accountable without lingering ice, and, indeed, there is no direct evidence of the latter.

"Finally," Goldthwait says, "it must be admitted that undulating pitted outwash, even with local foreset structure, as along the western edge of the Farmington Lowland, is a poor record of an extensive water level, whereas it fits well the picture of long marginal streams and pools." The writer believes this viewpoint arises from a consideration of the seventeen-mile zone of outwash along the western side of the Farmington Lowland as a single deposit rather than from the point of view of the units that compose it. The only general direction of slope and structure is eastward at right angles to the trend of the valley and any hypothetical long marginal streams. This deposit appears to be a connected series of parallel fans spread on land and terminating locally in deltas where they reached standing water. The profile from south to north is highly irregular, and local delta structure is interpretable as marking fluctuating water levels. At one point, nearly opposite the Tariffville Gap, the profile declines abruptly to be resumed at a lower level northward. The only explanation that easily covers all these varied facts is that of a northward retreating ice tongue terminating in a general valley lake that created a high but fluctuating base level for the outwash surfaces until the end of the tongue retreated north of the Gap with consequent draining of the lake and abrupt lowering of base level for all later outwash. The concept of a stagnant ice block and pools[6] was thoroughly considered and found to explain some details but not the complex combination of interrelated features of the Farmington Lowland.

Referring to the color distinction between old red and younger yellow or buff sediments in the Lowland, Goldthwait says, "Lougee does not mention the excellent work by Krynine[7] on these sediments." With this statement the writer can not agree. It is true that this particular paper written by Krynine with suggestions and criticisms by Flint was not quoted in my report, but this was because its conclusions, based on petrographic analysis, were of doubtful correlative value in my physiographic study. An example will make my meaning clear:

I have described and pictured[8] a massive deposit of fine light tan- or buff-colored dune sand that the prevailing westerly winds have drifted against the eastern margin of the Quinnipiac Lowland, three quarters of a mile northeast of Fair Haven. It is traceable high up the slopes, at least to 70 feet elevation, and is still actively blowing into drifts where stripped of vegetation. The composition shows that the dune was probably blown up from the adjacent river flood plain a few hundred feet away, where, after the valley had been drained of static water, a train of yellow or buff sand was spread somewhat below the present salt-marsh level by a glacial river from the Farmington Lowland. Buff sand did not enter the lower Quinnipiac Valley until some time after the ice had retired to the vicinity of Plainville, 24 miles away. Interfingering with the smoothly bedded dune sand are a few lenses of Triassic red gravel or till washed down on the growing dune from the till-covered hill slopes above.

Interpreting a sample from this locality Krynine says:[9]

> A high silt and clay content is characteristic of sediments formed in ponded bodies of water from which the finer grade sizes can not escape. Specimen 19 shows a mixed character (fine grain size, high mica content, high Triassic admixture and relatively high content of very fine sand and silt), and in addition shows horizontal banding and is found on the very border of the lowland and at a much higher level than the other ice-free deposits. High-velocity material in a low-velocity deposit suggests an abrupt decrease in stream velocity immediately before deposition. The field appearance and position of the deposit indicate that it was on the fringe of the basin of sedimentation and was built by high waters rich in Triassic admixture, which, however, reached it only after depositing part of their coarse material near the center of the valley. Partial closure through abutment against the valley border resulted in a high content of fine sand and silt. This sand can be interpreted as a high-level flood-plain border deposit built by exceptional floods. The alternative hypothesis is a marginal valley deposit at approximately the same level with the main surface of deposition, away from the main channels of swifter currents and coarser sediments and reached only by sedimentation at times when stream volume and velocity were high. Such an interpretation implies that, at least in the lower part of the Quinnipiac Valley, the orginal surface of "buff" deposition was from ten to 20 feet higher than the present surface and that a considerable amount of "buff" sand has been flushed out of the valley by recent streams.

Needless to say, this deposit, which is assigned an ice-contact symbol on Flint's latest geologic map,[10] shows to what variety of interpretation the glacial sediments of Connecticut have been subjected.

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[6] R. F. Flint, *op. cit.*, pp. 88–89.
[7] P. D. Krynine, *Amer. Jour. Sci.*, 5th ser., 33: 111–139, 1937.
[8] R. J. Lougee, *op. cit.*, p. 34 and Plate IV–B.
[9] P. D. Krynine, *op. cit.*, p. 133.
[10] R. F. Flint, *op. cit.*, Fig. 2. p. 82.

MACROCOSMS IN VITRO

IT is hoped that the writer may be pardoned this rather flamboyant title here used to introduce a few

remarks anent certain phenomena which he has observed taking place in his beakers.

The first is an easily reproduced observation which presents a singularly beautiful analogy to the formation of spiral nebulae from unorganized dispersions of matter and the further condensation of nebulae into star masses. The operation is so commonplace that the result must needs have been observed innumerable times. When a solution containing some considerable amount of lead has been evaporated strongly with sulfuric acid, then cooled and diluted with water, there is formed a dispersed cloud of precipitated lead sulfate throughout the solution, which cloud we may perhaps think of as resembling a primal chaos of matter in space.

When the chemist, deputy demi-urge pro tem, gives to his beaker a rapid swirl to better mix and settle the precipitate, a very striking demonstration follows. Almost immediately a nucleus of precipitate forms at the center of rotation of the liquid. About this nucleus rotate spiral arms of matter which quickly draw in toward the center. One can not but be impressed by the close resemblance between the appearance of this formation and that of the photographs of the great spiral nebula in Orion. In the beaker the micro-nebula endures but a few seconds, for the arms are quickly absorbed by, and coalesce with, the central nucleus, forming a disk-shaped "star" which, in a gravitationless field, had certainly been globular in shape.

The writer has not sufficient temerity to draw a rigid parallel between the phenomenon here described and that taking place in the nighted dark of infinite space, but it is suggested that some similar cause must control the two cases.

A second observation has to do with a condition which may not be reproducible and which may present itself but once in a lifetime. Recently the writer was diluting, with a jet of water, a concentrated solution of various sulfates in sulfuric acid, using the caution advisable in such cases. The first few drops of water formed a number of globular pearls upon the surface of the liquid, which droplets were almost immediately absorbed with the exception of two which remained upon the surface for a fleeting instant. The larger of these droplets, perhaps three millimeters in diameter, came to rest near the center of the beaker, while the other, very minute, skipped across the surface, approaching the larger with increasing speed until it reached a maximum of velocity near its primary and went whirling around it and away in what may have been a parabolic or elliptical path. The wall of the beaker unfortunately intervened, and the droplet disappeared. The writer was forcibly reminded of the behavior of a comet which falls from infinite distance toward the sun, around which it swings at maximum speed while endures the balance between the centrifugal and gravitational forces, to go winging away into space again as the centrifugal force predominates.

The increase in velocity of the smaller droplet as it neared the greater may have been due to the depression of the surface of the liquid by the weight of the latter, so that the former may really have been running down hill in its approach. If such be the case, then we may have here an observation duplicating Einstein's analogy of gravitation. Perhaps we may surprise the workings of universal law in the ridiculous as in the sublime, in a chemist's beaker as in infinite space.

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LA OROYA, PERÚ

TORNADO CLOUD SEEN IN ALASKA

TORNADOES have never been reported from Alaska, although Sir Douglas Mawson, in "The Home of the Blizzard," reports the occurrence of tornadoes—"whirlies," he calls them—in the Antarctic.

On August 3, 1939, the writer was at the Adam Werner farm in Sec. 20, T. 18 N., R 2 E., in the Matanuska Valley. This farm is three miles north-northwest from Palmer, Alaska. About 2 P.M. some very heavy storm clouds were seen to the westward with an unmistakable tornado funnel silhouetted against a more distant area of lighter-appearing clouds.

The stormy looking clouds with appended tornado funnel appeared to be about 20 or 25 miles distant and about S. 85° W. from the point where seen. This would place the clouds about 25 miles north of Anchorage, Alaska. The air temperature was about 60° F.

Later inquiry at Anchorage gave the additional information that a violent shower of thunderstorm type broke upon Anchorage at about this hour. The flat valley lands over which I estimate the funnel to have been when seen are practically uninhabited, so that possible local observers would be few and far between.

The funnel appeared to be attached to, or hanging from, the lower surface of some clouds which would be technically classed as of strato-cumulus type. The base of the parent cloud formation was probably 2,000 feet above the ground, and the funnel, the writer estimated, extended about two thirds of the way to the earth's surface, but at no time during the period observed did it reach the earth's surface.

When first observed, the black-looking funnel was perfectly formed, but before the writer could get a camera and reach a point of vantage for a photograph, the funnel began to disintegrate, and in two or three minutes from the time when first seen, it had entirely disappeared.

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