Man's Haemoglobins Including the Haemoglobinopathies and their Investigation. By H. Lehmann and R. G. Huntsman. (Pp. xi + 331; illustrated. 70s.) Amsterdam: North Holland Publishing Company. 1966.

Human haemoglobin, like the domestic pea, is one of the cornerstones of the building of genetics. The Garrod-Bateson concept of one gene – one enzyme arose in the early 1900's from the study of a few metabolic diseases. The refinement of this to the concept that one triplet of bases length of DNA codes one amino acid developed from the work starting in the late 1940's by Pauling, Ingram, Kendrew, and others on the structure of normal and abnormal haemoglobins simultaneous with the development of the Watson-Crick model of DNA. Lehmann and Huntsman have written a most attractive account of the haemoglobin and its variants, describing not only the molecular, clinical, and pathological aspects, but also something of the contribution of the study of haemoglobins to population genetics, evolution, and anthropology.

The haemoglobin of the lug-worm is saturated at only 4 mm. oxygen tension. The more complex molecules made of several haemoglobin units characteristic of vertebrates have the advantage of a sigmoid dissociation curve. The closer two animals are taxonomically, the more similar will be their haemoglobins. The sites of attachment of the vital haem groups are evolutionarily conservative; even the carp and man have some amino acids in this region in common. The horse, pig, and rabbit have polypeptide chains differing from the human chain by about 20 amino acids in each chain. Man and gorilla have two amino acid differences in their α chains and one in their β chain. Man and chimpanzee have no detectable differences in either chain. The gene for the α chain is oldest, and it is suggested that from a duplicated α chain gene was derived the gene for the γ chain, which in turn gave rise to the β gene which more recently still gave rise to the δ gene. The β , δ , and probably the γ gene locus are closely linked. Minor haemoglobin variants, depending usually on single amino acid substitutions, contribute not only to the understanding of the racial relations in man, but also, for example, of the relative contributions of the tropical humped cattle and the European aurochs to domestic breeds, and of the origins of domestic sheep.

Haematologists will welcome the detailed descriptions of techniques which form the last third of the book and are based on the authors' very extensive experience in the detection of abnormal haemoglobins. A much

wider group of geneticists and medical practitioners will find this a book which they greatly enjoy reading and wish to have on their own shelves.

C. O. CARTER

Finger Prints. By Francis Galton. With a new introduction by Harold Cummins. (Pp. xxiii + xvi + 216; 23 figures + 34 tables. \$6.95.) New York: Da Capo Press. 1965.

Galton's classic, *Finger Prints*, now reproduced in a facsimile reprint edition with an introduction by a present-day expert, dates from 1892 when Galton was 70. Four years earlier his curiosity had been aroused by thumbmarks as a sign of identification. The outcome was a characteristically ingenious, thorough, and clearly recorded series of inquiries.

It was in large measure due to Galton's work on the classification of fingerprints and his demonstration of their value as a means of identification that fingerprinting came to be adopted in police work. Though here he largely developed the ideas of others, he was the first to study the heredity of fingerprints. Comparing the fingers of sibs he found with each pattern type, arch, loop, and whorl, that observed similarities exceeded random expectation, thus confirming his idea that 'it would be strange if the law of general heredity failed in this particular case'. More detailed studies confirmed this, including his examination of the prints of 17 sets of twins. Since the distinction between monozygotic and dizygotic twins was not then appreciated, the time was not ripe for fingerprints to be used as an aid in distinguishing the two types.

Galton's more detailed analysis was complicated by the scale of 53 patterns which he used. More than once he seems to have been on the point of adopting some form of ridge counting. But he considered 'the quantitative results are not yet well defined, and that part of the inquiry must lie over until a future time'. He would perhaps have been gratified if he could have known of the results of subsequent work on the polygenic inheritance of fingerprints, much of it carried out in a laboratory bearing his name and based on his theory of correlation.

Galton also foreshadowed future advances in his collection of fingerprints among various constitutional and racial groups. He 'took a large number of prints from the worst idiots in the London district', but with negative results. And he looked without conspicuous success for differences between English, Welsh, Jews,