

"It seems likely that a profound racial change is taking place in humanity, physically as well as socially. It would be highly desirable to know whether a similar physical reversal is taking place in those foreign lands where the upward surge of the last half century has been most marked."

Science News Letter, May 11, 1940

"Man-Apes" Contemporary

RE-STUDY of the fossil ape skulls and teeth found in South Africa by Dr. Robert Broom of the Transvaal Museum in 1936 was reported in an illustrated lecture by Drs. William K. Gregory and Milo Hellman of the American Museum of Natural History. Their findings confirm those of Dr. Broom: that the canine teeth of these apes are almost human, while the large molars combine human and ape features.

"Our reconstruction of the upper dental arch comes out in almost human form," Dr. Gregory stated. "The lower teeth also combine ape and human characters."

"These creatures probably represent persistent primitive forms that lived on in South Africa after man himself had arisen, possibly in another part of the world."

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Hopewell Indians Described

THE INDIANS who built the famous Hopewell mounds of the Ohio valley, and whose cultural remains have been found as far west as Iowa and Missouri, were brought a little closer to personal portraiture by a paper presented before the meeting of the American Association of Physical Anthropologists, by Dr. T. D. Stewart of the U. S. National Museum.

Trouble with the Hopewellians is that they practised cremation, so that bones found in their elaborate funeral mounds have always been burned beyond any possibility of reconstruction. Therefore while scientists have been able to collect great amounts of data on their really beautiful workmanship in copper, shell, mica, obsidian, horn, bone and river pearls, they could never get an idea of what the people themselves looked like.

However, some skulls from a Hopewell site near Kansas City, Mo., excavated by Dr. W. R. Wedel of the National Museum, at last give a clue to the Hopewellians' personal appearance. Search in the Museum's great collection of Indian skulls has also brought to light specimens from the Illinois-Wisconsin-

Iowa region, which had hitherto been overlooked.

The typical Hopewellian skull appears to have been long and narrow—in Europe it might have been classified as either Nordic or Mediterranean. Similar skulls were common among more recent Indian tribes in eastern North America. There is also a pronounced narrowing of the forehead, which Dr. Stewart believes may have been artificially produced by binding of the heads of the young children. Head binding is common practise in many Indian tribes, though it is usually done in such a way as to cause a flattening instead of a narrowing of the skull.

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Early Skull Surgery

EVIDENCE that Indians who once lived near Washington, D. C., practised the skull-piercing surgery that was common in ancient Inca-land was offered in another paper presented by Dr. Stewart. A skull dug up by Mrs. Alice L. L. Ferguson on her property on the Maryland side of the Potomac opposite Mount Vernon has a triangular hole in it, the sharp edges bevelled inward. The bone had healed perfectly.

The find is a very puzzling one, be-

cause primitive trepanning has not hitherto been known for this part of the continent. Yet the job was so skillfully done that "it would seem unreasonable to expect such a successful end result on a first attempt at cranial surgery."

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PHYSICS

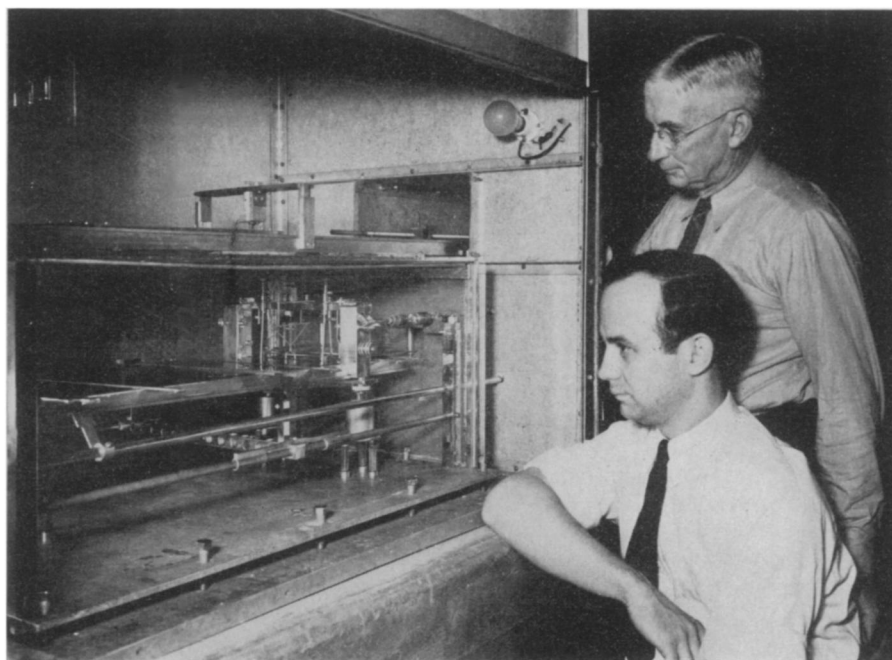
Ice Melts Without Heat In World of Thin Films

AMAZING things happen in the strange two-dimensional world of thin films which scientists can create in their laboratories. Typical is a new kind of "ice" which requires no heat to melt it, and turn it from a solid to a liquid state.

However, an extremely large amount of heat is used to expand or swell the liquid whose molecules separate sufficiently so that if this occurred in three dimensions it would be as if one quart of milk were to expand to three quarts, and yet remain liquid.

Prof. William D. Harkins, T. Fraser Young and Edward Boyd of the University of Chicago told of this new discovery to the National Academy of Sciences.

Every farmer knows that the way to keep potatoes in the vegetable house



MEASURES THIN FILMS

Prof. William D. Harkins and Dr. R. J. Myers are shown here with their apparatus for studying thin oil films only one molecule thick. Pressure, temperature and molecular area are measured and from these heat of expansion can be calculated.

from freezing during the winter is to keep tubs of water around. On cold nights this water freezes but in so doing liberates a large amount of what is called "latent" heat. Ice, in other words, gives up heat when it forms and requires heat to melt it, a fact which enables refrigerators to create cold.

In Prof. Harkins' thin film experiments many of the ordinary rules of heat and cold seem to be non-existent, but actually the same laws hold, though greatly disguised. Using an organic substance called pentadecylic acid it was found that when the molecules in the thin film are far apart the material exists as a gas in two dimensions only.

On compression, Prof. Harkins reported, this two-dimensional gas begins to change into a two-dimensional liquid. If this liquid is further reduced in area a second and remarkable type of liquid is created. This liquid is at first highly compressible, then becomes quite incompressible as the pressure is increased.

Finally, as the area is greatly reduced, the second kind of liquid shrinks and the liquid film freezes, but it is remarkable freezing in which no latent heat

is evolved. "Thus," says Prof. Harkins, "a kind of 'ice' is formed which requires no heat to melt it."

The thin films which Prof. Harkins and his group have been studying have only two dimensions—length and width. The thickness is only that of a single molecule, that is, a fifty-millionth to a ten-millionth of an inch. These thin films have remarkable departures from the behavior of ordinary three-dimensional matter. (1) No heat is required to melt the solid. (2) Very little heat is required to expand the first type of liquid as long as its molecules stay packed about as tightly together as in three dimensions. (3) There then ensues an expansion of this liquid film such that the intermolecular distance may increase as much as 35%.

This expansion occurs without a change of state, but nevertheless the heat absorbed is very great. For example, if the film consists of pentadecylic acid this extension of the film absorbs as much heat as it used in the evaporation of the same number of molecules of water at ordinary temperatures (11,000 calories per mole).

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● RADIO

Dr. Alexander Wetmore, assistant secretary of the Smithsonian Institution, and secretary general of the Eighth American Scientific Congress will interview eminent Latin American scientists who are participating in the Congress as guests on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, May 16, 4:45 p.m., EDST, 3:45 EST, 2:45 CST, 1:45 MST, 12:45 PST.

Listen in on your local station. Listen in each Thursday.

simply immense areas to get any harvest at all from such slow-maturing trees. At \$140 per section per year, this is not economically feasible. Instead, the timber baron "cuts out and gets out."

Sitka spruce is the victim of still another circumstance. Only between 2% and 7% of the cut yields lumber suitable for aircraft work. Much of the rest is highly useful, but Sitka spruce pulp at the moment is a drug on the market. And in many of its other uses, it could be replaced by a less-threatened wood.

The situation is comparable to killing herds of steers merely to get the filet mignon. The logger can't tell which will be the filet mignon parts while the tree is still on the hoof.

The main remaining stands of virgin Sitka spruce are on Vancouver and Queen Charlotte Islands and in the valley of the mighty Fraser River, which roars through British Columbia into Georgia Strait just south of Vancouver. Sitka spruce stands in the United States are still smaller.

The events in Scandinavia have not markedly affected the demand for coast lumber, as Scandinavia produces mostly pulp. This is lumber country.

The government reforestation program in British Columbia will have put 20,000,000 Douglas firs and also Sitka spruce into the ground. But none of us will be around to see them soar majestically heavenward, almost perfectly straight all the way up and with the first hundred feet of trunk clear of branches. Large forest areas in British Columbia remain untapped but they too will be cut over in time.

Only a changing technology, which is substituting plastic cellulose products for lumber, and thus permitting the wider use of faster-growing trees like cedar and hemlock, will protect 100,000 wage earners in the Oregon-Washington-British Columbia area from loss of their forest source of livelihood. Cedar and hemlock have always bulked large in this region's forestry. They will bulk larger as time goes and the big trees grow fewer.

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RESOURCES

War's Demands for Wood Wreaking Havoc In Canada

Toll of Timber Increased by Fact That Less Than 7% Of Sitka Spruce Cut Is Suitable for Aircraft Work

WORLD War II is taking a heavy toll of the Pacific Northwest's famous but almost irreplaceable tall timber, one of the last stands of big trees in the world, conservationists in Vancouver and in Seattle declare.

Cutting of Sitka spruce, the 250-foot forest monarch whose best cuts go into military training planes, is up about 50% since the declaration of war, a British Columbia Forest Service official estimated. The available supply of virgin spruce will last less than 40 years at the present rate of cutting, instead of the 50 years the pre-war cutting rate would have allowed.

The take of Douglas fir, best Pacific coast lumber tree and one of the finest in the world, is such that virgin stands of this species of fir will not last more than 15 years. Production is temporarily off because of a shipping shortage, but once the shipping difficulties are solved (and they will be), the rate of cutting

will exceed that of 1939, which exceeded 1938.

In not too many years the familiar barge loads of Douglas fir "peeler logs" from the Pacific coast islands will be a sight of the past. The 12-foot long, stout "peeler logs," cut from the butt of the tree, are top grade lumber.

Tragedy of both Sitka spruce and Douglas fir is that neither achieves its outstanding qualities of strength in much less than 250 years. This slow period of growth, combined with a peculiar system of timberland holding in effect in British Columbia, makes forest "harvesting"—in which the annual cut is limited to the annual growth—appear an impractical dream for these two trees.

Timberlands are not owned outright, but revert to the government when the timber has been cut. The right-holder must pay an annual tax of \$140 a square mile as long as the land is not cut and he holds it. He would need rights on