tales is that they tend to be told badly, and the result, of course, is that the tales themselves lose their hold on the imagination and the events pass from the realm of the understood into that of the merely remembered. All those whose happy lot in life it is to study the ancient cultures of the Near East have read of the great decipherments over and over again and cheerfully believe that they understand how these achievements came about; few of them understand why they came about or how they came about in the way they did at the time they did. It is probable that a certain amount of hindsight is inseparable from the practice of scholarship; indeed, it may rank among its chief comforts, much as it does in the equally satisfying study of military history. No Egyptologist, for example, questions for a moment the extraordinary astuteness of Champollion in deciphering the hieroglyphic script of Egypt; and it is very probable that every Egyptologist secretly believes that he would have done it himself in something less than half the time.

For such complacent post-factum pioneers, Pope's book comes as a salutary corrective; for in it for the first time each of the quantum jumps in human knowledge represented by the decipherments is placed in its proper historical setting, recounted in terms of the intellectual environment of its particular time, and (more important) in terms of the evolution of thought about language and writing in the period leading up to the event. It is a tribute to Pope's extraordinary sympathy with long-dead scholarship, and to his narrative skill, that the decipherment of Egyptian (the story of which occupies the first third of the book) emerges primarily as a coherent and integral episode in the development of man's growing interest in and curiosity about his world, but remains at the same time a remarkable intellectual feat. Champollion's achievement has, however, ceased to be the result of "inexplicable genius," to borrow Pope's words, but becomes instead the fruit of one man's brilliant ability to use the intellectual resources and insights of his age to new advantage.

Having traced the story of Western man's interest in the Egyptian scripts from Roman times until the solution, Pope turns his attention to later decipherments, from the work of Rawlinson on Old Persian to the most recent and most impressive of all, the breaking of the Linear B script by Michael Ventris. To the writer of this review it is something of a pity that Pope did not see fit to mention the work of the great British Egyptologist F. Ll. Griffith on the ancient Meroitic script of the Sudan, which culminated in 1911 in the complete decipherment of that form of writing. That the language expressed in that writing remains largely unintelligible would surely have served Pope as a useful case in point, both of the distinction between decipherment and interpretation and as an instance of successful decipherment carried out in the absence of linguistic information.

Pope has produced the finest work of its kind that has appeared, and one that is a delight to read. It belongs not only on every archeologist's shelf but on every archeological student's required reading list.

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The Laboratory versus the Forger

Authenticity in Art. The Scientific Detection of Forgery. STUART J. FLEMING. Institute of Physics, London, and Crane, Russak, New York, 1976. xii, 164 pp., illus., + plates. $14.50.

The subtitle of this interesting book tells what it is about more accurately than does the title. The authentication of works of art will always depend on the eye and judgment of an experienced curator taking into account all the cultural nuances of iconography and form as well as the knowledge of material and technique provided by historical and scientific analysis.

The final sentence in the book, quoting Princeton conservator Stephen Guglielmi, underscores the importance of critical study of art objects, for fakery is rampant and profitable: "Perhaps it will be necessary to reverse the basic premise applied in human courts of law. An art object will first have to be proved genuine, rather than accepted on dangerous optimistic assumptions." Although it is somewhat ironic that the value of an object should be determined primarily by its authenticity rather than by its intrinsic esthetic merit, the correct assignment of date and place of origin is essential for historical studies.

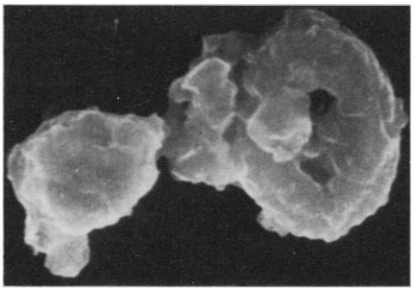
Stuart Fleming is a prominent member of the famed Research Laboratory for Archaeology and the History of Art at Oxford. He presents engagingly an account of the running battle between forgery and its exposure, with sophistication on both sides increasing with time. Though forgery must be unequivocally condemned on moral grounds, most scientists will share the grudging respect that physicist Samuel Goudsmit displays in his foreword for the combination of esthetic understanding, wide technical knowledge, and manipulative skill that

Detail of a portrait of Deborah Kip, wife of Sir Balthasar Gerbier, and her children, attributed to Rubens. "No doubt a few curators blanched when they learnt [the painting] had regions covered with a varnish containing synthetic ultramarine," which was not available in the 17th century. It was eventually concluded that the varnish was a late addition. [Reproduced in *Authenticity in Art*, courtesy National Gallery of Art, Washington, D.C., Andrew W. Mellon Fund; catalog no. 2558]

good forgers must possess. Their products have deceived the Nazis and, occasionally, have punctured inflated pretensions of professional art critics and archeologists. Moreover, although scientific work in museum-associated laboratories has until recently had forgery detection as its main incentive, it has incidentally served to establish the basic facts of technique development which are necessary for building a proper historical understanding of technology in human affairs on a larger scale. The unbiased record of action and thought that is preserved in the composition and structure of ancient objects can be read only in the laboratory, but it reflects an important aspect of the past that is ignored in the written records favored by conventional historical scholarship. Museum scientists and their collaborators in industrial and university laboratories can in some degree relive the individual human experience of technology that underlies all social change—but to do so they must go beyond simply providing ingeniously gathered data to aid a curator or art historian or to prevent a collector from being swindled (which is the main orientation of the present book) and must learn to ask their own questions of history.

Fleming presents, at a level appropriate both for the collector or curator and for scientists in general, the principal techniques that have proved useful in the recognition of forgery. These involve more or less absolute methods of dating based on radioactive decay (carbon-14) or radiation damage (thermoluminescence) and the characterization of materials in terms of their chemical or isotopic composition or in terms of the internal structural evidence for the methods used in producing them. Findings obtained by any of these methods have to be interpreted against a background of comparative data collected laboriously by experience with authentic objects.

The introduction discusses types of fakes and gives some history of fake detection. Part 2, on paintings, shows how the identification of pigments and vehicles by microscopy and neutron-activation analysis can reveal anachronisms when the history of their production is known, while radiography uncovers overpainting and exposes the work habits of individual artists. Part 3, on ceramics, is mainly on thermoluminescent dating, with a rather unclear explanation of the physics underlying the new "predose" method for dating recent objects and with a discussion of pigment analyses on Chinese blue-and-white ware, the latter inexplicably relegated to the appendix. Part 3, on metals, shows the value of composition studies (mainly by x-ray fluorescence) on coinage, with a little on the evidence for the techniques used in bronze casting and working and on the telltale effects of corrosion. The widely informative methods of radiocarbon dating and the very revealing lead isotope studies of glass and metal again are dealt with in the appendix. It is only in the part of the book dealing with metals that there is adequate emphasis on the statistical viewpoint that is essential in the interpretation of laboratory results. Not only does one have experimental error (too frequently of shocking extent, hidden beneath computer printouts that give three or four "significant" figures when even one is doubtful) to contend with, there are also real variations within groups of authentic objects. Sampling is of the utmost importance. In metals large variations of local composition arise from internal segregation or from external treatment in shaping, finishing, or subsequent weathering. Though desirably nondestructive, the superficial or localized sampling invited by the sensitivity of modern instrumental methods of analysis carries great danger of giving misleading results. Museum scientists must learn to be at least as informedly skeptical of their own methods as art curators are of the authenticity of their objects.



Scanning electron micrograph of a coccolith, *Zygodiscus*, from the chalk ground of the painting of the Gerbier family. "Up to 1850 only natural sources of chalk were exploited; then an artificial form was produced . . . as a precipitated calcium carbonate. . . . Natural chalk . . . is littered with the fossil remains of unicellular algae, whereas precipitated chalk is fossil-free." The coccoliths in the ground of this painting, as revealed by the scanning electron microscope, indicate "that the chalk used is from a deposit laid down in the Cretaceous period, as one might expect for a painting produced in Flanders." [Reproduced in *Authenticity in Art*, courtesy Dr. R. L. Feller, Mellon Institute, Pittsburgh]

With its bibliography to lead to more detailed treatment of any aspect, this book provides a fine introduction to a timely and important topic and should be widely read.

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Qualities of a Discoverer

By the Evidence. Memoirs, 1932–1951. L. S. B. LEAKEY. Harcourt Brace Jovanovich, New York, 1974. x, 276 pp. + plates. $9.95.

Leakey's Luck. The Life of Louis Seymour Bazett Leakey, 1903–1972. SONIA COLE. Harcourt Brace Jovanovich, New York, 1975. 448 pp. + plates. $14.95.

Human Origins. Louis Leakey and the East African Evidence. GLYNN LL. ISAAC and ELIZABETH R. MCCOWN, Eds. Benjamin, Menlo Park, Calif., 1976. xiv, 592 pp., illus. Cloth, $17.95; paper, $10. Society for the Study of Human Evolution, Perspectives on Human Evolution, vol. 3. W. A. Benjamin Series in Anthropology; A Staples Press Book.

Louis Leakey was the most widely known and widely acclaimed paleoanthropologist of this century. This extensive reputation came about to some extent through the *National Geographic Magazine* and television films: most literate people of the English-speaking world have heard the names of Leakey and Olduvai. It was a reputation as deserved as it was widespread. Leakey was a man of genius in his field, a man of passionate energies whose enthusiasm kindled most of those he met, a superlative lecturer and teacher, who made a lasting contribution to the science of human evolution.

Leakey was not so much a scientist, however, as a naturalist. He could have turned his hand to any branch of natural history without trouble, and he did venture into many. His were indeed the qualities of genius: a remarkable intelligence, tremendous energy, unfailing patience, and the capacity to take infinite pains. Moreover, he seemed to thrive on difficulties, which he customarily took as a challenge. These admirable qualities are unselfconsciously demonstrated in the second volume of his autobiography, *By the Evidence* (which follows the first volume, *White African*, 1937, reprinted by Schenkman in 1966).