program, which consisted of three biological films—*Mites and Monsters* (Strand Films), *Heredity in Animals* (G. B. Instructional) and *The Private Life of the Gannets* (London Films)—in all of which he had acted as scientific adviser. *Mites and Monsters* is designed for commercial showing, but with the aim of putting across cerain definite ideas concerning the size of animals and its limitations in different groups. *Heredity in Animals* is a purely educational film, designed to explain the elementary facts of Mendelism and selection to boys and girls in the higher classes of secondary schools, and *The Private Life of the Gannets* is a straightforward nature film, aimed simply at interesting the general public.

DISCUSSION

EVIDENCE OF THE AUSTRALOPITHECINE MAN-APES ON THE ORIGIN OF MAN

A RECENT visit to South Africa, in response to cordial invitations from Dr. Robert Broom, of the Transvaal Museum, Pretoria, and Professor Raymond A. Dart, of the Medical School of the University of the Witwatersrand, Johannesburg, was undertaken by us for the purpose of making a close study of the dentition of the Pleistocene South African man-apes described by Dart (1925)[1] and Broom (1936, 1938).[2] The full report of our results is being sent for publication by the Transvaal Museum, but in view of the exceptional importance of Dr. Broom's discoveries, the following brief note may be of interest to readers of SCIENCE.

We found that the forms called *Plesianthropus transvaalensis* and *Paranthropus robustus* by Broom displayed in their adult dentitions the following characters which are transitional or intermediate between the ape and human stages: (1) the upper and lower canine teeth, apparently in males as well as females, were of relatively small size, with low tips, and were altogether more human than ape-like; (2) the third upper and lower molars were very large, in contrast to the usually short third molars of man; (3) the second upper molar was larger than the first, as in apes; (4) the third lower molar crown pattern was evidently a derivative of the ancestral five-cusped "*Dryopithecus* pattern,"[3] but it was approaching the human "plus pattern" in the arrangement of its grooves and bore a large sixth cusp as in certain primitive men; (5) the grinding teeth when well worn acquired nearly flat occlusal surfaces as in man, whereas in apes the buccal cusps of the upper, and the lingual cusps on the lower, tooth rows, tend to remain in high relief even in well-worn specimens; (6) in the upper dental arch of *Plesianthropus,* as carefully reconstructed by us, the sides were slightly divergent posteriorly and the general effect was more human than ape-like; (7) in correlation with the small size and low crown of the upper canine, the first lower premolar had a convex buccal face and showed little or no trace of the shearing mesiobuccal face which is found in the ancestral *Dryopithecus* stock, where it sheared against the distolingual face of the tusk-like upper canine. Thus the first lower premolars in *Paranthropus* were almost human in stage.

On the whole the adult dentition of the South African Pleistocene man-apes was somewhat more human than ape-like in the small canines and premolariform first lower premolars, as well as in the flattening of the crowns of the grinding teeth by wear, in the form of the upper dental arch and in the great development of cusp 6 on the lower molars. On the other hand, it was more ape-like than human in the large size of the second and third upper and lower molars and in retaining the *Dryopithecus* pattern on all the lower molars.

The deciduous dentition, which is well preserved in the young skull of *Australopithecus africanus* Dart, is more human than ape-like in the reduction of the incisors and canines, in the advanced submolariform patterns of the upper and lower deciduous molars, in the shortness and width of the deciduous dental arches; on the other hand, the relatively huge size of its permanent upper and lower molars, together with their characteristic crown patterns, indicate that this is the young of one of the adult forms noted above and serve to mark its definitely infra-human status.

These conclusions are confirmed by the annectant characters of the braincast as recently figured by Broom. The smaller adult braincast, provisionally estimated by Broom as about 440 cc, although not as large as that of a large gorilla, is more human in general appearance. The larger braincast, estimated by Broom at about 600 cc, is not unlike that of *Pithecanthropus erectus,* but definitely smaller.[4]

In 1926 H. H. Wilder, in his excellent book, "The Pedigree of the Human Race," took the bold step of uniting apes and men in a single zoological family, the Hominidae. If mice rather than men were being classified, this would have been widely recognized as a genuine discovery, in line with the more fundamental one by Linnaeus that man is a member of the natural

[1] *Nature,* 115: 2884, 195–199, February 7, 1925.

[2] *Nature,* 138: 3490, 468–488, September 19, 1936; *ibid.,* 142: 3591, 377–379, August 27, 1938.

[3] William K. Gregory, 1916. *Bull Am. Mus. Nat. Hist.,* Vol. XXXV, art. 19, pp. 239–355, *Dryopithecus* pattern, pp. 293–295. Gregory and Hellman, 1926; Hellman, 1928.

[4] *Nature,* 142: 3603, 897–899, November 19, 1938.

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-