of hail started. After the hailstorm the temperature fell steadily to a minimum of 43° at 8:15 a. m. of the following morning (25th).

For three and one-half hours preceding the storm the weather was unsettled and somewhat threatening during the greater portion of the time, and a trace of rain fell. About 20 minutes before the hail started to fall, at 4:35 p. m., the sky was black and threatening. At 4 p. m. a low whitish nimbus cloud was observed moving rapidly from the northeast, underruning the stratus in the northern sky and the strato-cumulus in the southern sky. By this time, 4 p. m., a very low, dark-brown cloud mass appeared in the southwest, with a tonguelike projection pointing toward the northeast. From the nimbus cloud a sprinkling rain began at 4:15 p. m., and changed to light rain at 4:30 p. m. Distant thunder was heard in the southwest, first at 3:50 p. m. Suddenly at 4:35 p. m., hail began to fall in great quantities, in attendance upon a wind gust from the southwest, which started at 4:32 p. m., and which changed to a moderate northwest wind seven minutes later.

Hail fell for four minutes, and the ground became as white as snow, so rapid was the fall. The heavy rain, which began at 4:39 p. m., quickly washed the hail from the streets and sidewalks, except where it was piled up against the windward side of houses and steps. Most of the stones were larger than mothballs, but they ranged from the size of peas and moth balls to small hickory nuts. They varied in shape as follows: Spherical, elliptical, sharp pointed, and disklike (the latter the size of a dime to a quarter). The hail fell straight down and not at an angle. The writer passed through the storm, in a street car, and none of the hailstones struck the windows.

The hailstorm swept over the city from west to east, therefore the time of beginning in the eastern part of the city was later than in the western. At the Weather Bureau office the hail began at about 4:35 p. m. Rainfall was excessive from 4:39 p. m. to 5:02 p. m., and the amount during this 23-minute period was 0.55 inch. Hail was washed by the heavy rain that followed from the surrounding neighborhood to a depth of 6 inches to a foot or more at the intersection of Charles and Lanvale Streets, and blocked street-car traffic at that point for 20 minutes, or until the hail could be shoveled off the tracks. At the northeast intersection of these streets the weight of the accumulated hail tore a basement door from its fastenings, and the basement filled with water and hail. Accumulations of hail such as this were due chiefly to the choking of sewers by leaves stripped from trees and also by hail. Hundreds of cellars were flooded, owing to the choked sewers.

Within the city hail stripped leaves off of trees and bushes and cut down flowering plants, rose bushes, etc. In country districts some damage resulted to wheat, corn, tomato plants, cabbage, truck crops, and to fruit on trees. Some poultry was killed.

Within the city some skylight and window panes were broken, while the breakage of greenhouse glass was more or less general. The conservatories in the city parks had thousands of panes of glass broken. About 1,200 panes of glass were shattered in the hothouses at Clifton Park. Florists in northeast Baltimore, just to the northward of Clifton Park, experienced the heaviest losses, but there were more windows broken in South Baltimore than elsewhere in the city.

The greatest accumulation of hail after the storm was found at Charles and Lanvale Streets, where it was washed into huge piles. The following day three 5-ton motor truck loads, twenty-two 3-ton motor truck loads, and fifteen 1-horse cart loads were hauled away from this vicinity.

It is impossible to estimate accurately the depth of hail that fell on the level, because of the torrential rain that swept it into the sewers within five minutes after the hailstorm started, but probably the depth was about 1 inch.

The area covered by the hailstorm was rectangular and about 12 miles wide by 18 miles long, extending from the extreme northern portions of Howard and Anne Arundel Counties northeastwardly across Baltimore City into southeastern Baltimore County. The northwestern edge of the hailstorm extended from near Ellicott City northeastward to about Fullerton; and the southeastern edge extended from near Rock Point northeastward to Bowleys Quarters, about 1 mile south of Bengies, Md.

Losses from the hailstorm are estimated at about $75,000, two-thirds of which was to greenhouse glass.

This storm created a sensation in Baltimore, due to the fact that it occurred over the heart of a great city. A similar hailstorm in country districts would have attracted comparatively little attention, but very likely would have caused greater money loss, due to the destruction of crops. The Forest Park, Walbrook, Roland Park, and Guilford sections of Baltimore were among the northern suburbs that escaped material damage from the storm.

A low-pressure area was directly over the Baltimore district on the afternoon of May 24, 1925. Lowest pressure was 29.38 inches at 4:30 p. m.

RIVER AND RAINFALL RECORDS IN AN IMPORTANT LAWSUIT

[Note from the official in charge, United States Weather Bureau Office, Nashville, Tenn., dated March 30, 1925]

The river and rainfall records of the Nashville station were important evidence in a rather unusual law suit[15] recently, in which a sand and gravel dredging company was sued by a riparian owner for dredging on his land at points a few miles below Nashville. The defendant claimed that he did not dredge on land above the "ordinary low-water mark," and was therefore within his rights.

It seems that the plaintiff had some years ago purchased the land and his deed called for the bank extending down to "extreme low water," although it has long been established by court rulings that in Tennessee riparian owners' property extends only to "ordinary low-water mark." Also, the plaintiff had purchased the property after the Government locks and dams had been built in the Cumberland River, which changed the line of "ordinary low water," raising it considerably.

The judge defined "ordinary low-water mark" in the following statement: "Although it is difficult to define with precision what is the ordinary low-water mark, it is a question of law and may be defined with sufficient accuracy to mean the usual and common or ordinary stage of the river when its volume of water is not increased by heavy rains or freshets, nor diminished below such usual stage or volume by long-continued droughts to an extreme low-water mark." Under this definition of the court and under all the evidence the judge stated, "the jury must find where that mark is in the river."

[15] Goodall v. Herbert et al.

The plaintiff claimed that what is known as pool level of the river, or the lowest stage to which the fixed dam will permit the water to fall (6.5 feet at Nashville), is ordinary low water. The defendant claimed that ordinary low-water mark is above the pool level some 6 or 8 feet, and attempted to prove this by the Weather Bureau records. A number of tables and charts prepared from Weather Bureau data were introduced as exhibits and from these what seemed to be periods of "ordinary" low water were pointed out. Principal among the data prepared were the average river stages and the average rainfall for the last 20 years, by months and seasons; five tables and charts showing the percentage of days in 20 years when the 7 a. m. river gage reading was at or above certain levels; a table and chart exhibiting all the dry spells (spells of 21 days or longer with 0.25 inch or less of precipitation) at Nashville, 1871 to 1924.

The verdict of the jury was in favor of the defendant, and was equivalent to saying that it had been shown that the "ordinary low-water mark" on the banks involved in the suit corresponded to 12 to 14 feet on the Nashville river gage. This would be 5.5 to 7.5 feet above minimum pool stage, which is 6.5 feet.

METEOROLOGY AND DESERT ROAD-BUILDING

The recently completed construction of the so-called "Wendover Cut-off," which consisted in part of a road fill some 40 miles long across Great Salt Lake Desert west of Salt Lake City, Utah, involved certain important adjustments of road-building methods to meteorological conditions, as suggested by the following extract from Engineering News Record of April 23, 1925.

* * * That portion of the cut-off of about 40 miles crossing the alkali mud flats and salt crust is all that called for unusual methods. This mud flat and the salt crust * * * are the sediment of a geological lake. The mud flat is about 80 miles long and half as wide. In this flat * * * is the island of salt, about 6½ miles wide where the road crosses. The salt crust varies from a few inches thick at the edges to 4 feet thick in the middle. In the summer, or the dry season, the water table over a large area is about at mud-surface level. In winter this area is covered with water up to a foot or so in depth, varying with the precipitation and as the winter is open or severe. This sheet of water shifts with the wind. A north wind of much duration will pile up the water at the south end of the "lake" and virtually lay dry the road location. With a shift of wind the piled-up water comes flooding back and submerges the highway location sometimes several inches deeper than normal. * * * The clay used in the embankment * * * was a very fine-grained material * * *. When this mass became saturated it held a considerable amount of moisture * * *. After the salt cuts were made and the underlying clay thrown up in windrows along the line of the embankment it took considerable time for the surface to dry out sufficiently to permit a caterpillar and grader to work upon it. The hot sun working on this mass for weeks would not dry it out to exceed a depth of a quarter of an inch. It was demonstrated that wind was more effective than the rays of the sun.

THE INCREASING RUNOFF FROM THE AVOCA BASIN (DUE APPARENTLY TO DEFORESTATION)[16]

By E. T. QUAYLE, B. A.

Formerly the stream bed of the Avoca River, a small stream in southeastern Australia near Melbourne, was characterized by many large water holes, many of which were 20 to 40 yards long, 10 to 15 wide, and 8 to 10 feet deep.

[16] Proc. Royal Soc. Victoria, Vol. XXXV, new series.

For 30 years, or up to the early nineties, the changes in the channel were not particularly noticeable, but during the last decade or two they have become very marked.

Changes in the vegetable cover of the basin began with the destruction by stock of the coarse grasses and trees which lined the river bed. With this destruction the cutting of the channel began. This gradually lowered the level of the water in the water holes and now, in most cases, has almost completely drained them. When the flow is rapid a fairly deep and uniform channel is eroded, but so far as seen by the author no lateral erosion has occurred.

Precise data as to the extent of timber cutting do not seem to be available. The author confines his remarks to what he has personally observed and he notes that "it is common knowledge in that district [the basin of the Avoca] that the clearing of the timber has most strikingly improved the summer flow of the stream by increasing the activity and duration of the springs."

He recalls the fact that a certain stream which was formerly dry for the greater part of the season is now a permanent stream; that even in April, 1922, it was discharging 5 c. f. per minute.

Statistics of the average minimum flow in c. f. s. for the 20 years 1890–1910 are compared with similar statistics for 1910–1919. This comparison shows that the average minimum discharge of the latter period is from two to ten times greater than formerly, while there has not been any special increase in the rainfall.

The official gaugings of the flow of the river over Coonooer wier show that the volume as well as the constancy of the stream flow is increasing greatly.—*A. J. H.*

METEOROLOGICAL SUMMARY FOR JUNE, 1925, FOR CHILE AND ARGENTINA

[Reported by Señor Julio Bustos Navarrete, El Salto Observatory, Santiago, Chile]

In June, 1925, the weather was rather rainy in the southern part of South America; there were two important periods of cyclonic disturbance—7th to 15th and 21st to 28th.

From the 1st to the 6th the atmospheric condition was characterized by the presence of a marked anticyclone over the south-central part of the continent, which caused severe cold waves invading the central valley of Chile as far as Santiago and the central pampas of Argentina as far as Cordoba. High pressure prevailed repeatedly over Argentina from the Province of Buenos Aires northward.

On the 7th an important depression was approaching from the west in latitude 45° south; on the following day it began to manifest its influence in the southern region, bringing strong winds and rain in the southern Provinces of Chile. Another depression appeared in latitude 40° south on the 10th, and on the next day its influence was shown in the occurrence of rain from Aconcagua southward to Chiloe. On the 12th the center of this low pressure area had moved to a position off Cabo Raper and during the next three days it advanced across the region of Magellanes in a course toward the South Shetland and South Orkney Islands and entered the frozen antarctic sea.

A rather important depression present in the Province of Rio Negro, Argentina, on the 10th was accompanied by rains extending southward as far as Puerto Madryn.

Between the 16th and the 20th an important anticyclonic center was formed in the south-central part of