loessial hills of Palouse soil or in peat swamps scattered through the scablands.

The mounds average practically circular. Careful measurements failed to show any greater elongation in one direction than another. The highest point of the mounds is the center. They thus differ in shape from ordinary sand dunes. The mounds are of all sizes, from a few feet across to over one hundred feet and average around thirty to forty feet in diameter. They rarely exceed three or four feet in height above the scabrock. The material composing them is loess like and differs so markedly from soil formed from basalt that little of it can be derived from that source. It appears to have been brought in from elsewhere and deposited by the wind. The source of the material was probably the soft lake beds of the Ellensburg formation of south central Washington and the finest outwash material of the glacial period. Where I have studied the mounds in the northern half of the scabland area they practically without exception occur above a depression in the basalt. The depression is sometimes shallow, making the cross-section of a mound lens-like; in other cases it has steep sides like a pothole. In either case the basalt under the mound is very little weathered and makes a sharp contact with the mound. Such weathering as occurred resulted in chipping off small fragments of the basalt from the sides of the depression which are scattered through some of the mounds, chiefly in their lower part.

The work of Bretz (*Jour. of Geol.*, Vol. 23, pp. 139 to 149, Vol. 31, pp. 617 to 649) on the channeled scablands shows that the Spokane flood from a rapidly melting ice sheet removed the surface soil from the basalt and by the suction of the swirling torrent plucked out from the stream beds great chunks of the jointed lava, leaving its surface in a highly pitted condition. We only find the mounds in places where the basalt's surface contains depressions. The mounds are found in the midst of level areas, on the sides of hills, at the edge of rock terraces and even on top of small isolated hills of basalt. They occur both in the timbered and treeless parts of the scablands. In fact, they may occur anywhere on the bare basaltic rock and never elsewhere in this region. Their absence from the surface of crystalline rock is accounted for by the fact that such rock is denser and that potholes or other depressions were not worn into its surface. A considerable number of mounds have been cut through in road and railroad cuts, and a few wells and vegetable pits have been dug in them. Besides examining such, I have trenched several others. In the areas so far examined I have invariably found that the mounds occur over a depression in the scabrock. In the bottom of the depression there may be gravel and a few boulders washed in by the Spokane flood and some chips of basalt from the weathering of the sides; aside from this the depression is filled with the loess that composes the mound that rises above it. Some of the depressions are shallow with gentle slopes, others are many feet deep with steep sides. A well in one case was dug twelve feet deep in a mound below the level of the scabrock without striking bottom.

Apparently at the close of the Spokane flood the basaltic lava was left with a decidedly pitted surface, the depressions of which had about the same dimensions in various directions. Sediment accumulated first in such depressions. Vegetation started growing on the sediment and retained the wind-blown material until the entire depression was surrounded and surmounted by a mound. The fine material of the mounds holds moisture better than the scabrock and the depression beneath is a storehouse of moisture which helps to promote a vigorous plant growth. It seems probable that the mounds were chiefly formed soon after the glacial period, although the much more luxuriant growth of grass on them to-day than on the bare basalt would permit additional wind-blown material to be caught and retained. Mounds have been reported outside the channeled scablands on the basalt of the Columbia Plateau but have not been examined by the writer. It would be of interest to learn if these mounds occur above natural depressions in the lava. It also may be that some lens-shaped mounds reported from other sections of the United States may be found to have grown as the result of more luxuriant vegetation in them, catching and holding wind-blown material until the mounds were formed.

The mounds are of economic importance to the inhabitants of the scablands. They provide the best available grazing aside from certain peat swamps. Corn, melons, sweet clover, potatoes and garden truck flourish when planted on the mounds, as the plants draw on the moisture in the soil that fills the depressions. It is difficult, however, to cultivate most of the mounds, due to their small size.

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FURTHER ON AERIAL SOUNDS IN YELLOWSTONE PARK

SINCE the publication of my note in your issue of July 30, my attention has been called to a much fuller and more important article on the phenomenon I described, written by Dr. Edwin Linton and published in SCIENCE (old series) for November 3, 1893. I suppose that I must have seen this article at the time,

but, if so, I had completely forgotten it. Any one interested in our subject should not fail to look it up, as it is by far the most careful and detailed description of the mysterious aerial sounds of Yellowstone Park which has thus far been given by any one.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A RAPID IRON HAEMATOXYLIN TECHNIQUE

THERE seems to have been little if any work done aiming to secure a stock solution of haematoxylin which would remain indefinitely, or at least for a long time, in an entirely unoxidized condition. Such a solution would appear to be useful, especially in view of the fact that unoxidized haematoxylin solutions can be oxidized almost instantaneously by the addition of appropriate substances.[1,2,3] This line of procedure seemed to the writer to offer promising possibilities. If one could start with a totally unoxidized solution it would seem possible to devise a technique that would permit the stain to reach the tissue sections at the peak of the staining power, thus making possible a maximum of action in a minimum of time. The duration of the staining power of the solution would be of minor importance, providing that the method of preparing the ready stain were simple and rapid.

A series of experiments with the above considerations in mind has resulted in a technique which has been used with success on a considerable variety of tissues, following fixation in corrosive acetic, Bouin's, Carnoy's No. 1 or Zenker's solution. The formulae for the necessary stock solutions are as follows:

Mordant	50 per cent. alcohol	20 cc
	Ferric chloride	1 grm
	Glacial acetic	2 cc
Stock Haematoxylin Solution	Absolute alcohol	20 cc
	Sodium hydrosulphite	0.2 grm
	Distilled water	5 drops
	Haematoxylin crystals	1 grm

In the stock haematoxylin solution only a slight amount of the sodium hydrosulphite ($Na_2S_2O_4$) will dissolve.[4] It is necessary that an excess be added, so that at all times there will be some crystals in the bottle. The haematoxylin crystals should be the light brown, not the dark product.[5] After the ingredients have been mixed the bottle should be stoppered and solution facilitated by shaking. This completes the preparation of a very powerful stock solution which will keep without oxidation for a long time. Such a solution, which has been kept in ordinary daylight for over a year, still retains its original light amber color and shows no sign of oxidation. Tests made at intervals show that its staining power is unimpaired.

The mordant and stain may be used separately or combined. Staining may be accomplished either by flooding the slides or by immersion in staining jars. This procedure is not only useful for sections but also has a somewhat more restricted use for staining in bulk. The capabilities and limitations of this technique are being investigated further. At present it may be said that flooding sectioned material affixed to slides, first with the mordant and then with the stain, gives the best results. It has been found most convenient to keep both mordant and ready stain in dropping bottles.

Before giving the general outline of procedure it is necessary to describe the method of preparing the ready stain. To five cc of tap water in a dropping bottle are added five drops of the stock haematoxylin solution, followed by one drop of ammonium hydroxide. The solution is ready for use within thirty seconds and will retain vigorous staining power for about four hours. The substitution of 95 per cent. alcohol for water in the preparation of the ready stain increases the life of the solution so that it will stain satisfactorily for five days or even longer. The alcoholic solution, however, will not stain vigorously until it has set about twenty minutes after preparation. If the five drops of stock solution are added to ten drops of tap water, and a drop of ammonium hydroxide then added, oxidation proceeds rapidly. After thirty seconds five cc of 95 per cent. alcohol may be added. The stain is then ready for immediate use and has a considerably longer life than the aqueous ready stain. This last modification, then, combines the immediate readiness of the first solution and the longer life of the second.

Sections, in paraffin ribbons, are affixed to slides by the albumen and water method and are allowed to dry into contact. Then follows the usual proce-

[1] Mayer, Paul, 1891, "Ueber das Färben mit Hämatoxylin," Mitth. Zool. Stat. Neapel, Bd. 10, Heft 1, S. 170–186.

[2] Unna, P. G., 1892, "Ueber die Reifung unsere Farbstoffe," *Zeit. wiss. Mikr.*, Bd. 8, S. 475–487.

[3] Piazza, C., 1912, "L'invecchiamento rapido delle soluzioni ematossiliniche," *Zeit. wiss. Mikr.*, Bd. 29, S. 69–71.

[4] Sodium hydrosulphite used was that manufactured by E. I. du Pont de Nemours and Co., Inc.

[5] Light brown haematoxylin crystals manufactured by McAndrews and Forbes were used and gave entire satisfaction.