

to a lag in the rearrangement of its molecules, as the external form of the contractile elements changes. This viscosity hypothesis is, however, altogether unnecessary; for the decrease of force and work with increased speed can be deduced from the manner in which the energy liberation is regulated. Some applications were also described. The maximum power developed by a muscle is with a load about three tenths of the maximum load it can bear. The highest efficiency (work/total energy) is with a load of about 0.45 of the maximum. These are near enough for maximum power and maximum efficiency to occur very nearly at about 37 per cent of the maximum load. These results obtained with frog's muscle almost certainly apply, though possibly with different constants, to man, and it would be very important to find out and to determine the constants of human muscle. The technique required would be a very different one.

Anthropoid Evolution in South Africa

DR. ROBERT BROOM continues to provide sensational news from South Africa for anthropologist and palaeontologist. In another column of this issue (see p. 897) he reports further finds of relics of South African fossil anthropoids, which, if anything, surpass in interest the remarkable discoveries he has already recorded recently in these columns. From the site on which was found the Kromdraai skull, he has now recovered three bones, or parts of bones, the right humerus, the ulna and one of the toe-phalanges of *Paranthropus*, which, as his nomenclature indicates, he places, on the evidence of the skull, very near the line of man. The new evidence fully bears out his conclusion, for as he states, these bones, which on the balance of probabilities must be associated with the skull, are "nearly human". Further, and this is the most interesting feature of the discovery, they, and more especially the toe bone, must be interpreted as pointing to *Paranthropus* having walked erect. In other words, the upper limbs of this type were already freed from the duties of locomotion to undertake those functions which were to play a predominant part in forwarding the development of the specific characters of the brain of *Homo sapiens*.

THIS eminently reasonable interpretation of the Kromdraai finds removes the element of surprise from the further discoveries from Sterkfontein, which Dr. Broom records; but it adds to their significance in mutual corroboration as between the two series of discoveries. At Sterkfontein, on the site on which he had previously discovered *Plesianthropus transvaalensis*, an advance towards the human on Prof. Raymond Dart's *Australopithecus*, or ape-man from Taungs, Dr. Broom has also found the distal end of a femur and part of the brain cast of, it is argued, a mature male. Not only would the fragment of femur suggest that this type of fossil anthropoid also had attained bipedal status, but in addition the brain cast, when reconstructed, would place the capacity of the brain of *Plesianthropus* next in the scale of measurement, so far as at present known, to the recently

discovered specimen of *Pithecanthropus* from Java. *Pithecanthropus*, no longer in danger of being classed as a gibbon, is definitely above the human border-line. The new evidence from Kromdraai and Sterkfontein, taken in conjunction with the evidence of the symphyses, which Dr. Broom further records, would indeed seem to afford warrant for the view that we have been given a glimpse of the evolutionary process at a moment when what has been regarded hitherto as man's prerogative, the permanent assumption of the erect posture, had not long taken place. The difficulty in the way of regarding the South African fossil series as forming part of the human evolutionary process, though of course significant by analogy, on the ground of its relatively late date, to which Sir Arthur Keith has directed attention, is reduced, though not eliminated, by Dr. Broom's evidence for a revised dating.

Scientific Associations of the Lubbock Estate

THE public acquisition of the High Elms estate in Kent, as part of London's 'green belt', is an event of note in the history of science; for this was the home of the Lubbock family from 1808. In that year, Sir John William Lubbock acquired the nucleus of the property, some 270 acres; by later accretions the estate reached its present extent of nearly a thousand acres. A second Sir John William Lubbock was the first to bring scientific fame into the annals of the family: his observations of tidal and lunar phenomena and in physical astronomy ranked him high, and he was elected fellow of the Royal Society when barely twenty-seven years old. He worked also on the mathematical doctrine of probability and applied it practically to the subject of life assurance. He became the first vice-chancellor of the University of London. He built the present mansion of High Elms, extended the property, and greatly beautified it by planting many of the splendid trees which grace it now. He was followed by a still more famous son, Sir John Lubbock, afterwards Lord Avebury, who, born in 1834, spent nearly all his life there, and succeeded to the property in 1865. It is well known that on the scientific side his extraordinary career was influenced, not only by his father, but also, profoundly, by Charles Darwin.

IN fact, the assurance of the preservation of High Elms rounds off, as it were, a unique scientific memorial. For Down House is less than two miles from High Elms, and Down House, as is well known, is preserved as a memorial to Darwin by the gift of Sir Buckston Browne to the British Association. It is on record that Sir John William Lubbock hailed as a great event the news that Charles Darwin was coming to live at Down House in 1842, and it was not long before intimacy was established between the two houses. Between Darwin, in his thirties, and John Lubbock, not yet in his teens, a close friendship grew and endured until Darwin's death in 1882, when Lubbock paid final tribute to his scientific master by drawing up the memorial which petitioned the Dean of Westminster that Darwin should be buried in the Abbey. It is good to know that not