imaginal and larval anatomy of Scolytid beetles as those in the technical memoir have ever been issued before, while in the systematic portion are to be found, not only full structural accounts of the various species, but figures showing the characteristic form of the brood and larval galleries in each case. The accompanying figures, slightly reduced from the original, give some idea of Dr. Hopkins's excellent illustrations.

Most Scolytid beetles—the well-known *Hylurgus* (or *Myelophilus*) *piniperda*, for example—lay their eggs in dying or unhealthy trees or in felled trunks, the vigorous flow of sap and secretion of resin in healthy growing trees being unfavourable for the development of the larvæ. Members of the genus Dendroctonus, however, prefer, as a rule, healthy trees for breeding purposes; hence the destruction wrought by the insects may become exceedingly serious (see the photograph reproduced), and it is not possible to exterminate large numbers of the beetles and larvæ by "trap-trunks" or "trap-logs," according to the practice of German foresters with Hylurgus and similar bark-beetles. As is usual in American economic work, attention has been paid to the natural enemies of the destructive beetles, and experiments have been made

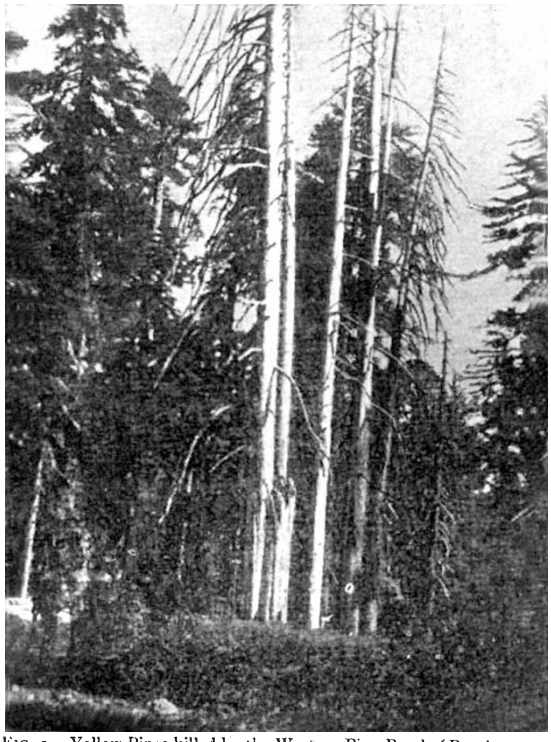

FIG. 2.—Yellow Pines killed by the Western Pine Beetle (*Dendroctonus brevicornis*), Yosemite National Park.

with imported specimens of the handsome European beetle *Clerus formicarius*, which drags bark-beetles and larvæ from their burrows and ruthlessly devours them.

The genus Dendroctonus has a remarkable distribution. Twenty-three species are found in North America, the genus spreading northwards to Labrador and Alaska and southwards through the Mexican highlands into Guatemala. In the "Old World" a single species only is known—*D. micans*, which inhabits Russia, Germany, Denmark, and southern Scandinavia. While "the species of this genus of beetles are the most destructive enemies of the coniferous forest trees of North America," they are hardly known in Europe except to special students of the Scolytidæ. The absence of Dendroctonus from northern Scandinavia, from our own islands, and from western Europe generally, suggests that the former geographical connection between the outlying European *D. micans* and the numerous American members of the genus was by way of Siberia and Alaska. G. H. C.

ATMOSPHERIC ELECTRICITY IN EGYPT.

IN Paper No. 10 of the Survey Department of Egypt Mr. H. E. Hurst discusses two years' results of atmospheric electric potential obtained from a Kelvin water-dropper electrograph at Helwan from March, 1906, to February, 1908. From observations made with a Kelvin portable electrometer, and experiments on the disturbing effect due to the presence of instrument and observer, a factor was obtained, multiplication by which transfers curve readings to potential gradient in the open (volts per metre of height). The mean value found for the potential gradient from the two years was 113, a value lower than is usually encountered in Europe. In the second year, however, owing to the more open scale employed, there was at times considerable loss of trace, and an allowance which Mr. Hurst makes for this would bring up the value of the potential gradient for that year from 119 to 129, and the mean for the two years from 113 to 118. The curves were not smoothed, and were measured only at the even hours, and there is rather excessive irregularity in the diurnal inequality curves which are given for individual months of the year. All show a prominent minimum in the early morning from 4 a.m. to 6 a.m., and some a secondary minimum in the early afternoon, but successive months differ in this respect rather widely. In the mean diurnal inequality for the year there is little variation in the potential from 10 a.m. to 10 p.m.; the value at 8 p.m. is the absolutely largest in both years. One very exceptional phenomenon is that the potential is decidedly highest in summer. The mean potential gradient from the four months June to September was 136, while that from the four months November to February was only 98, no allowance being made in either case for loss of trace. Curiously, however, the mean range of the diurnal inequality was 81 for the four mid-winter months as compared to 50 for the four months June to September.

The mean diurnal inequality for the year was analysed in a Fourier series. The amplitude of the 24-hour term was nearly double that of the 12-hour term. The latter term was found, as at Kew, to be almost exactly in phase with the 12-hour Fourier "wave" for barometric pressure. No connection could be found between potential gradient and temperature, sunshine, or any other meteorological element except wind direction and possibly vapour pressure. Other observers have associated sudden changes of potential with sunrise and sunset, but no such connection seems to exist at Helwan. During sandstorms negative potentials are sometimes encountered, but not always.

The present publication is welcome evidence of the scientific activity of the Helwan Observatory, and contains several results of much interest. It is to be hoped, however, that a more complete analysis will be made some years hence, when sufficient data have accumulated to give fairly smooth results for individual months of the year, and that the curves will then be measured at all hours of the day, and not merely at the even hours.

C. CHREE.

AMERICAN HYDROLOGY.[1]

NEGLECTING the quantity disappearing through evaporation as relatively insignificant, the rainfall over any area either finds its way on or near the surface into streams or percolates into the ground to form subterranean reservoirs, which are tapped in many cases, naturally by springs and artificially by wells. Each of these processes has a distinct and valuable bearing upon the industrial and hygienic resources of a country, and in countries where there is no separate hydrological service the scientific investigation of the national water supply comes within the purview of the geological department, as is the case in the United States. The two papers which form the subject of this brief notice illustrate in a very

[1] Surface Water Supply of the United States, 1907–8. Part ii., South Atlantic Coast and Eastern Gulf of Mexico. Prepared under the direction of M. O. Leighton by M. R. Hall and R. H. Bolster. Water Supply Paper No. 242. Pp. 226.

Underground Water Resources of Connecticut. By Herbert E. Gregory, with a Study of the Occurrence of Water in Crystalline Rocks, by E. E. Ellis. Water Supply Paper No. 232. Pp. 200. (Washington: Government Printing Office, 1909.)