Saldanha Man and His Culture

William L. Straus, Jr.

Enough evidence is now available to permit evaluation of the fossil human skullcap and fragment of lower jaw that constitute the creature known as "Saldanha Man." This South African specimen, found in 1953 by Keith Jolly and Ronald Singer, is particularly interesting because of its association with a variety of fossil vertebrates and stone tools. The site of discovery is located about 10 miles from Hopefield, a village near Saldanha Bay, some 90 miles north of Cape Town.

Despite certain differences in details, the Saldanha skullcap, in general, strongly resembles that of the famous Rhodesian skull, which was discovered in a cave at Broken Hill, Northern Rhodesia, in 1921 (*1–3*). As Singer (*1*) has shown, the two skullcaps are strikingly similar in both general outline and measurements. The brow-ridges of the Saldanha skull are comparatively huge, approximating but not equaling the truly enormous ones of Rhodesian Man; the shape and curvature of these structures differ, however, in the two skulls (*1*). The contours of the respective frontal bones and, hence, the shapes of the foreheads are practically identical.

Drennan (*3*) believes that the Saldanha mandibular fragment suggests a "typically Neanderthaloid" lower jaw which would be quite "out of harmony" with the Rhodesian skull (no part of the Rhodesian lower jaw was recovered, but the upper jaw is complete); rather, he regards it as closely resembling the corresponding part of the famous but enigmatic Heidelberg jaw. The Saldanha and Rhodesian mandibles were, therefore, in Drennan's opinion, quite different in morphology. Possibly such a conclusion is legitimate. However, conclusions based on bits of mandibles should be taken *cum grano salis*. As for expecting inevitable "harmony" between mandible and cranium, it may be noted that nature has produced some strange combinations. Relevant to this matter is the recent observation of Hutchinson (*4*) that Oldfield Thomas, a distinguished mammalogist, epigrammatized that whereas God made the cranium, the devil made the mandible.

The nuchal plane of the Saldanha skull is largely lacking. Drennan (*2*) thinks that it must have inclined backward as in Neanderthal skulls, an arrangement that he regards as indicative of a crouching posture. In the opinion of Singer (*1*), however, there is little reason for believing that the Saldanha nuchal plane differed markedly from that of the Rhodesian skull, which is disposed essentially horizontally, as in modern man. It may be added that, whatever the slope of his nuchal plane, it now appears that there is no reason to suppose that the posture of Neanderthal Man differed fundamentally from that of present-day man.

Endocranial casts are notoriously unreliable for determining slight differences in cerebral status. Yet Drennan (*3*) concludes that a comparison of the Rhodesian and Saldanha casts "substantiates a degree of cerebral inferiority" in the latter; and he holds this opinion despite the presence of an "ultra-gorilline" and supposedly primitive condition in the obelionic region of the Rhodesian endocranial cast, which is lacking in the Saldanha cast. One has only to recall the supposed evidences of primitive or inferior features originally noted in the Piltdown endocranial cast—features which were advanced in support of the "dawn man" concept of the synthetic Sussex monster! Available evidence indicates that the cranial capacity of both the Rhodesian and Saldanha skulls is about 1250 cubic centimeters, which is well within the normal range for modern man.

Rhodesian Man has often been regarded as an African variety of Neanderthal Man; and both Singer (*1*) and Drennan (*3*) have obviously been thinking in this direction with respect to Saldanha Man. Singer is the more explicit; he labels both Rhodesian Man and Saldanha Man examples of an "African Neanderthalian," which, however, differs markedly in many respects from Neanderthal Man of Europe. Yet he emphasizes that the brow-ridges represent the only indication of a Neanderthal "streak" in the Saldanha specimen. Such phenotypic resemblances, however, do not necessarily indicate close genetic relationship. They may merely be expressions of basic morphological characters common to the whole of the primitive human stock, which have appeared independently in different radiations and at different times. They may, for all that we know, even stem from different complexes of genes. Thus, there are different sorts of brow-ridges in man, whether fossil or extant. Some are basically the result of osseous hypertrophy, whereas others are the result, at least in large degree, of greatly expanded frontal sinuses. Moreover, identification of "Neanderthal" fossils in all parts of the world represents a hang-over of the now generally discarded concept of a "Neanderthal stage" in the evolution of the modern type of man.

On the basis of the differences between the two skulls, both observed and reconstructed, Drennan originally was inclined to regard the Saldanha specimen as a separate regional variety of, and as possibly a more primitive forerunner of, the Rhodesian race (*2*). Later, relying heavily on a comparison of their endocranial casts and presumed differences in lower jaw structure, he concluded that the Saldanha skull is of a "lower morphological grade" than the Rhodesian, and that the relationship of these two fossils is probably not lineal but collateral (*3*). Consequently, he created a new species for the Saldanha specimen, terming it *Homo saldanensis*.

This creation of a new species for the reception of the Saldanha skull is to be deplored. There has already been too much blithe creation of new species or even genera of fossil men—a practice which has cluttered and confounded the terminology of paleoanthropology. Furthermore, Drennan's assessment of the status of Saldanha Man is open to at least reasonable doubt, for it tends to ignore the natural phenomenon of individual variability within populations and is, therefore, a reversion to the concept of "type," an outmoded taxonomic concept that continues to plague paleoanthropology. Singer (*1*), however, regards his observed differences between the Saldanha and Rhodesian skullcaps as falling "within the limits of individual variation." Drennan (*3*) himself notes that the Saldanha skull is "another example of the diversity of character which appears to pervade fossil man." It can be reasonably argued that this diversity is apparent within a species, probably even within a lower taxonomic level. Hence, on the basis of the recent detailed descriptions of his skullcap by Singer and Drennan, there appears to be no good reason for regarding Saldanha Man as specifically different from Rhodesian Man; this despite possible differences in facial structure. Indeed, in line with current tendencies in taxonomic procedure, these two African fossil men can be regarded as belonging to one and the same subspecies of *Homo sapiens*, which may be designated *Homo sapiens*

The author is professor of physical anthropology at the Johns Hopkins University, Baltimore, Maryland.

rhodesiensis. Or, by those who regard these two fossils as specifically different from modern man, they may be designated as merely varieties of *Homo rhodesiensis,* the name originally applied to Rhodesian Man. Whatever the preference, either of these classifications would invalidate the terminology suggested by Drennan.

The taxonomic views of Singer (*1*) with respect to Saldanha Man are not entirely clear. It is evident, however, that he would not separate him from Rhodesian Man, for he states that the Saldanha discovery "confirms that the Rhodesian skull is no isolated, abnormal or pathological type of primitive man." This also appears to be the opinion of Sir Wilfrid LeGros Clark (5), who states that the Saldanha skullcap is "almost a replica of that of Rhodesian Man" and that its discovery is "important because it confirms the evidence of Rhodesian Man that there was a rather aberrant type of *Homo* in Africa at the end of the Pleistocene, and because it suggests that this type may have been in existence there over a considerable period of time."

An extensive stone industry, characterized by hand axes and other implements of an Acheulian type, and a large fossil vertebrate fauna were associated with the Saldanha skull. From the archeologic, paleontologic, and geologic evidence, as well as from results secured by the fluorine-dating method, it appears likely that Saldanha Man can be assigned to the early part of the Upper Pleistocene (*1*), at a time probably prior to the last glaciation in Europe (*5*). The skeletal remains of Rhodesian Man, on the other hand, were associated with a different culture. These artifacts, which include quartz flakes, round bolas-stones, and bone points and gouges, are in the Levalloisian tradition (*6*). Chemical studies (analyses of lead and zinc content) indicate that the human and other animal remains found at Broken Hill are approximately contemporaneous (*7*). The total evidence, while short of being conclusive, assigns Rhodesian Man to the Upper Pleistocene (*6, 8*) at a time that is probably equivalent to the Upper Paleolithic of Europe (*7*). If so, he would appear to be more recent than Saldanha Man.

As is noted in the preceding paragraph, the site of the Saldanha discovery is characterized by an extensive stone culture. In addition, two so-called "crude bone implements" were recovered. Interpreted as "fossilised bone chisels made by prehistoric man from the metacarpal bones of horse" (*9*), they have been regarded as particularly significant in being the first such implements found in association with the older South African cultures. These bone "chisels" have recently been studied by Singer (*10*). Actually they are equid metatarsals, of which the distal extremities have been fragmented. However, they are not identical in form, as was originally supposed, and, what is the most significant, they clearly exhibit furrows such as would be made by the teeth of carnivores. Bones of other fossil mammals from the same site also were found to exhibit manifestations of tooth marks or fragmentation which produced bizarre shapes resembling chisels, cleavers, and the like. Recent bones from a cave in Fish Hoek, which could not have been inhabited or frequented in recent times by man, show similar evidence of mutilation by the teeth of carnivores. Since various fossil Carnivora occur at the Saldanha site, Singer concludes that "there can be no doubt" that the so-called "bone chisels" or implements thought to have been made by man are actually only bone fragments originally chewed by carnivores and then subjected to weathering.

This study of Singer's (*10*) has implications that extend beyond any interpretation of the cultural capacities of Saldanha Man. It indicates the need for a careful assessment of the reality of other early, supposed bone tools, such as those of the so-called "osteodontokeratic culture" recently attributed by Dart (*11*) to the fossil Australopithecinae of Makapansgat—those early Pleistocene "man-apes" of South Africa.

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Mathematics in the Soviet Union

A. J. Lohwater

I had been living in Helsinki, Finland, for almost a year as a Guggenheim and Fulbright scholar when, early in June 1956, I was invited to give a mathematical address at the third Congress of Soviet Mathematicians to be held in Moscow beginning 25 June 1956.

Since the congress was the first such convention in more than 20 years, the organization committee decided, at almost the last minute, to invite about 40 foreign mathematicians, whose research was of current interest to Soviet mathematicians. All expenses for the foreign mathematicians, except travel, were to be borne by the Soviet Academy of Sciences; my travel expenses were paid by the Guggenheim Memorial Foundation. Norman Steenrod of Princeton University was the only other delegate from the United States; it is perhaps amusing to note that, until the congress in Moscow, we had not met each other.

General Characteristics of the Congress

The meeting was similar in character to a national meeting or convention of any one of our scientific societies; there were lectures to the general membership of the congress, special sections for research papers in the various specialties of mathematics, a business meeting of their mathematical society, scheduled entertainment of various sorts, and, of course, a banquet at the close of the con-

Dr. Lohwater is professor of mathematics at the University of Michigan, Ann Arbor. He was one of the two official representatives of the American Mathematical Society at the congress described in this article.