanus* Shiraki into Hawaii some time prior to 1913 from China or Formosa. This species is surely very destructive to buildings in the cities, but published accounts do not indicate its invasion of the wild habitats in the Hawaiian Islands.

One possible exception to the general rule that foreign termites have not spread from the point of introduction into native habitats may be found in the case of *Heterotermes tenuis* (Hagen), a native of Brazil, the Guianas and Panama. This termite is reported to have been introduced into the island of St. Helena in 1840. Accounts of the damage to houses and furniture are vivid, but the invasion of native wild habitats has not been reported.

A careful study of the limiting factors of the distribution of various species of termites may ultimately enable us to predict the results of introduction, but up to date we have little evidence to support the idea that termites are extending their range or that they will be able to compete effectively with the native species in natural habitats if introduced from foreign countries.

ALFRED E. EMERSON

THE UNIVERSITY OF CHICAGO

HIGH ALTITUDE STRATOSPHERE OBSERVATIONS[1]

IN the November issue of the *Journal of the Aeronautical Sciences* for last year we[2] described a system of radiometeorography which had shown promise as a method of securing weather data at moderate altitudes—up to 20 kilometers. In undertaking this development we had in mind ultimately to construct equipment along similar lines designed to go to much higher altitudes to secure other information from the stratosphere, such as ultra-violet intensity and cosmic-ray data, using automatic radio recording.

The practicability of this idea has been well demonstrated by a record obtained from a sounding balloon with radiometeorographic equipment which we released on March 23 of this year. A 44-inch (uninflated) rubber balloon was inflated to give an ascension rate of nearly 500 meters per minute when carrying our 5-meter transmitter with associated equipment which weighed altogether approximately $1\frac{1}{2}$ pounds. The atmospheric pressure record obtained is shown in the accompanying figure. The circles in the curve I each represent a pressure reading transmitted to the ground and punched in a paper tape by a recording radio receiver. These occurred at one-minute intervals. Occasional missed readings were caused by local "interference"—not failure of signal. The

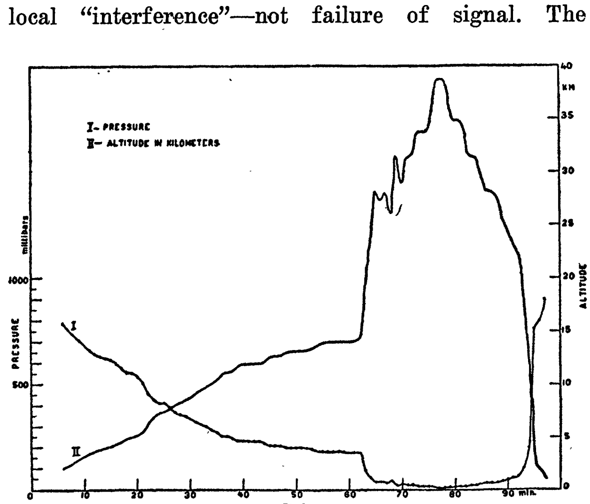

FIG. 1

minimum pressure recorded is 6 mm of mercury (8 millibars) which corresponds to an altitude of 38.7 kilometers or 127,000 feet. The transmitter also sent out signals which yielded an automatically recorded account of the temperature of the interior of the Cellophane inclosure which shielded batteries, oscillator and

[1] Publication approved by the director of the National Bureau of Standards of the U. S. Department of Commerce.

[2] L. F. Curtiss and A. V. Astin, *Jour. Aero. Sci.*, 3: 35, 1935.

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.

L. F. CURTISS
A. V. ASTIN

NATIONAL BUREAU OF STANDARDS

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.