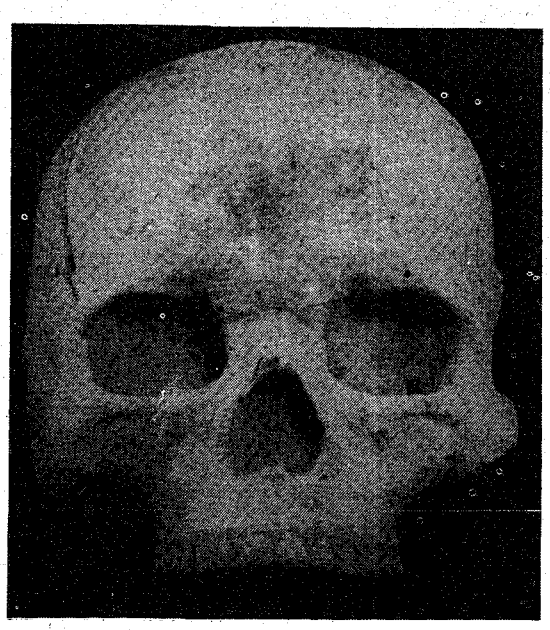

Fig. 1 Norma frontalis of skull of skeleton No. SRN-4 (photograph by courtesy of the Anthropological Survey of India).

way. It was discovered in 1968. The eastern sector of the site—about 600 m²—had been badly eroded and there was visible evidence of a cluster of human graves, the only such example to have been reported from the plain of the Ganga.

A considerable number of microliths and waste flakes made principally of quartz were collected from the surface of the site, where there was a regular microlithic industry. The finished tools, which mostly had steep retouches, included blades, points, piercers, burins, lunates, triangles, trapezes, arrowheads and borers. Heavy tools were conspicuously absent. Chips of charred animal bones were found scattered all over the surface. Some irregular and circular markings on the eroded surface of the site were noticed. These finds represent the debris of a spot where a small group of people had camped.

In March 1970 I conducted an excavation on behalf of the Anthropological Survey of India at the request of the Archaeological Department of Uttar Pradesh, assisted by Mr Anadi Pal. Digging yielded an articulated, almost complete and undamaged skeleton (No. SRN–4) buried in a grave; only the mandible and right humerus were missing. Another eight, badly damaged skeletons were lying nearby, exposed because of heavy erosion of the top soil. The right clavicle and some fragmentary bones of one of these skeletons (No. SRN–5) were removed for examination, and other fragments were sent for radiocarbon analysis to the Tata Institute of Fundamental Researches, Bombay. Some skeletons show evidence of the early stages of petrification.

All skeletons were buried within the deposit of layer 1, and No. SRN–4 was 14 cm below the present surface. This layer is composed of compact and hard silt of a darkish colour. When I revisited the site in May 1971, accompanied by Dr D. K. Sen, director of the Anthropological Survey of India, and Mr P. Gupta, I could locate the skeletal-bearing layer 1 against an exposed section of a nearby small tributary of the Sai River flowing across the district a few kilometres to the north of the site. The layer is about 32 cm thick, resting on an under layer of about 26 cm made up of silt mixed with kankar. Immediately below it is a layer of sandy silt of about 17 cm thick. The nature of the deposit indicates minor climatic oscillations, but generally a dry phase in the post-Pleistocene period.

Clay pots prepared by coiling and baking were found embedded, possibly in some pattern, in most of the graves. The upper part of most of the pots was, however, eroded away, leaving a circular cross-section of pots projecting from the surface.

There is evidence that the dead were regularly disposed of in a supine posture, usually in a normal extended position with the head to the west (some, however, between west and south but usually within a few degrees of west).

Skeleton No. SRN–4 belonged to a male who was older than 30 when he died. The skull (Fig. 1) is virtually complete and well preserved, and lacks only the mandible. The head is sub-rounded with the keel of the vault somewhat flattened. Seen from the top, the contour is "birsoides". In profile, the forehead is steep, and the superciliary ridges are mesially developed. The face is broad and short with moderately compressed orbits, while the nose is flattish-broad with a marked depression at the base. The mastoids are strong. The cranium has a complete upper dentition which is highly attrited. The wear of the upper incisors clearly indicates that the owner of the skull had the habit of biting in an "edge to edge" manner. The cranial index is 76.04 (mesocranic), nasal index 53.61 (chamaerrhine) and orbital index (left) 74.70 (chamaekonchic).

The radiocarbon analysis of a bone sample (index No. TF–1104; depth 5 cm; layer 1) has provided an absolute date of $10{,}050 \pm 110$ ($10{,}345 \pm 110$) BP (the first date is based on half life of radiocarbon of $5{,}568 \pm 30$, and the date parentheses are based on the value of $5{,}730 \pm 40$ for the half life of radiocarbon)[1].

These remains clearly predate by about 5,800 yr the previous earliest record of man, from the Late Stone Age site at Lekhania in Uttar Pradesh and dated by radiocarbon.

A detailed report on these finds will be published later.

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[1] Agarwal, D. P., *C*^{14} *Date List—March 1971*, Tata Institute of Fundamental Researches, Bombay (1971).

More about Dowsing

THE article on "Dowsing Experiments" by Foulkes[1] describes some work with which I was concerned and reflects the considerable effort involved in the planning and subsequent analysis of the trial. It does not, however, bring out some of the things which went wrong, which both modify and add to Foulkes's account and which illustrate problems which future experimenters would presumably wish to avoid. My part in this work was the carrying out of the statistical analysis and data presentation which Foulkes reports and it is with these aspects that I am concerned. My remarks are made after reference back to notes I made during the analysis period.

First, the pattern of objects illustrated in Fig. 1 was, indeed, that plan which was originally produced and the objects were nominally laid out in that manner. During some trials with a conventional mine detector, however, subsequent to the dowsing experiment, it was found that row E had not been laid out exactly as planned. Specifically, the objects planned for E6 to E15 were misplaced and actually buried in E5 to E14 and the remaining "blank", planned for E5, was in fact

"buried" in E15. The analysis, which was by this time complete, had to be redone and the Tables given in the later parts of the paper are correct. How this error was not discovered by at least one of the gangs of men who were responsible for burying another class of object is still a mystery.

The results of the two dowsers, experimenters six and seven, were not in Figs. 5 and 6 of Foulkes's article. The results of these experimenters were very interesting. They wandered off unsupervised (that is, without an accompanying "caddy" to record their responses). Their results were very similar for both types of ground. The results of experimenter six on the natural ground are given in Table 1.

Table 1 Dowsing Results of Experimenter Six on Natural Ground

	Object buried					
	B	M	C	W	P	Totals
Response						
M	1	10	2	3	6	22
P	2	11	5	6	7	31
O	1	19	0	1	27	48
(Blank)	36	0	33	30	0	99
Totals	40	40	40	40	40	200

B, Blank; M, metal mine; C, concrete block; W, wooden block; P, plastic mine.

Table 1 has a similar form to Table 2 in the article. On the original score card the dowser was instructed to record M for metallic mine, P for plastic mine and O for nothing present. When questioned about the response O and the blanks left on the score sheet, experimenter seven said that O had been used to mean that an object was present but its identity was unknown and that a blank had been left when a square had been dowsed and nothing found. Table 1 shows clearly a remarkable degree of association between the blank response and the presence of B, C or W and between the O response and the presence of M or P. Since the statement about the meaning of O was made "*a posteriori*" it does not necessarily indicate an ability to dowse and as the two dowsers traversed the course together their results are not necessarily independent.

The experiment was therefore repeated by experimenter seven and his results are, in fact, those attributed in the article to experimenter eleven. There was no significant association on this second attempt without experimenter six, who was not retested. This dowser was the soldier illustrated in Fig. 3 of the article, a Nigerian, who unfortunately could not be retested. These results, although inconclusive because of the lack of experimental control, do suggest that something peculiar occurred on this occasion which might be worth further investigation. Two different conclusions, all too common in this type of work, can be drawn. Either some form of ability was demonstrated (although peculiarly recorded and interpreted) or a breach of security of the trial (including the possibility of cheating) took place. It can be argued that it would be possible for an unsupervised student to have prodded the ground (for example with one of the dowsing rods) and at least detected an object present, since for control purposes small wooden pegs indicated the position in which an object, if present, would have been buried. Although this form of cheating may well have taken place on this occasion it does not explain how mines and other objects might have been differentiated. Indeed, since the basic concern was with methods of detecting underground mines, a proven ability to detect the difference between a mine and an object (for example a stone), even by prodding, could have been of considerable importance.

There is also slight evidence that a positive response was more closely associated with the presence of a wooden block than with a concrete block—especially on the raked ground. Although this may be a spurious result, the wooden block may have absorbed more moisture than the concrete block, thus altering the drainage pattern and hence the surface appearance of the ground.

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[1] Foulkes, R. A., *Nature*, **229**, 15 (1971).

Dowsing Experiments Criticized

MY photograph appeared in Foulkes's article, Dowsing Experiments[1], without prior reference to me, and I would like to make the following comments on the article.

The experiments carried out at the Military Engineering Experimental Establishment (MEXE) did not involve true "dowsing" as they were not water divining. Although experienced dowsers can locate buried objects such as cables, pipes and the like, these experiments were a search for objects unfamiliar to those taking part. Those I spoke to made no claim to achieve success, but agreed to the trial as an interesting experiment that might be of practical use. It was also evident to all that, to be of practical use, map dowsing must be used when walking over a live mine field. I agree that this experiment was a failure although one man was successful far beyond the bounds of chance.

The "flow in a pipe" experiment is not one which I would attempt, although I could probably locate the pipe either full or empty. No mention is made of the dowser's experience in this particular kind of search. I consider this test valueless, if he had no such experience.

I would like to emphasize that I was not instructing anyone in dowsing during the exercise at Chatham. The object was to find a number of men who could usefully develop into proficient water diviners. I do not think it possible to instruct anyone. Of those involved, 10%, not 25%, found accurately my second flow line; their judgment coinciding with mine and confirming my classification of them as sensitives.

I still maintain that the well referred to was correctly sited on one of the flows in the upper chalk. I predicted that the water would be near the bottom of the upper chalk and detectable by drilling through the clay to the chalk. This has not been done, as the drilling rig was removed before it had passed through the clay stratum. This was, therefore, not a dowsing failure.

The test over the 42 inch pipe seems to have been made by some of the 10% of "sensitives", who had no real dowsing experience. Even over natural fissure flows I would not have expected these novices to assess quantity.

Foulkes's description of the V rod movement was inaccurate. If the rod is held firmly in the normal way, another person can press the tip up or down, and, when released, the rod will return to its original position without any additional effort by the holder.

The Rocard experiment proves nothing. There are many dowsers who cannot dowse in rubber soled shoes. If Rocard, thinking he had used magnetized iron in his elbow joints, actually used non-magnetic iron, the experiment could have had the same result. It is a pity that Foulkes does not seem to have consulted any other authority than Rocard.

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[1] Foulkes, R. A., *Nature*, **229**, 15 (1971).