order Primates. But most of the clergy, innumerable educators and a vast majority of the laity can not stomach the Linnaean classification because it brackets with the "brute beasts" that self-conscious and conceited prig who calls himself *Homo sapiens* and is fond of acting like the viceroy of God. The supposed phylogenetic isolation of man is even a favorite theme of those scientists who rest their beliefs upon an uncritical acceptance of catch-words such as "polyphyletism," "parallelism," "irreversibility of evolution," and the like.

While the myth of the Eocene dawn-man will doubtless continue to flourish, the small-brained Pleistocene man-apes of South Africa now add their mute testimony that man, like his less ambitious cousins, the modern anthropoid apes, is a descendant of the late Tertiary dryopithecine ape stock of Europe, Asia and Africa, and that, as long maintained by us and more recently supported by Davidson Black, Weinert and Broom, the human status was gained through a long-continued and profound morphological revolution during the Pliocene and early Pleistocene epochs.

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SOME NOTES ON THE NEW ENGLAND HURRICANE OF 1938, MADE AT WORCESTER, MASS.

THE hurricane arrived so inconspicuously that hardly any one noticed its arrival. The Weather Bureau forecast in the papers sold on the street up to the time of the storm made no suggestion that anything unusual might occur. The wind was blowing hard in the middle of the afternoon, but no one thought anything of that. There were none of the ordinary signs of storm, no heavy black clouds, no suggestion of lightning. Instead, the wind came from slightly east of south, a direction from which we usually get mild weather, and the sky was overcast with a feeble attempt at rain.

The first, within my personal contacts, to recognize danger was our family cat. Previously she had insisted that her family be kept upstairs, but as the storm approached she came down the stairs with a kitten in her mouth, hid it under the couch while she went to the cellar to find a better refuge for her family.

The wind continued to increase, but no one thought anything of that. The clouds started to break up and the rain practically stopped. Now we could see two distinct layers of clouds, a high layer which appeared stationary, and a very low layer of light fleecy clouds moving rapidly from a little east of south. If the light fleecy clouds were near the top of the hurricane layer, as we would expect, it would suggest that the storm was confined to a very thin layer of air, compared to most storms.

Next we saw workmen on the roof of a nearby factory building, trying to fasten down the roof covering, which was working loose. But the attempt was soon abandoned, and we saw the roofing paper torn loose and blown away. Still I thought nothing of the severity of the storm. With no signs of storm present except the severity of the wind, how could it be anything unusual? I wondered at the weakness of construction, how people could be so careless as to put on a roof covering in such a way that the wind could blow it off. Next we saw the edging of the roof rise and fall with each gust of wind, like a wave a few inches high running the full length of the building, and I wondered what kind of trimming this could be. It was not till this had been going on for a half hour or longer that it rose higher than usual, and I noticed that it was the entire roof, leaving the brick wall standing alone. Finally, after the wind appeared to be diminishing, the brick wall in one section gave way under the repeated hammering, buckling slowly, as it seemed, letting the roof beams fall to the floor below. The worst of the storm was now passed, and the wind was insufficient to cause further damage.

At the height of the storm closing time came at our factory. For some time, no effort had been made to keep any one at work, but most of the employees made an attempt at work between the intermissions at the windows. Now the employees, all young men, cleaned up and left for home as usual. The sensible thing to have done was to have stayed in a solidly built building like ours, to wait for the fury of the storm to pass, but not one of my employees did so. Whenever we looked, there were people on foot and in automobiles making what progress they could, with bricks, signs and roofing materials falling on all sides. Probably the most astonishing thing about the storm in Worcester was that not a single person was killed by falling or blowing materials. Automobiles were demolished, but the people escaped.

I saw one building damaged, and further off two others appeared to have suffered. Others saw trees near them fall. But most of us thought that we saw some local trouble, that we had seen a piece of faulty construction, or a few trees weakened without our knowledge of it. It was not till after the storm, when I walked through a mile of continuous destruction, with hardly a hundred feet of open sidewalk at any point in that distance, that I began to realize the extent of the damage. Not until several days later did I realize that practically every building in the city was damaged to some extent, that church spires that looked sound were so weakened that it was decided to take them down rather than to repair. Not for a week did I dis-

cover that over our own building, which stood so solidly, with hardly a quiver from the wind, the roof was beginning to weaken. There was enough motion to start some of the joints, and several planks were noticeably loose.

Examination of the damage showed conclusively that it was not the force of the wind that alone caused the damage. Most of the buildings would have stood a considerably harder blow, if that was all. It was the continued motion that gradually loosened the joints and weakened the structures. It was the same with the trees. The motion pulled the roots up gradually, and after the storm many trees left standing were two or more inches higher at the base of the trunk than before. Often the roots at one side of the tree had been raised four to eight inches, letting the tree incline, but leaving it still solidly planted.

The storm was now practically over, but the wind, as closely as we could tell without instruments, was in the same direction. At the very center of the storm it was a straight blow, but we heard later that there had been a center of rotation a hundred miles or so west of the center of the storm, that at the center of rotation the damage was comparatively slight. If we look at the storm in the customary way, as a rotating mass of air, it is evident that some force must accelerate the air from nearly at rest to hurricane velocity and then almost stop it in each revolution. That must have been a great force, but what is its nature? How could a force be applied edgewise, that is, in a horizontal direction without causing the thin layer of air to buckle upwards? I will mention again that one of the most conspicuous features of the storm was its thinness, as indicated by the clouds, and not once did I notice a break in the uniform flow of light fleecy clouds. The traditional comparison with water flowing from a drain in the bottom of a wash basin was clearly not valid. A better comparison would be that of a thin layer of water, perhaps one-eighth inch thick, rotating at the bottom of the basin, while all the water above remained undisturbed, a thing which we never observe.

It appeared more like a mass of air from above, rolling down on the lower layers and squeezing them out. If that was the case, the observed rotation must have been only a secondary effect, an eddy at the side of the main storm, as it appeared to be. But if the wind velocity was the result of pressure from above, why the low barometer? Pressure would be expected to result in a high barometer. It suggests the familiar paradox of the flow of water in pipes, where reducing the size of pipe with a constant flow of water decreases the pressure also. It is the principle used in one form of vacuum pump, where, by making a hole in the side of the pipe where the diameter is smallest, suction is produced. Can a condition of this kind exist in the air, where a pressure from above is not transmitted to the ground, but acts in such a way as to reduce the size of the channel through which the air is flowing, with a resulting reduction in pressure?

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OHIO PRO-GLACIAL LAKES

IN 1908[1] and 1914,[2] the author published notes on lake beds in central Ohio. Four beds were called Finger Lakes of Ohio and described as well as possible, after the reconnaissance survey then made. One of these was reported to have tilted shorelines. Both the presence of the lakes and the tilt were discredited at the time by other workers and the author subsided, not because of any doubt about his findings, but because of lack of time in the pressure of other work to go over the field in a more thorough way. The recent gift of retirement from active teaching granted by the generous provision of Oberlin College has made the necessary time available, and during the past summer eight to nine weeks has been given to intensive field studies by the author, assisted by a graduate student.

During the last twenty-five years a lookout for more lake beds has been maintained, and the studies carried on this summer have covered ten abandoned lake beds; five or six more are known, and their study is booked for next summer. One of the ten examined was not wholly finished.

The findings have some considerable geomorphologic interest and a little economic value. Speaking of the possible resources first we can report that silts are found in all lake beds. Several deposits are being worked for the manufacture of tile and brick. Clays were also found in several lake beds, but in only one is any industrial use made of the clay. Gravels and sands as beach deposits are scarce and have little value, but three deltas, large for such lakes, are known; all are opened for road material. Specific shoreline features are usually wanting around the borders of the lakes.

Of value in studies in American epirogeny is the complete confirmation of tilting described twenty-four years ago in Lake Craigton. It is now known that Lake Craigton is much larger than was claimed in the preliminary survey and report, and that the tilting amounts to eighty feet in eighteen-nineteen miles along a N–S axis. This lake has three arms, one northwest toward Ashland, one north toward West Salem, and the third south toward Big Prairie. The north arm is lifted up more than the northwestern arm, hence the maximum tilt is up in the northeast. Two other lake beds have length enough in this direction to show tilting.

[1] *Am. Jour. Sci.*, 25: 239–243, 1908.

[2] SCIENCE, 39: 470, March 27, 1914; *Am. Jour. Sci.*, 37: 444–450, May, 1914.