Book Reviews

Reinterpretation of the Earliest Art

Treasures of Prehistoric Art. ANDRÉ LEROI-GOURHAN. Translated from the French by Norbert Guterman. Abrams, New York, 1967. 543 pp., illus. $40.

Palaeolithic Cave Art. PETER J. UCKO and ANDRÉE ROSENFELD. McGraw-Hill, New York, 1967. 256 pp., illus. Cloth, $4.95; paper, $2.95. World University Library.

Prehistoric Art. Paleolithic Painting and Sculpture. P. M. GRAND. New York Graphic Society, Greenwich, Conn., 1967. 103 pp., illus. $12.50. The Pallas Library of Art, vol. 3.

Man's earliest known art is found in stratified deposits and on the walls of more than a hundred caves and rock shelters in France and Spain. Consisting of carved or decorated portable objects and mural paintings and engravings, the latest examples are at least 10,000 years old, and the beginnings of this initial period in art history are variously estimated at from 35 to 50 thousand years ago. Leroi-Gourhan has produced the first major chronological and cultural interpretation of Paleolithic art since 1952, when the Abbé Breuil, the late dean of this field of study, summarized a lifetime of discovery and comment in his *Four Hundred Centuries of Cave Art.*

Leroi-Gourhan proposes a radically new chronology of Paleolithic art and an equally novel interpretation of its cultural significance. Whereas Breuil divided Paleolithic art into two great cycles (Aurignacian-Périgordian and Solutréo-Magdalenian), each with its own climax, the proposal here under review sees the history of this art as a continuum during which the art waxed ever more accomplished and prolific. Leroi-Gourhan distinguishes four periods within this continuum, the last of which lies in the Middle and Upper Magdalenian, or from about 13,000 to 8500 B.C. To this final period of Paleolithic art he assigns 78 percent of the mural art and 81 percent of the *art mobilier.*

As to the cultural significance of this art, Leroi-Gourhan rejects the long interpretative tradition which insists that Paleolithic artists were engaged in magical ritual in behalf of the hunt. Instead he finds evidence for an ideology shaped by intense consciousness of the difference between male and female. Support for this view comes from his analysis of the distribution of animal and human figures in the caves, from the association of certain animal species with phallic objects in the *art mobilier,* and from a distribution of abstract signs with male-female implications which parallels that of the animal species and humanoids in the caves.

The occurrence of animal species in the cave art follows a statistically significant pattern: horses, cervids, and bouquetins are most often found at the entrances or in the deep recesses. When they occur in the middle of a cave they are often at the margins of the great central mass of depictions. While there are relatively few human representations in Paleolithic art, the males are distributed similarly to the horses, cervids, and bouquetins, whereas the females are found mostly in the middle. The association is further enhanced by the fact that, in the *art mobilier,* those objects which are patently phallic are engraved with horses, cervids, and bouquetins. Finally, there is that class of abstract signs which, according to Leroi-Gourhan, fall into two groups: points, batonnets, and barbs (male), and ovals, triangles, and rectangles (female). Their distribution in the caves parallels that of male and female animal and human figures. It is thus that the author establishes that Upper Paleolithic man saw the total universe of men and animals in male-female terms.

Leroi-Gourhan's reshuffling of the chronology and reinterpretation of the ideological significance of Paleolithic art are not merely new answers to old questions. He bases his proposals on a set of principles and procedures of analysis and interpretation more explicit and detailed than any heretofore. And it is this that invites serious consideration of his work. For if his conclusions are soundly arrived at he will rightly claim that they are at least more plausible than those of his predecessors. What, then, is Leroi-Gourhan's methodology?

Whereas the Abbé Breuil depended largely on the superposition of figures on the walls of relatively few caves for his determination of chronological sequence, Leroi-Gourhan says (i) that superposition is difficult to determine, (ii) that superposition gives sequence but no indication of the duration of time between one figure and another superposed upon it, and (iii) that Breuil's evidence was meager indeed considering the wealth of data available. He goes on to set out the following canons for research: (i) The data must consist of all the available material or a volume of material so great as to approximate the totality. (ii) The data must cover not only the wall art but the more firmly datable *art mobilier* which can help to date the wall art. (iii) As does Annette Laming, Leroi-Gourhan insists that the figures in the caves cannot properly be studied individually but must be treated as an ensemble, indeed as a "composition." (iv) The problem of deriving patterns of association and other correlations from this mass of material requires the use of perforated cards and a sorter. This will lend objectivity and statistical validity to interpretation, whether of chronology or cultural significance. (v) In approaching the art with questions about the ideology of its makers, Leroi-Gourhan turns his back on ethnology. Insisting quite rightly that earlier speculation adverted indiscriminately to citations from ethnographies, he himself will not use ethnology at all. He wants rather to let his imagination take off from statistical facts, like the evidence from perforated cards which shows that 90 percent of the bison depicted occur in the middle portion of the caves.

This summarizes Leroi-Gourhan's methodology, and it is seriously defective. No one will quarrel with the injunction to base interpretation on a large corpus of material, or with the convenience of punch cards. But the classification distinguishes little more

than male and female humans, the various animal species, abstract signs according to their basic shapes, and locations (entrance, middle, or furthest recesses) within the caves. In the case of humanoid figures the male-female classification is gross: one can at least subdivide the figures further into the categories of (i) unequivocal humans, (ii) synthetic figures of which some elements are frankly human and others identifiably animal, sometimes even as to species, and (iii) ambiguous figures which might equally be termed humanoid animals and animal-like humans. As to location within the caves, this reviewer is not aware that the locations of original entrances have in all cases been established. Even if we accept the ready division into entrance-middle-deep recesses, we can hardly be sure of the assignment of the figures to these zones. And this would cast doubt on the statistical results.

A far more serious objection can be made to the insistence that the depictions in a cave should be treated as a single composition. This brings up the matter of *style* and how the author conceives it. One of the most striking impressions afforded by Paleolithic art is the variety of styles it presents. One has only to contrast the "handwriting" of the artists of Font-de-Gaume with those of Altamira, the treatment of horses at Le Portel with that of horses at Niaux, the art of Lascaux with that of, say, Rouffignac, to appreciate the diversity. And the Abbé Breuil, who was by no means insensitive to style, identified stylistic differences again and again within individual caves. Even if we do not accept Breuil's analysis of palimpsests as a sound basis for a chronological sequence of Paleolithic art, we cannot ignore the fact of the stylistic differences he and others have identified. Accordingly, while agreeing that cave paintings must be regarded not as isolated figures but in context, we cannot agree that this common-sense precaution warrants going all the way in another direction and insisting that all paintings in a cave be viewed as the work of a single purposive intelligence.

This problem illustrates the intimate connections between chronology and cultural interpretation. To treat the art of a single cave as a unit assumes the contemporaneity of the depictions. To be sure, Leroi-Gourhan's ingathering of almost 80 percent of Paleolithic art in a single final period of 4500 years accommodates this view better than a chronology which spreads the art out over a greater span of time. But even 4500 years is an enormous span of time if we think of an ideological calendar rather than one provided by the dating of material culture. Today in Arnhem Land, where the material culture remains extremely simple, the caves exhibit both an early art style (the Mimi paintings) which is no longer practiced and a contemporary style (X-Ray art) which is the current mode of representation. The same is true of the ancient Wondjina figures in northeast Australia. We do not know the time span involved in Australia, but it is clear that the changes in art style there need not be held down to the pace of change in material culture. There is no warrant for assuming that in Paleolithic art styles could not have changed relatively rapidly and that one cave might not have served successive styles and successive ideologies. The methodological implication here is that style analysis and chronology will have to be pursued independently at first and only later reconciled. Meanwhile, confusion of style and period must be avoided.

In totally rejecting recourse to ethnology, Leroi-Gourhan has surely overstated his case. Prehistory which seeks to reconstruct ancient cultures can do so only by applying lessons learned from ethnology. If, for example, prehistoric settlement patterns are to be exploited as the skeletal remains of social institutions, how can this be done unless we have some prior general understanding from ethnology of how settlement patterns reflect social institutions? In the case of Paleolithic art, we may not be free to support interpretations by examples chosen at random from the literature of ethnography. But may we not, by controlled comparison of the conditions of life and ideology of contemporary and recent hunters, derive some common denominators which will provide intelligent questions which might ask about the corpus of prehistoric art? It is false objectivity to insist that we limit ourselves to such data as the art alone will yield. For then we would have no reason to expect that a study of these images would reflect ideology, since the putative relation between art and culture is itself a derivation from ethnology.

Thus Leroi-Gourhan's methodological strategy does not in the end lend aid and comfort to his interpretations. Nevertheless, this is a book with which students will reckon for some time. Not only does it contain the latest series of proposals on Paleolithic art, it is the most completely documented presentation of the subject and therefore a gold mine of information whose value is not lessened by the methodological wrongheadedness and ill-founded interpretation. In the opinion of this reviewer, the failure of the book is a function of too big an attempt too soon. Only when the problem of style has been solved and we have not just a single corpus of art, the product of some tens of thousands of years, but a series of stylistic-geographical-chronological entities within that big sweep of art history, can we hope to proceed to cultural interpretation. Only then, and only with the aid of controlled ethnographic comparison, can we proceed to inferences about the ideologies of the societies to which these stylistic subunits actually belonged.

This review has thus far dealt exclusively with the work of Leroi-Gourhan, at the apparent expense of Ucko and Rosenfeld and of P. M. Grand. In fact, these authors, whose books appeared two years after the publication of Leroi-Gourhan's book in France, agree with the reviewer as to the importance of his work and subject him to similar criticism. Let me therefore simply content myself with a general description and assessment of these works.

Ucko and Rosenfeld have produced a valuable introduction to the study of Paleolithic art whose modest format and price belie its importance. They survey the Paleolithic epoch, canvass the mural art, offer a compact and brilliant review of the interpretative traditions, and conclude with a critical analysis of interpretations. Nowhere, on any level of erudition or seriousness of purpose, will one find as sensitive and clear-headed a discussion of methodology as in this book. This, indeed, is the main purpose of the work; and it is a major contribution to the new era of emphasis on methodology in the study of Paleolithic art. I can think of no better introduction to the subject for the would-be serious student, and it will instruct mature scholars in the field as well.

Prehistoric Art by Grand offers a critique of Leroi-Gourhan's statistical method, calling attention to strategic errors such as the simple crediting of a site with the presence of horse or bison with no indication of whether these animals are represented by one or by dozens of figures. She dilates on some of the assumptions built into Leroi-

Gourhan's rubrics and otherwise exposes the superficial objectivity of the former work. But this is not the principal aim of Grand's book. Unfortunately, it pretends to survey the field of Paleolithic art while the text is subordinated to pictures to an extent which takes it out of the class of the two books reviewed above. The reasonableness and nuance of Grand's critical discussion surpass by far the superficiality of the rest of the text and make one wish Grand would publish on a more professional level. As it stands, her *Prehistoric Art* is an addition not to the library of scholarship but to that of gift picture books.

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Single-Cell Technique

The Radiobiology of Cultured Mammalian Cells. MORTIMER M. ELKIND and GORDON F. WHITMORE. Prepared under the direction of the American Institute of Biological Sciences for the U.S. Atomic Energy Commission. Gordon and Breach, New York, 1967. xvi + 615 pp., illus. $13.50; to libraries, $32.

A few years ago a distinguished high-energy physicist had the opportunity to attend a major international meeting in radiation research. It seemed to him that radiobiology was in a state of confusion and that extracting order from the chaos would indeed be a difficult task. This attitude on the part of scientists from other disciplines is understandable. Radiobiology has been bedeviled by a plethora of only partly related facts, and many such facts are still accumulating. Unifying concepts and general models have been disappointingly few. One reason for this has been the difficulty of understanding radiation effects in whole animals. Systems more appropriate for quantitative study, single-cell organisms of a wide variety of types, have seemed not to satisfy the need for data that can be applied to man.

This situation has undergone a significant change in the past decade, a major factor being the development by Puck and Marcus of a quantitative technique with single mammalian cells in culture, paralleling techniques in use with microorganisms. The enthusiastic acceptance of these techniques and their further development have been of importance in biology generally, and of paramount importance in radiobiology. A fundamental link now exists between studies in single cells and studies in intact mammals. Although, as Elkind and Whitmore fully recognize, single-cell studies cannot tell the whole story for the complex mammal, understanding of the performance of cells in compartments in vivo and of their importance to the survival of the whole organism has received great impetus because of studies in single cells.

This important subject has, however, lacked an authoritative text. This book, written by two men who have themselves contributed much to the development of the field, should fill this need.

The book contains chapters on survival-curve theory, in vitro and in vivo survival curves, the influence of chemical and physical factors on survival, recovery from radiation damage, effects on division and growth, chromosome damage, and biochemical effects. A useful appendix and a much-needed glossary are also included. After laying a background in survival-curve theory, the authors discuss cell culture experiments critically and in considerable detail. The coverage of the literature is excellent for the most part, and most of the important techniques and procedures and the results obtained with them are described *in extenso*. Considering the rapidity with which this field is moving and the time required for publication, the book is well up to date in most of its chapters. Careful attention has been paid to the definition of terms, and some of these, such as "recovery" and "repair," have been clarified.

Considerable emphasis is placed on the importance of synchrony techniques, the development of which has contributed so much to our present understanding of the kinetics of irradiated populations, and on the effect of variations in age on response to irradiation. The authors predict (correctly, in my opinion) that synchrony techniques will have an even larger part to play in the future.

The material is presented in such detail that its contents will be appreciated most by the serious student and the specialist. However, there is much important material here for anyone concerned with the quantitative aspects of radiobiology. Although the chapter on survival-curve theory, for example, will not be easily understood by biologists lacking a physical background, and the authors suggest that it can be omitted by some readers, it is to be hoped that just those readers will study it carefully. It contains important principles that should be appreciated by more workers in this field.

The book has a logical beginning but, like radiobiology itself, no definable end. Its contents should serve to interest and guide others who may provide future contributions to our understanding in this field.

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Parasites

Plant Nematology. W. R. JENKINS and D. P. TAYLOR. Reinhold, New York, 1967. xviii + 270 pp., illus. $12.50.

The authors designed this brief text primarily for general courses in plant nematology but also with an eye toward "plant pathologists, soil microbiologists, county agents, extension specialists and others concerned with plant production." Rather an ambitious goal.

An introductory text in nematology should, above all, interest the reader by placing the specialized subject in a frame of reference to the rest of soil and plant biology. It should also provide him with some tools and information he can use. On these criteria, the book falls short of being a satisfactory introductory text. The largest part of the text (62 percent) is an encyclopedia of important parasitic genera. By page count, the introduction and section on morphology comprise 16 percent, control takes 10 percent, and the chapter on damage to plants is a scant 6 percent. Illustrations are prominent, consisting of photographs of symptoms and bold, stylized diagrams of diagnostic features of each genus.

The discussion of the zoological position of nematodes is weak, there is no comprehensive treatment of nematode ecology or of the ecology of disease, and there is very little nematode physiology. The role of nematodes in the general biology of the soil is poorly presented. The text does not treat the larger aspects of the subject.

Another limitation is the lack of discussion of techniques. From this book the neophyte will gain no information on methods of collecting and handling nematodes, of preservation,