

the nasal index as well as the cephalic index in my conclusions. My generalised map of race migrations was published in December 1919 by the *Geographical Review*. It is reproduced with only minor changes in my recent book (1927). I ask anthropologists to consider the present map of head indices (Fig. 1), which is essentially that given by Biasutti (plate vii) in his "Antropogeografia Generale" (Florence 1912). I first saw the map in 1922, and I have redrawn it on the polar projection to show the corridors of migration from Asia. My theory of migration zones is, I think, as clearly shown in Biasutti's map as in the frontispiece of my own book. There is the belt of narrow-headed races occupying Africa, India, Australia. They have been thrust away from the Bering Corridor into the Yenesei Valley and Japan. In America they are found only in the extreme east in the Hudson Bay region and in Brazil.

In Central Asia and along the main corridor to Europe are the broadest-headed races, which I call 'late Alpine.' The same types occur down the corridor in the west of the Americas. May I quote

in anything anthropological save the Australian aboriginal. I am the more grateful for its kindly reception.

University of Sydney,
May 15.

GRIFFITH TAYLOR.

EXPERIENCE has shown that it is often dangerous to place too great reliance upon averages when dealing with distributions, and this is particularly the case with the head index. In a map of the world on a very small scale, it is impossible to avoid broad generalisations which mask important racial movements; as an example, one has only to compare Arabia and India in Prof. Griffith Taylor's diagram of Biasutti's pl. vii. with the original.

The broad facts of a zonal distribution of the head index are clearly brought out in Griffith Taylor's maps, but it appears to me that they are apt to produce a wrong impression on those who have not made a study of human races and their distribution. The pleasing simplicity of this presentation is a snare, as

the problem is really a very complex one. Perhaps I should not have referred in my review to 'early Alpines,' since Griffith Taylor had left a loophole for brachycephaly in Central Africa as being due to a Negrillo element on p. 106, though on p. 225 he refers to this stock as "comparatively narrow-headed as in Africa." I would like to take this opportunity to say that I consider the polar projection maps of Griffith Taylor to be of very great value in showing the corridors of migration by land. A. C. HADDON.

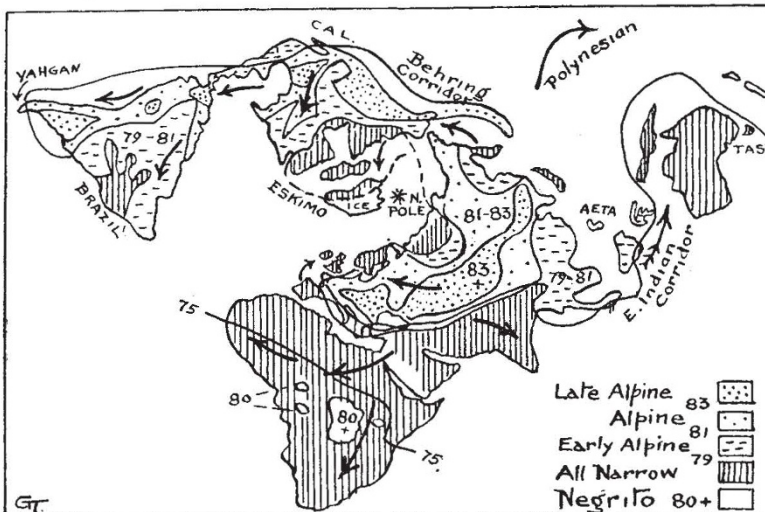


FIG. 1.—Distribution of head index (after Biasutti). The migration arrows and the isopleth for 75 in Africa added.

Dr. Marett's review in which he says of this 'migration-zone' theory that it is "a working hypothesis of singular breadth and completeness"? What alternative is there to my theory which will explain these zones? As I point out in my book, it is from the ethnological fossil record (*i.e.* in archaeological strata, etc.) that we shall learn the evolution of the races of man. I advance evidence to show that the order of these zones is repeated in the ethnological strata, where they have been investigated. Hence the Alpine races appear to be evolved more lately than the Mediterranean or negroid races.

Finally, I may perhaps be permitted to mention that it was partly due to a discussion with Dr. Haddon on our journey to Broken Hill in 1923 that I relegated most of my brief and specifically 'tentative' account of culture to an appendix. One form of culture, language, I have discussed more fully; and I have tried to show how and why language zones and racial zones do not agree (p. 162).

It can be but rarely that a text-book has been written under such disabilities as affected that under discussion. When preparing the book in Australia (with the exception mentioned above) I had never come in contact with any expert who had an interest

The Reflection of X-rays from Glass and Quartz.

IT is well known from the work of Compton and others that X-rays can be reflected at glancing angles up to about 40° , and Holweck claims to have observed reflection at $16^\circ.2$.

We have obtained evidence of reflection of X-rays of about 50 Å. from glass and quartz up to glancing angles of 45° , the maximum observable in the spectrometer used. The X-rays from a target upon which electrons from a Wehnelt cathode are incident, are reflected from the glass or quartz plate in a vacuum spectrometer on to Schumann film. This reflecting plate is mounted in the place of the crystal of the spectrometer. Copper and carbon targets, with difference of potential between cathode and target of 10,000 and 375 volts respectively, have been used.

The photograph obtained with the reflected rays shows a laterally inverted slit image of the focal spot, and the angle of incidence is accurately equal to the angle of reflection.

The ratio of the intensity of the incident to the reflected beam with the carbon target is about 2 to 1 up to angles of 35° . Above 35° the intensity of the reflected ray diminishes.

The question arises whether the radiation reflected is X-rays, or ultra-violet light in the Millikan-Lyman region, or cathode rays. As the photographic film is enclosed and placed opposite the slit (0.05 mm. wide) in a metal box which is at the potential of the negative end of the filament of the cathode, the rays cannot be cathode rays.