these investigators identified various species of Salmonella. The present publication reports the results of an investigation of Salmonella cultured from the mesenteric lymph nodes of 171 persons dying of different maladies in the General Hospital of Mexico. D.F.

The technique employed in this study was the same as that utilized previously in our study of Salmonella obtained from pigs.[5]

We isolated four species of Salmonella of Group B, five species of Group C and one species of the Further Groups. Twenty-seven Salmonella were identified: *S. typhimurium* 5 times, *S. oranienburg* 6, *S. newport* 4, *S. muenchen* 4, *S. montevideo* 3, *S. reading* 1, *S. essen* 1, *S. chester* 1, *S. choleraesuis* 1 *and S. carrau* 1.

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# SCIENTIFIC BOOKS

## SINANTHROPUS PEKINENSIS

*The Skull of Sinanthropus Pekinensis: A comparative Study on a Primitive Hominid Skull.* FRANZ WEIDENREICH. *Paleontologia Sinica,* New Series D. No. 10, Whole Series No. 110. Published by the Geological Survey of China, 1943. New York. N. Y.: G. E. Stechert and Company. 278 pages of text. 38 tables. 93 plates. Index and Bibliography.

THIS massive and cumulative study of the human remains found near Peking is without doubt the most significant and important treatment of the whole subject of fossil man to appear in many decades. Perhaps indeed, because of its wealth of new information, it is the most significant comparative study yet to be made in the entire field of human paleontology. That the work has been brought forth in the midst of war, at a time when even the whereabouts of many of these precious fossils is unknown, is a tribute to American democracy and to the single-hearted devotion to science of Franz Weidenreich.

A pupil of the late Gustaf Schwalbe, whose broad interests ranged over many fields of biology, Dr. Weidenreich has been the carrier of a great tradition in a day when narrow specialization has too often impeded the course of science. That there are men in our universities who know his name as a histologist and not as a paleontologist, that anthropologists are often unaware of his contributions in other fields than their own, is both indicative of the breadth of his interests and the increasingly divergent paths of the anatomical sciences. It has been exactly forty years since Dr. Weidenreich wrote his first paper upon the development of the human chin, begun, characteristically, when he was actively engaged upon the study of the blood and its related organs. The present work is the product of decades of wide labor in seemingly remote fields, all of which have contributed to the scholarship brought finally into splendid focus in the writing of this volume.

The book begins with an account of the discoveries at Choukoutien, their state of preservation and an explanation of the methods employed in their restoration. Part II is devoted to an analysis both of the structural features of the crania in general, and the characters of the individual bones. The metrical as well as the morphological features receive detailed attention. Variations, both sexual and individual, are noted and the character of the *Sinanthropus* skull thoroughly established. Needless to say, its right to a position in the human phylogeny distinct from that of the Neanderthal type is thoroughly demonstrated. Part III of the monograph is devoted to a comparison of the Peking material with other fossil types such as *Homo soloensis, Pithecanthropus, Africanthropus,* the Australopithecines and other more recently discovered remains. Not content with his exhaustive treatment of *Sinanthropus,* Dr. Weidenreich details many new and pertinent observations upon these latter forms, as well. In conclusion, he ventures extended general comment upon the course of human evolution in the light of the evidence available to our generation.

The salient characters of *Sinanthropus* may be indicated in compressed form as follows: A completely erect posture, associated with a skull and face still in the grip of active evolution from an anthropoid to a human state. The skull is dolichocephalic averaging at 72.2. The great thickness of the cranial vault is a marked element in the low cranial capacity, which ranges from 915 cc to 1,225 cc with an average, for five skulls, of 1,043 cc. The supra-orbital ridges are massive and protrude beyond the infra-orbital border. The marked post-orbital constriction and small size of the brain case combine to produce a markedly phaenozygous skull. The nasal bridge is broad and short, the anterior nares wide and low. There is no nasal spine. The torus occipitalis "appears as a continuous broad bulge . . . which crosses the occipital bone in its entire breadth. . . . " The breadth of the skull is greatest at the biauricular plane, and, unlike the condition in modern man, decreases above that level. The skull is low and there is a pronounced sagittal crest

or ridge. After a careful consideration of the problem of suture-closure, Dr. Weidenreich records the suspicion that growth and aging took a more accelerated course in *Sinanthropus* than in *Homo sapiens*. Sexual distinctions in size may have been a little more pronounced than in modern populations.

The species is viewed as lying on the direct line of ascent to modern man, with certain characters suggesting Mongoloid affinities. Dr. Weidenreich does not share the rather widely held view that the modern races are relatively recent variants from a generalized *sapiens* stock. Instead, he regards present human varieties as the product of already existing racial variations among the earlier hominids.

Taking exception to the views of Gregory and Hellman that *Dryopithecus* represents the stock from which both the human and anthropoid branches were derived, Weidenreich expresses the belief that the dentition of *Dryopithecus* and related forms betray specializations already suggestive of the anthropoid rather than the human line. Just as seriously, he has considered and rejected his own earlier views upon *Homo soloensis*. On the basis of more extended information, he now regards this form not as an Asiatic Neanderthal, but as an even more primitive variety lying in an intermediate position between the Pithecanthropus and Neanderthal stages.

Dismissing *Eoanthropus* as an "artificial combination of fragments," Dr. Weidenreich feels that our accumulated remains are now sufficient to establish a reasonably clear line of ascent to modern man. Furthermore, he regards this line as unbroken by extreme saltatory variations. The existence of more advanced forms, anatomically, in early geological periods which also reveal the presence of more primitive hominids, is explained on the basis of retardation in some areas, more rapid advance in others. Thus the living Australian he would regard, not as an archaic Pleistocene survival, but young in the sense that he has more recently attained a status through which the more phylogenetically advanced types have already passed. It remains to be seen whether the recently reported Keilor skulls suggesting, according to reports,[1] great antiquity for the Australoid stock, will force a reconsideration of this view.

Obviously some of Dr. Weidenreich's opinions will be challenged. The theory expressed above, for example, is capable of political distortion and has social implications which will not be well received in some quarters. To say this, however, does not prove Dr. Weidenreich's theory to be wrong, and certainly he offers it objectively, with no thought of stimulating racial disparagement. In seeking for an explanation of undoubted discrepancies between anatomical status and the geological age of more or less simultaneously existing Pleistocene forms, Dr. Weidenreich has fallen back inevitably upon an explanation, which, if true, might by indirection be taken to imply racial "childhood" for certain existing peoples. The mental implications of this view are not discussed, but they are too iconoclastic from the standpoint of the sociologist to be ignored.

The possibility of inequalities in the speed of development of various human types will be certain to add fuel to the controversy over racial superiority. Without attempting to assay the argument here, let it be pointed out that Dr. Weidenreich himself slyly comments that the European *sapiens*, on the basis of geological evidence, "must either be older or its later development must have been somehow more retarded than is the case with the Southeast Asiatic line. . . ." This good-humored remark should, I think, prove ample protection from charges of partiality toward the European branch of mankind.

Irrespective of some of the author's more tentative ventures into the unknown, the amount of anatomical detail available in the compass of this single volume makes it a priceless acquisition for the paleontologist and comparative anatomist. The book is more than a study of *Sinanthropus*. It is a vast and painstaking review of the whole subject of human evolution enlivened by an extremely thorough and original mind.

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# REPORTS

## WARTIME INVESTIGATIONS AT THE MELLON INSTITUTE. II

### SCIENCE SERVES SYNTHETIC RUBBER

The production, purification and analysis of butadiene and styrene have been investigated searchingly by the multiple industrial fellowship on tar synthetics, and the fruitful results have been put in industrial practice at Kobuta, Pa. No success here has had a stronger spur and the rapid and very beneficial outcome demonstrates how war stimulates excellence in research. Studies have eventuated in specifications for metals most suitable for butadiene and styrene plant construction. Worthy fundamental work has been done on the physical chemistry of the purification of synthetic rubber raw materials. The polymerization phenomena of butadiene, styrene and acrylonitrile are under close scrutiny. In an adjacent field new tests

[1] F. H. H. Roberts, *Scientific Monthly*, 58: 156–157, 1944.