50-percent discount to educational institutions). This lists the contents of some 400 to 500 periodicals by journal, with full titles rather than authors seriatim. It is combined with an author and subject index. Each title is indexed under several subjects, apparently in order of importance. The attempt is made to list papers of interest to oceanographers from such journals as *Science*, but not conference reports and similar transitory material. All articles listed are microfilmed, and "Xerox copies are made available for a small service charge" (to member subscribers, that is). A preliminary test of this compilation indicates that the comprehensive subject indexing system may lead one to acquire a copy of a paper in which the subject of interest may receive only a brief mention, but perhaps this is better than the attempt to make value judgments by the compilers. In the first 1965 issue of this Index, which was received while this review was in proof, notice is given that U.S. Government research and development reports will be included. I also note that the contents of those hardbound objects which are neither books nor serials ("Advances in this or that") are now being listed; doubtless copyright restrictions will prevent distribution of Xerox copies of these.

In any event, although not as comprehensive in some aspects as the FAO *Current Bibliography*, the *Oceanic Library Index* provides a copy service (as does FAO, Rome) and is easier to use. However, the FAO bibliography is being compiled in cooperation with the Aquatic Sciences Information Retrieval Center at the University of Rhode Island and eventually, I suppose, one may command sets of microcards of all possibly appropriate papers from that enterprise. Such a copy service, however, is still in the future. At the present time the Retrieval Center is equipped to produce a print-out response to a search request, based primarily on the FAO compilation. This service is described by O'Connor and Saila ["A developing aquatic sciences information retrieval system," *Trans. Amer. Fish. Soc.* **91** (2), 151 (1962)].

It would appear from these various services that aquatic science (especially oceanography) is being as adequately served as possible at this time. At least the three services referred to are under the supervision of people within the field who obviously have some sense of proportion and basis for making the judgments necessary to list information in a retrievable manner. This can not be said, unfortunately, of another project, "The Biological Sciences Communication Project." The first part of this is a mimeographed list of aquatic laboratories of various kinds followed by an alphabetical list of aquatic biologists. Unfortunately, this appears to have been compiled primarily from a register of federal grants and contracts, with the result that the specialties of many of the persons listed are simply the subjects of the grants they happen to be administering. There are many small mistakes in spelling the names of people and organisms. One part of this project was a sort of bibliography, *Books on Aquatic Biology*, that has more mistakes than can be politely mentioned.

It would seem that with the several services generally available (each providing something somewhat different and not completely duplicative), still another is unnecessary, especially when the criteria are selected and applied by persons whose primary end seems to be a system itself rather than trying to approach the needs of the field through the use of a system. As Vickery stated in the conclusion of his essay on the subject:

> Analysis and synthesis of information, though it may be aided by the machine, can only be carried out effectively by skilled human labor. We shall cope with the information explosion, in the long run, only if more scientists and technologists are prepared to commit themselves deeply to the work of collecting, indexing, reviewing, and correlating information, and to studying the problems of handling information.

One thing is certain about computerized retrieval: it can not replace the human factor or think for people. What people think when they store things in computers may influence thought in unexpected ways, but if the entire paper can somehow be retrieved, that should offset this disadvantage. Perhaps the most serious danger of a comprehensive retrieval system built up of neatly coded information is the inhibition of serendipity that could result. Or, can we hope that the computer will inadvertently provide some serendipity of its own?

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# A History of the School of Medicine, University of Pennsylvania

Any American institution that achieves its 200th anniversary must reflect in its history the stages of national growth from colonial to major industrial status. The Medical School of the University of Pennsylvania, founded a decade before the Revolutionary War, ranks as America's oldest school of medicine. Its development has paralleled that of the city and nation of which it is a part, but also has reflected the special problems of medicine and medical training of the past two centuries. George Corner's **Two Centuries of Medicine** (Lippincott, Philadelphia, 1965. 373 pp. $7) is an exciting history of a medical school as well as an important document in the social history of the United States. By turning to the final sections of this book and reading of the complex structure of the present University of Pennsylvania Medical School—stretching from the scientific through the clinical subjects, from the laboratory and classroom to the operating table and the ward—we gain a fuller appreciation of each of the innovations along the way.

In 1765 Philadelphia was one of the largest cities in the British Empire and the most populous of the American colonies. Its college, although not among the oldest, was flourishing. The education of physicians, however, was left to an unregulated system of apprenticeships. Only those men willing to go abroad, to the universities at Edinburgh, Leyden, or Paris, or to the teaching hospitals of London, could

receive a formal medical education and qualify for an M.D. Corner has carefully examined this early history of the medical profession and provides an excellent insight into the steps taken to adapt the European model of medical education to the American scene. The wisdom of some of the early advice (from men like the London physician John Fothergill) and the foresight of the founders is given its proper dimension alongside the squabbles and jealousies that plagued the fledgling school.

John Morgan, a Philadelphian who had returned from the Edinburgh, London, Continental circuit, a man of brilliance and ambition, stands out as the real organizer of the new medical faculty. Corner's assessment of Morgan's inaugural "Discourse upon the Institution of Medical Schools in America" is generous:

> Morgan's plan, in fact, comprised practically all the elements of medical instruction that after long, costly trial and error the American profession has since found to be essential. Affiliation with a university, qualified professors, thorough premedical preparation of the students, a planned curriculum with well-defined courses of instruction introducing the basic scientific studies before clinical work, close relations with a teaching hospital, a library, high standards for graduation—all these are mentioned and most of them expounded at length. Morgan had seen, also, the need for laboratory-type demonstrations in anatomy, botany and chemistry. He even suggested that a medical school might become a center of research. Had a program such as he presented to his trustees in 1765 been followed wherever medical schools grew up in the new country, American medicine need not have taken a century and a half to catch up with Europe (p. 21).

But Morgan's plan was not enacted at once, even in Philadelphia (few, if any, of the European medical schools were up to the proposed standards), and it is the steps toward fulfillment which Corner reports and analyzes. The history is both internal and external; the long list of builders is constructed, and the very different careers of the teachers, the clinicians, and the scientists are recorded.

The problems that stood in the way of a high quality education, one which demanded effort and achievement on the part of the student, are examined in detail for the case of the School of Medicine at Pennsylvania but clearly apply to what became the national scandal of substandard medical education. Success, the success of attracting students and granting M.D.'s, encouraged the founding of other medical faculties (many without University connections) and led to competition for students and student fees, thereby tolerating lowered standards.

Other innovations are charted; among the most important of which was the foundation, at the University of Pennsylvania in 1874, of the first teaching hospital, built under the auspices of, and staffed by, the medical faculty. Hospital professors were appointed and students were brought into the wards, steps not achieved without some conflict. But by the end of the 19th century medical schools took on new patterns, their training procedures were improved, and research slowly became an integral part of their activity.

George Corner is a distinguished biologist as well as medical historian, and these dual interests have served him well in this history. Detail is given where needed, and the reader has the sense of getting a whole and balanced picture. But Corner has managed to fill his chronicle with much of the excitement of the events and their times. He has provided an extraordinarily complete bibliography arranged by subject within each chapter so that the reader is quickly referred to the documents and commentaries on special fields of medicine, institutions, or departments and to selected biographical accounts of the major figures in the history. The School of Medicine of the University of Pennsylvania has been twice fortunate—in its 200 successful years and in its most recent historian.

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## Dropping out of High School: Sociocultural and Psychodynamic Factors

**The Dropout: Causes and Cures.** Lucius F. Cervantes. University of Michigan Press, Ann Arbor, 1965. 256 pp. $6.95.

The increasing number of unskilled, uneducated, and unemployed in the labor force is one of the most critical social and economic problems facing the United States today. Among the factors that contribute greatly to the problem is the incidence of withdrawal from high school. Employment opportunities for high school graduates are limited at best, but those for the nongraduate are slight indeed. The importance of the problem of the high school dropout is becoming recognized, and programs to alleviate the situation are being established. But much more will need to be done. The research reported in this book contributes a comprehensive body of facts and analysis which can be extremely valuable to those engaged in planning or introducing programs to combat this problem and to those in positions to deal with the dropout or potential dropout face to face—social workers, high school principals, counselors, and teachers.

This research was "designed to examine, in an explorative fashion, both the sociocultural and psychodynamic factors involved in withdrawal from the academic milieu," or more simply, dropping out of high school. The areas of investigation included "the structure, dynamics, and emotional climate of the family"; the influences of family friends and of the teen-ager's teenage friends; the school experiences; and psychic characteristics as evaluated by means of the Thematic Apperception Test.

Since "the heart of the dropout problem is encased in the blue-collar metropolitan area," *matched* samples of dropouts and graduates were obtained from such areas in New Orleans, Boston, St. Louis, Omaha, Denver, and Los Angeles. The samples comprised 150 paired dropouts and graduates equivalent in sex, age, I.Q., and attendance at the same school and from the same general socioeconomic background. There was no representation from Negro slums or white suburbs.

Data were collected by means of an interview schedule, a questionnaire, and the Thematic Apperception Test. The average interview lasted 35 minutes. In the case of the dropout, the interview was conducted "in his own locale —either his home or some community center." The graduates were largely interviewed in their schools. Each interview was private and was tape recorded. It is stated that "good rapport was established in almost every case and there is no substantive reason to question the truthfulness of the responses." Apparently the teen-age respondents