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HEAD IMAGING AND CRANIOMETRY: A HISTORICAL NOTE ON A BASE LINE ERROR

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Introduction

Standardization of patient positioning during radiological examination of the skull was a process which seems initially to have evolved slowly. Early workers, such as Stenvers(1,2) gave carefully detailed, yet somewhat individualized, descriptions of their investigations. Beginning with the petrous bone(3), then the whole skull(4), it was Lysholm who began the process of standardization proper. Yet, as late as 1961, a need for clarification was still apparent for which a study meeting was held on projections and nomenclature under the auspices of the World Federation of Neurology, Problem Commission of Neuroradiology(5). Problems addressed included the classification of landmarks, lines and planes, the classification of the most important routine skull projections and the classification and analysis of special projections.

Three lines were agreed as being fundamental to skull radiography: the auricular and the inter-pupillary (or inter-orbital) lines and a basal line for which two alternative, equally acceptable versions were recognised. These were 'the orbito-meatal line which joins the outer canthus of the eye to the central point of the external auditory meatus,'(5) (now commonly called the radiographic base line) and 'the basal line accepted at the Munich Congress in 1877, also known as the line of Frankfort, or Reid's base line. It is the line which joins the infra-orbital point to the superior border of the external auditory meatus and is also known as the anthropological base line.'(5). Here there is an error, not one which necessarily hampers practice but one which is perpetuated in some standard texts, for Reid's base line is not identical with the anthropological base line.

In 1884, Robert Reid (1851-1939), then a demonstrator of anatomy at St Thomas's Hospital(6,7) proposed a method of cerebral localization whereby the hidden topography of the brain could be related to a system of lines drawn between large and easily felt landmarks on the surface of the head. In particular, he sought to locate specific sulci and gyri accurately enough for exposure following removal of a one inch piece of bone. This system Reid founded on a base line (figure 1) which ran 'through the lowest part of the infraorbital margin and the middle of the external auditory meatus'(8). The anthropological base line, by contrast, is a craniometric line joining the lowest points of the infra-orbital margins and the mid-points of the upper margins of the external auditory canals (figure 2) and its chequered history can be traced to other than Munich 1877.

Until the Franco-Prussian war of 1870, Broca's system of craniometry had predominated. Afterwards, a growing tendency for Germany individualism led

in 1874 to new methodological proposals by von Ihering at a congress of the German anthropological societies. Craniometric conferences followed in Munich in 1877 and in Berlin in 1880 until a scheme of craniometry, which included the anthropological base line, was drawn up by Kollmann, Ranke and Virchow and submitted before the 13th General Congress of the German Anthropological Society, held in Frankfurt-on-Maine in 1882. This scheme was adopted and designated the 'Frankfort Agreement.' While some aspects were welcomed, the general feeling among British anthropologists was of hostility to both the Frankfort Agreement and to the new anthropological base line¹". Based on its own merits, the new system could not prevail and the need for an international unification of methods was apparent. Despite various attempts, craniometric systems remained diverse until a process of unification began with the 13th International Congress of Prehistoric Anthropology and Archeology in Monaco in 1906 and continued at its 14th Congress in Geneva in 1912(10).

Although apparently quite similar, it is important to remember that the nature of the two base lines is quite different. Reid's base line is 'drawn' on the surface of a live subject whereas the anthropological base line is 'drawn' between bony points on a dry skull.

Where the confusion first arose is unclear. Lysholm(4) refers to the use, by anthropologists, of the eye-ear plane which he also calls the 'Frankfurter' horizontal and which he also traces to acceptance at Munich in 1877 but he does not mention Reid. Notably, the same error appears in Dobson's definitive 'Anatomical Eponyms,'(6) which may suggest that the error first occurred outside radiology.

There is, perhaps, a final twist, for it is doubtful whether one ought to credit Reid with his base line at all. Von Baer was the first to use it while von Ihering(11) defined it more precisely(9). Furthermore and of apparently independent devising, Kronlein's scheme for cerebral localization was also founded on a base line identical to Reid's(12).

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