

(a) Brains were removed at daily intervals during the incubation period. Each was divided into halves longitudinally; the xanthine oxidase activity of one half was determined while the other was fixed, sectioned and stained with hæmatoxylin and eosin. It was found that the xanthine oxidase activity had already considerably risen by the second day, whereas cellular infiltration did not appear until the third day and was not prominent until the fourth day after inoculation.

(b) Determinations were made of the desoxyribonuclease activity of normal and virus-containing mouse brains. No significant difference was found. This enzyme is present in large amounts in mouse lymphatic tissue; since the cellular infiltration is insufficient in amount to produce a detectable increase of desoxyribonuclease activity, it is not likely that it is responsible for producing the observed rise of xanthine oxidase activity, which at times amounts to ten times the normal value.

The evidence, therefore, does not support the view that xanthine oxidase is introduced into the brain by the accumulation of inflammatory cells, as it begins to increase in amount some considerable time before cellular infiltration appears. This being so, it is possible that the presence of the virus brings about in some way the accumulation of xanthine oxidase, perhaps by a selective affinity for it which is greater than that of the host tissues, and that the enzyme is an essential growth factor which is required for virus multiplication.

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The Premaxilla and the Ancestry of Man

IN 1914 I had the privilege, thanks to the kindness of the late Prof. Fawcett, of studying the development of the human facial bones in his unique series of embryonic crania. In 1918, as a result of this investigation, I stated in my first publication on the "Ancestry of Man" that absence of the premaxilla on the human face was "a human specific character", and that from its very precocious ontogenetic development it might be presumed to be a very early phylogenetic acquirement. This statement received a certain amount of adverse criticism, but I repeated it and amplified it again in "Man's Place among the Mammals" in 1929.

At the time I did not realize that my findings were merely a repetition of those made by G. W. Callender in his forgotten paper of 1869. In that paper Callender had shown that in man the premaxilla is "shut off from the face by the nasal and incisor processes of the superior maxilla". Afterwards, Dr. E. H. Johnson, working in my department in the University of Melbourne, repeated the whole of the work on the development of the upper jaw in 1936. These results may be briefly summarized:

(1) Notwithstanding the numerous statements to the contrary, the suture between the maxilla and premaxilla is never present on the human face at any pre- or post-natal stage. This is so because

(2) in early embryonic life the maxilla of each side grows forwards over the *anlage* of the premaxillæ and, by meeting in the middle line of the upper jaw, buries them completely on their facial aspect.

(3) In this way those parts—the portion of the upper jaw bearing the incisor teeth and the nasal margins—which in monkeys and apes are formed superficially from the premaxilla are, in man, constituted by the medially growing incisor and nasal processes of the maxilla.

(4) The division between the superficial maxilla and the buried premaxilla in man is marked, as Jarmer showed in 1922, by the interalveolar suture; for in man alone are the sockets for the incisor teeth formed from maxilla labially and premaxilla lingually.

This striking fact of the fundamental difference between man and any other of the existing Primates in the architecture of the upper jaw appears to have been completely overlooked in assigning the rank of 'hominid' or 'man-apes' to the Taungs and Sterkfontein skulls. *Australopithecus* and *Plesianthropus* show definite facial maxillary-premaxillary sutures in typical simian form, and *Paranthropus* fails to show it only because the individual is over the age at which it is obliterated and not at all because the condition is 'as in man'.

Whether the orthograde bipedal posture and the other attributes that have been claimed for these South African forms will ultimately be established is a question that only time and further discoveries can solve. But meanwhile it can be asserted with every possible assurance that all of them are apes, and that they throw no light whatever on the primate forms that were ancestral to *Homo*.

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Species of Sulphur Bacteria Associated with the Corrosion of Concrete

IT has already been shown¹ that in the highly acidic end-products of corrosion of concrete sewers exposed to atmospheres containing hydrogen sulphide, there are present large numbers of a sulphuric acid-forming species of sulphur bacterium provisionally named *Thiobacillus concretivorus*. Further, it has been shown² that the typical corrosion process is a case of bacterial corrosion; it cannot proceed under sterile conditions and can only be carried to the acid stage through the activity of this organism. It is typical of this form of corrosion that the pH of the products falls continuously as the corrosion process becomes established. As the organism cannot exist at a higher pH than 6.5, its activity could not explain the initial stage of the process in which the pH of the fresh concrete surface (11-12) falls to 6.5 or less. It was then suggested that this preliminary drop in pH could be brought about either by purely chemical reactions or by the activity of further species of bacteria.

I have now isolated, from the corrosion products of concrete in the early stages of corrosion, two other groups of bacteria the activity of which explains this preliminary drop in pH.

The first group appears to be a homogeneous single species characterized as follows: the organisms are strictly autotrophic Gram-negative bacilli which rapidly oxidize thiosulphate to sulphate, polythionate and elemental sulphur, forming a pellicle of sulphur