

New Material Created From Clay

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By HOWARD W. BLAKESLEE.
(Associated Press Science Editor.)

Cambridge, Mass., Oct. 15 (AP).—A new material has been created at the Massachusetts Institute of Technology. It looks like paper. But no fire burns it, no acid corrodes it. It is good for writing, printing, wrapping, or can be made transparent as glass. It is odorless, tasteless, promising a hundred practical uses.

The new stuff is a thin film of pure clay. No binder holds the particles together. Its making comes from discovery of a new law of nature. The clay particles are all below the limit visible in an ordinary microscope. They attach, end to end, to form long threads. They do this automatically, something it had been supposed only living or organic substances could do.

This natural miracle first came to light in the laboratory of Dr. Ernst A. Hauser, associate professor of chemical engineering. His collaborator was Dr. D. S. le Beau, a slim, young blonde woman chemist.

Test Bentonite Clay.

For months they had been investigating Bentonite clay. Bentonite can be bought for a cent a pound, is the largest item in foundry moulding, and also an ingredient in tooth paste, face powders and beauty masks. Mixed with water it forms a viscous liquid. The liquid solidifies when standing. But give it one shake, and the mud turns liquid again. The oil fields use this mixture to make "drilling muds."

An important reason for studying Bentonite was the fact that it is an abundant American raw material.

Absorbs Much Water.

It was known that this clay would absorb about 10 times its own volume of water. A little of the water, Dr. Hauser found, adhered so tightly to the particles as to be virtually solid.

This brought the experiments to the point of drying some of the solution to learn the dry weight of the clay it contained.

A thumb-size jar was filled with the wet jelly clay. When the mass dried, it shrank to a mere lining, sticking to the interior walls and bottom of the jar. Dr. Hauser placed a finger tip in the jar and pressed against the clay lining. To his astonishment, this film of earth did not crumble. It came loose as if it had been cut out of paper and shaped to fit the interior.

Electricity Causes Change.

Ultra-microscopic examination showed that the clay formed threads and that these matted to build up a true fabric. But this "inorganic" thread-making was unlike anything previously known. The clay particles did not grow like crystals.

Under the ultra microscope, each particle lined up to touch the end of another particle. They acted like compass needles. Electrical forces held the ends together, and in this way threads grew in every direction.

It was discovered that by heating the clay films to nearly 1,000 degrees Fahrenheit and subjecting them to pressures around 1,000 pounds a square inch, they could be made as flexible as paper, and stronger. They could be transparent, or opaque.

Resembles Mica.

X-rays and infra-red spectroscopy showed that the films have practically the same structure as mica, and that apparently substitute for it.

The new material can be turned out in any sizes, at low manufacturing costs. It does not scale like mica. It has been named alsifilm, from aluminum and silicon, the chemical elements forming mica.

Electrical tests indicate it may be an ideal wrapping for cables and wires. It is also a good wrapper for oil, butter and food, because it is tasteless. As a lining it is suggested for the interior of beer cans, and for any utensil containing corrosive chemicals.

For Permanent Records.

The films promise to be useful for making permanent written or printed documents. They can be made of any thickness, a fact which permits them to be molded while moist.

The film has been patented and the rights assigned to the Research Corporation of New York city, a non-profit scientific organization.

Utilizing Volcanic Ash

3-24-40 Democrat * * * *
Arkansas Has Deposits of "Bentonite"—A Clay With Many Uses

By ADOLPH O. GOLDSMITH.

Ashes from volcanoes extinct for a million years or more are used by you every day. The ladies smear the ancient product on their faces in cold creams and other cosmetics, you wash your teeth with it, fine wines are clarified with it and even laundries use it to help remove dirt from your clothing.

Of course, the material is not known as volcanic dust; it is known as bentonite clay. But the original base of bentonite was fine floating volcanic ash, drifting in the air and settling in the salt seas which used to cover the central part of the United States. Back in the Eocene age at the beginning of the Tertiary period or the age of modern man, when such delirium tremens monstrosities as the dinosaurs were wading cumbrously in the morasses bordering the great inland lakes, some restive volcano spewed forth millions of tons of white hot material, sending dense clouds of ashes drifting over what is now central Arkansas. Evidently this eruption continued for months or even years, the ashes settling and being washed into the placid bodies of water, sinking to the bottom, filling in the low places in the beds of the lakes until it was sometimes 16 feet thick.

No Guessing, Please.

Perhaps the steaming waters of Hot Springs are what is left of that long-retired volcano. I wasn't living here at the time, but I can guess. That's all anyone can do about things which happened so far in the past.

Anyway, these ashes formed a layer in the bottom of the lakes, and afterwards, when the lakes were disappearing, seepage of salt and alkaline waters brought other minerals in solution and slowly altered the deposits until they reached their present composition.

The clay-mineral montmorillonite forms about 95 per cent of the structure of bentonite, and there are two classes of the clay—swelling and non-swelling. The swelling variety is called true bentonite and has more varied uses. There are several deposits which have been discovered in Arkansas—in Saline, Hot Spring, Grant, Ouachita, and a small one in Craighead county near Brookland.

The J. R. Wilkerson deposit located in Saline county about a mile south of Spring Lake Club, is the most extensive yet found, containing probably between 50,000 and 100,000 tons. There are four or five other deposits in Saline county, one of which is the Palmer deposit, estimated to consist of 20,000 to 40,000 tons. It was opened up in a small way by T. P. Foster of Little Rock, and some clay was shipped. It was later worked to some extent by Robert V. West of Tulsa, Okla., and is owned by J. Ernest Smith of Wilmington, Del.

But Not the Taste.

True bentonite, the swelling kind, expands to four or five times its normal bulk when wet, and has the plasticity of firm cheese. Where it has not been discolored by iron or other minerals, the clay is almost pure white and banks of it have the appearance of drifted snow.

Bentonite was dug out and used like fuller's earth for bleaching and other purposes for a long time before its unique properties were realized. The principal commercial quantities are taken from the Black Hills of South Dakota and Wyoming. An idea of how recent is its development may be seen from the fact that in 1925 there were only 2,500 tons taken from two places in Wyoming and South Dakota, while in 1935 there were 42,000 tons shipped from six places in the two states. More than half of the Black Hills bentonite is used in metal foundries in molding sands. Large or unusual castings are made in special molds made of sand, and the bentonite is mixed with the sand because it has higher bonding qualities than other clays and thus less clay is needed in the mixture. This makes the sand molds more porous, allowing the steam to escape more rapidly and preventing holes and air bubbles in the castings.

Another large use for bentonite is in thickening drilling mud in sinking oil wells so it will suspend rock cuttings and carry mud-weighted materials, and also to seal the walls of the oil wells against water filtration.

So effective is bentonite in stopping water seepage because of its great expanding qualities that a thin coat on the outside of basement walls and floors stops the percolation of water through the concrete.

Many, Many Uses.

Bentonite is used as a bonding agent in making many clay tiles and ceramics of all kinds; it is used as a cleaning agent in laundries and in heat- and sound-insulating boards, plastics and cements. It is used in horticultural sprays and insecticides as a suspending, spreading and adhesive agent, and also for purifying turbid waters and sewage.

Mixed with concrete, bentonite



Bentonite Is White, Like Drifted Snow.

improves its workability and flow, and is used to inhibit gumming of screens in dewatering paper pulp. Wines are clarified and wet-mash poultry foods gelatinized by use of the clay, and it forms the base for many cosmetics, toothpastes and pharmaceuticals.

True bentonite is not very plentiful and every effort is being made to find new deposits in Arkansas and determine the extent of the layers already known.

In a report on "Occurrence of Bentonite in Southern Arkansas," by Dr. George C. Branner, state geologist, it is pointed out that although the Saline county deposit is 30 miles away from the Hot Spring county deposit, it is entirely possible that the layer of bentonite could be almost continuous between the two points, though perhaps not so near the surface. A geologic map of the district shows that later sedimentary deposits of the Pleistocene age have formed a wedge between the two points, and may have covered it to a considerable depth or perhaps washed some of it to the ocean during subsequent floods.

Although bentonite has not been found yet in Arkansas in sufficiently large quantities to justify erection of grinding and drying equipment, Dr. Branner and his associates are always on the lookout for possibilities of new deposits or substantial extensions of present ones.

Scientists at the Massachusetts Institute of Technology, after extensive research on bentonite, have developed a material known as "alsifilm," which looks like paper, but is made of bentonite. Fire cannot burn it and acid does not touch it. It can be made opaque like paper or transparent like cellophane. Permanent records placed on this sort of paper would stand the test of ages. Alsifilm is pliable, and being tasteless and odorless would make an excellent wrapper for foods. It is a good electrical insulator and can be made in any size or thickness. Not only that, but the raw material—bentonite—from which it is made, costs only about half a cent a pound.

PROSPECTING FOR BENTONITE CLAY

Feb. 21 or 27, 1935

Engineer and Crew Reported Seeking Deposits in Saline and Grant Counties.

Prospecting for Bentonite clay, valuable in modern oil refining, is being carried on extensively in Saline and Grant counties by an engineer and crew representing the Attapulugus Clay Company, it was reported here yesterday.

The Attapulugus company is said to be an affiliate of the Standard Oil Company of New Jersey and the Atlantic Refining Company. Reports indicate that the survey will include holdings of the Long-Bell Lumber Company and other lands in Grant, Saline and Hot Spring counties, and possibly will extend to other areas.

Dr. George C. Branner, state geologist, said yesterday that a small deposit of Bentonite was discovered in eastern Saline county, not far from the Pulaski county line, several years ago, and that a few additional finds have been reported since.

He said he had suggested to interests hopeful of commercial production of Bentonite that a minute investigation be made to determine location of the deposits. This clay is sacked