possessed a much larger brain than any existing ape. The gorilla, as shown by Selenka, has a brain of 400 c.c. in the young stage, when it possesses only the deciduous dentition, and it attains to a maximum of 590 c.c. in the adult. This, however, is a matter of only secondary importance. It is abundantly clear

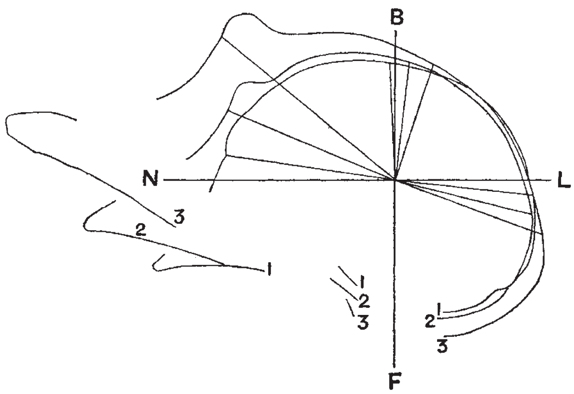

FIG. 4.—Profiles of the chimpanzee skull in different stages of growth.

that in a number of significant morphological characters, such as complete absence of the frontal torus, position of the nasion, greater magnitude of the parietal arc, reduced prognathism and shortening of the maxillary region, Australopithecus makes a nearer approach to the Hominidæ than any existing anthropoid ape. W. J. SOLLAS.

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### The Discovery of Benzene.

IN view of the projected celebration of the centenary of Faraday's discovery of benzene in 1825, it is important that any doubt concerning his priority should be dispelled. The standard work on coal-tar, Lunge's "Coal Tar and Ammonia," states on p. 223, vol. 1 of the fifth edition (1916): "It is usually stated that benzene was discovered in 1825, by Faraday, in the liquid separating from condensed oil-gas, but Schelenz (*Z. angew. Chem.*, 1908, p. 2577) has shown that the compound which we now term 'benzol,' or more recently 'benzene,' had been discovered in coal-tar forty years before Faraday in the year 1825 reported 'On new compounds of carbon and hydrogen. . . .'" Lunge then quotes from Schelenz three passages, culled from the chemical literature of the period 1740–1784, which in the opinion of both prove that benzene "was undoubtedly known forty years earlier" (although elsewhere in his article Schelenz refers to "Faraday's discovery, of which England can indeed be proud"). The citations from the eighteenth century are from German versions of Macquer's "Dictionary of Chemistry" (Leipzig, 1783), Demady's "Laborant" (Leipzig, 1784), and Caspar Neumann's "Prælectiones Chemicæ" (Schneeberg, 1740).

These works not being available, reference was made to similar English versions. In volume 1 of the English translation of the first French edition of Macquer's work (1766) we read (p. 166, footnote): "Fossil coal by distillation yields 1. a phlegm or water; 2. a very acid liquor; 3. a thin oil like naphtha; 4. a thicker oil, resembling petroleum, which falls to the bottom of the former, and which rises with a violent fire; 5. an acid concrete salt; 6. an inflammable earth remains in the retort." In volume 1 (p. 385) of "The Chemical Works of Caspar Neumann, M.D.," edited by William Lewis (second edition, London, 1773), the author states that 48 ounces of the best sort of pit-coal from Halle heated in a glass retort with a fire gradually increased, yielded 2 ounces 7 drachms of phlegm: 2 ounces and 1 drachm of a thin fluid oil, and 1 ounce of a thick, tenacious, ponderous, pitchy oil, which stuck in the neck of the retort: the residuum weighed 40 ounces 7 drachms. . . . That which distilled at first was light, and swam on water; the succeeding parcels proved more and more gross and ponderous, and at last sunk." The coarse stony pit-coal of Halle yielded no oil.

These quotations will suffice to show that the chemists of that period knew how to obtain by destructive distillation of certain coals a number of loosely-defined *mixtures* as fractional distillates, but they afford no evidence whatever that the light-oil or any other fraction was known to contain a definite, homogeneous chemical individual, which we know as benzene. Nevertheless, Schelenz states that Neumann certainly had benzene before him! Undoubtedly he had, but only as one constituent of a very impure mixture; and the preparation of a mixture which years later is proved to contain a hitherto unknown chemical compound does not constitute a discovery of that compound. Has Liebig ever been credited with the discovery of bromine? He actually saw it years before Balard "discovered" it. It is surprising that the statement in "Lunge" should have remained so long unchallenged; and it is fitting that at this time it should be given an unqualified and definitive denial.

It might be contended that Faraday's title to the honour of discovering benzene is rendered doubtful by the fact that he did not obtain it in a pure state. In his paper to the Royal Society (Phil. Trans., 1825, p. 440) Faraday admitted that his "bicarburet of hydrogen" was impure ($C = 11 \cdot 576$, $H = 1$, compared with $C = 12$, $H = 1$, required by theory), probably because it contained another hydrocarbon containing 8·25 parts of carbon to 1 of hydrogen. In this connexion it is interesting to compare Faraday's values of some of the physical constants of benzene with the values accepted to-day (Faraday's values are given first): sp. grav. 0·85 (at 15·5° C.) : 0·8850 (at 15° C.); melting point 5·5° C. : 5·483° C.; boiling-point 85·5° C. : 80·2° C.; density of vapour ($H = 1$) nearly 40 : 39. Allowing for different degrees of accuracy of the measuring instruments in use a hundred years ago and of those now available, the conclusion seems to be justified that, without any doubt, Faraday was the first to isolate benzene in a substantially pure state; and there has never been any question that he was the first to investigate its physical and chemical properties. E. H. TRIPP.

May 27.

### Double Impacts by Electrons in Helium.

IN a paper on the precise measurement of the critical potentials of gases (Proc. Roy. Soc., 107-291, 1925) Mr. E. G. Dymond finds that the difference between the first and second kink in the current potential curve in helium is 20·9 volts and not 20·55 volts as one would expect if the first kink corresponds to electrons which have caused the transition $1S - 2s$ (type $A$), and the second kink to electrons which have caused two transitions $1S - 2S$ *and* $1S - 2s$ (type $BA$). In attempting an explanation he assumes that in his apparatus the second kink is due to the transition $BB$.

I would like to suggest in the first place that this disagreement is possibly explained when the energy lost by *elastic impacts* between electrons and helium atoms is taken into consideration, and in the second place that the double impacts are probably of the