NOTES, ABSTRACTS, AND REVIEWS

THE ART OF PLUVICULTURE

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It is remarkable, when we consider the varied attempts in our country to grow rich without risk or effort, that one of the most certain enterprises of this sort has been almost completely overlooked by trade schools, as well as by the Argus eyed press.

The professions of crystal gazing, clairvoyance, kleptomania, and the like, receive due attention from the press, as well as by the police, all efforts to benefit humanity by these means being everywhere discouraged. The ancient arts of astrology and horoscopy, however, have their quarter column in most of our leading papers, while the modern diversions of pluviculture, chiropractics, and hormonism are everywhere treated with respect.

Of these none can be more scientific than is pluviculture or rainmaking, as it is commonly called. Yet nowhere, so far as I have noticed, is the method of operation made clear, nor the economic laws which make it, not only valuable to the farmers, but a sure thing in general. Even the astute Father Ricard goes on with his prophecies, apparently oblivious to the work of other scientists right within the range of his storms and sunspots.

For successful rain making it is necessary to find first a region in which rain is expected but has failed to come. The first element is then to find a few hundred ranchers willing to give, let us say $8,000 to insure a storm, worth easily let us say $50,000 to them.

The pluviculturist has next to build a modest shack or to set up a tent for his chemical operations. Next he prepares certain chemicals in accordance with a secret formula. These may cost $50 more or less according to the likelihood of further demands for extension of his operations. What the formula is naturally no one has explained. Let me suggest a formula of my own. Take first 10 pounds of pulverized chlorate of potash and an equal amount of granular cane sugar. Mix these carefully in a wooden tub and when ready pour over them a liter (or pint) of sulphuric acid (c. p.). This simple and inexpensive preparation will produce surprising results. These may be brilliantly enhanced by using a pound of magnesium ribbon, to one end of which a lighted match has been applied, the whole sent into the air by attachment to a sky-rocket. This is most effective towards night or after clouds begin to form. Then certain salts of strontium yielding red light, barium yielding green, and other salts yielding lights of different colors, should be set on fire. That this formula of mine has been used by any professional rainmaker, I do not know. I am sure that any pharmacist might furnish something equally good. Some also use an old-fashioned fanning mill to condense the air, but that is less impressive.

Now that the chemistry has been provided for, the most important point follows—the economics of the process. There is an international institution known as "Lloyds" which insures anybody against anything, after a study statistical or meteorological of the chances. It charges a modest premium which naturally varies with the probabilities. If you want a clear day for a picnic or a football game, Lloyds will for a consideration insure you against rain. Lloyds do not control the weather, but while losing the premium charged you will receive enough to finance your pleasure or your sport next time. You can insure a baseball player against striking out, or an airship from falling into the sea, in accordance with scientifically accepted probabilities. Every well-regulated stadium or other center of culture is a client of Lloyds.

Now let the rain maker insure himself against a rainless day. I do not know the premium which Lloyds would charge. In California it would vary, being relatively low in March, especially in the north, rising higher to 100 per cent, or even more in July.

Let us suppose that a dry period should occur in March, the month of all months when rain is most desired in Coarse Gold, let us say, in Alcalde, and in Calexico. Let us take a high estimate, assuming that the premium charged is $2,000, on amount of insurance in case of a dry day being $8,000. The balance sheet of rain making is shown below:

A. In case of rain—	
Received from the people of Alcalde	$8,000
Paid for chemicals and housing	50
Paid for premium to Lloyds	2,000
Balance of profit	5,950
B. In case of no rain—	
Received from Lloyds	$8,000
Paid for chemicals and housing	50
Paid for premium to Lloyds	2,000
Balance of profit	5,950

C. In A, case of rain—
The people of Alcalde pay $8,000, and receive rain worth $50,000.

D. In B, case of no rain—
The people of Alcalde pay out nothing and receive nothing They are then ready to try again. The transaction thus involves therefore no loss to anyone except to Lloyds in case of B. And this great corporation knows how to recuperate elsewhere. But under A, of course, the people of Alcalde would have had their rain anyhow.

There is one element of risk. Once in San Diego County and once again in Fresno County the rain came as a desolating deluge, doing much damage and relatively very little good. It is said that under these conditions the cautious pluviculturist saw fit to take no chances and never collected his fee.

It was Barnum, was it not, who stated the lesson to be drawn: "A sucker is born every hour." Herbert Spencer insisted that "to save men from the consequences of their folly would fill the world with fools."

For this reason perhaps the press discourages crystal gazings and applauds the pluviculturist.

THE FLOODING OF A PASTURE BY HAIL

Many remarkable results of hailstorms have been noted in this REVIEW, but perhaps none more remarkable than that reported by Mr. Edwin T. Larsen, official in charge of the Weather Bureau Office at Charles City, Iowa. Three photographs, which, unfortunately, are not clear enough to warrant reproduction, show the extraordinary magnitude of the deposit.

These pictures were taken on the day following a severe hailstorm which occurred in southern Floyd County, Iowa, on June 11, 1925. The fall of hail was heaviest over the drainage area of a creek, known as Bloody Run, which enters the Cedar River 3 miles southeast of Charles City, Iowa. This creek bed is normally dry, but during the storm it carried a stream 20 feet deep and 100 yards wide. The hail, which was stated by the residents of the storm area to have fallen to a depth of 2 to 4 inches, was washed from the adjoining fields into the creek by a torrential fall of rain. The pictures were taken at a turn of the creek where the hail was carried out of the creek bed and deposited in an adjoining pasture, where a woven wire fence assisted in holding the hail until the water subsided. About 1½ acres were covered with hail to a depth of from 2 to 4 feet. The total precipitation during the storm can only be conjectured, but it was evidently considerably heavier than at the Charles City station, where 1.76 inches occurred, of which 1.60 inches fell in 50 minutes. Only a light fall of hail occurred at the station. The hailstones were said to have approximated hen's eggs or golf balls in size, and at the time the pictures were taken hail up to 2 inches in diameter could be readily found in the drift.

HAILSTORM OF SUNDAY AFTERNOON, MAY 24, 1925, AT BALTIMORE, MD.

By J. H. SPENCER

[Weather Bureau, Baltimore, Md.]

Following the hottest weather ever recorded at Baltimore in May (maximum temperature, 98°, at 3:30 p. m., 23d), the weather continued warm during that night, with a minimum temperature of 69°; then the temperature rose rapidly on the 24th to a maximum of 87° at 11:30 a. m. This was followed by a slight fall to 83° between 11:30 a. m. and 1:30 p. m., and at 1:30 p. m. a cool wave from Ontario struck Baltimore. Beginning at that hour the temperature fell 16° in about 10 minutes and 8° farther (a total of 24°) by 4:35 p. m., when the fall

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.