hundred ranchers willing to give, let us say $8,000 to ensure 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 ten 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 rain-maker, 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 base-ball 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 rain-less 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 one hundred 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-gazing and applauds the pluviculturist.

DAVID STARR JORDAN

A ROOT ROT OF ALFALFA

MANY fields of alfalfa throughout the state of Colorado during the past year have exhibited a dying out due to a root rot.

The disease first manifests itself on plants three or more years old as a flagging of the shoots in the spring. These shoots remain wilted for some time, irrespective of moisture conditions, and eventually die and are not replaced. Sections of roots of affected plants reveal a plugging of the vascular system with

a yellow substance giving a characteristic test for wound gum. This plugging is progressive.

The diseased roots on the average are able to transport but one fourth the amount of water carried by healthy roots, as determined by pumping water through lengths of diseased and healthy roots.

It is interesting to note that diseased roots contain little if any stored starch, while healthy roots are rich in that substance. The result of this lack of food supply is poor growth in the spring and a progressive weakened condition. Isolations from deep-seated diseased tissue constantly yield a fluorescent bacterium. Inoculations with this organism by root-cutting and injection into the roots cause discolorations and plugging of the vascular system identical with field symptoms. Check inoculations with water, physiological salt solution and other bacterial organisms isolated from rotted crowns failed to react in this way.

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THE DEFINITION OF LOESS

THE excellent summary with reference to the "Origin of the loess of the Palouse Region, Washington," given in SCIENCE of May the first, 1925, page 469, raises again the question of the proper use of the term loess. Is a deposit in a lake properly a loess?

As Grabau[1] briefly describes recent deposits of loess, they are chiefly wind laid deposits, may contain beds laid down in shallow water and may even contain beds of sand and gravel washed in by streams. He uses the term silt[2] in describing the size of the particles apparently as the word is used in soil surveys.

The present writer believes it is time to use the name loess with a definite meaning: a wind-laid deposit of loosely arranged, angular particles of calcareous silt loam typically intermediate in fineness between sand and clay, of uniform mechanical composition, often with color changes revealing faint lamination, and with a tendency to break off in vertical slabs.[3] This accords with the general use of the term. With the loess may be associated sheets of gravel which are not loess, but water laid. With it may also be associated beds of water-laid silt with shells of fresh-water molluscs. With it also may be associated a glacial boulder, but this boulder, though on the loess and surrounded by loess, is not loessial.

Failure to make such distinctions has been the occasion of misunderstandings in the past. The loess along Missouri River was in the early days thought to be a lake deposit. Later it was recognized as a wind-laid deposit with all the peculiarities of such a deposit. Later still, patches of silt laid down elsewhere in sheets of water in loessial areas and containing fresh-water instead of air-breathing molluscs were spoken of as if loess. It is well to distinguish between these classes of deposits and to use distinctive terms.

In describing any deposit we may recognize the source from which the material was derived, but the later deposit does not retain as its name the name of the material from which it was derived. A bed of sea sand is a marine deposit of sand regardless of the crystalline rock from which the sand was originally derived, and it is a marine deposit regardless of the agencies of river action that may have been involved in transportation. The fine deposits laid down by the wind are loess, regardless of the source of the material from which that loess was derived. It may have come from weathering of ancient rock, it may have come from soil or from alluvium along a recent river, but when laid down by the wind it is loess. When washed out later and laid down in water by a river it becomes a river silt (alluvium if on a flood plain). When laid down in the quiet waters of a lake it becomes a lake silt, along with such portions as may have been transported to that lake by streams, whatever the source of that fine material. Often one may be uncertain as to whether a given bed is a true loess. Then suitable terms should be used and the bed described accordingly.

If the term loess is thus confined to fine wind-laid deposits, as described, the term will have a definite meaning, which will accord with the general significance of the term.

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[1] A. W. Grabau, "Principles of Stratigraphy," pp. 565–568.

[2] *Idem.*, p. 565.

[3] Varied from Grabau, *idem*, p. 565.

QUOTATIONS

WHAT IS REASON FOR?

ABOUT sixty years ago Huxley made his famous answer to a precursor of Mr. Bryan. Wilberforce, Bishop of Oxford, had appeared before the British Association for the Advancement of Science and in the manner of Mr. Bryan congratulated himself that he was not descended from a monkey. Darwin himself was absent on account of illness, but Huxley was in the hall, and when Wilberforce had finished he rose and said in substance the following:

> If I had to choose, I would prefer to be a descendant of a humble monkey rather than of a man who employs his knowledge and eloquence in misrepresentation of those who are wearing out their lives in the search for truth.