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EDUCATION FOR HEALTH TECHNICIANS--AN OVERVIEW.

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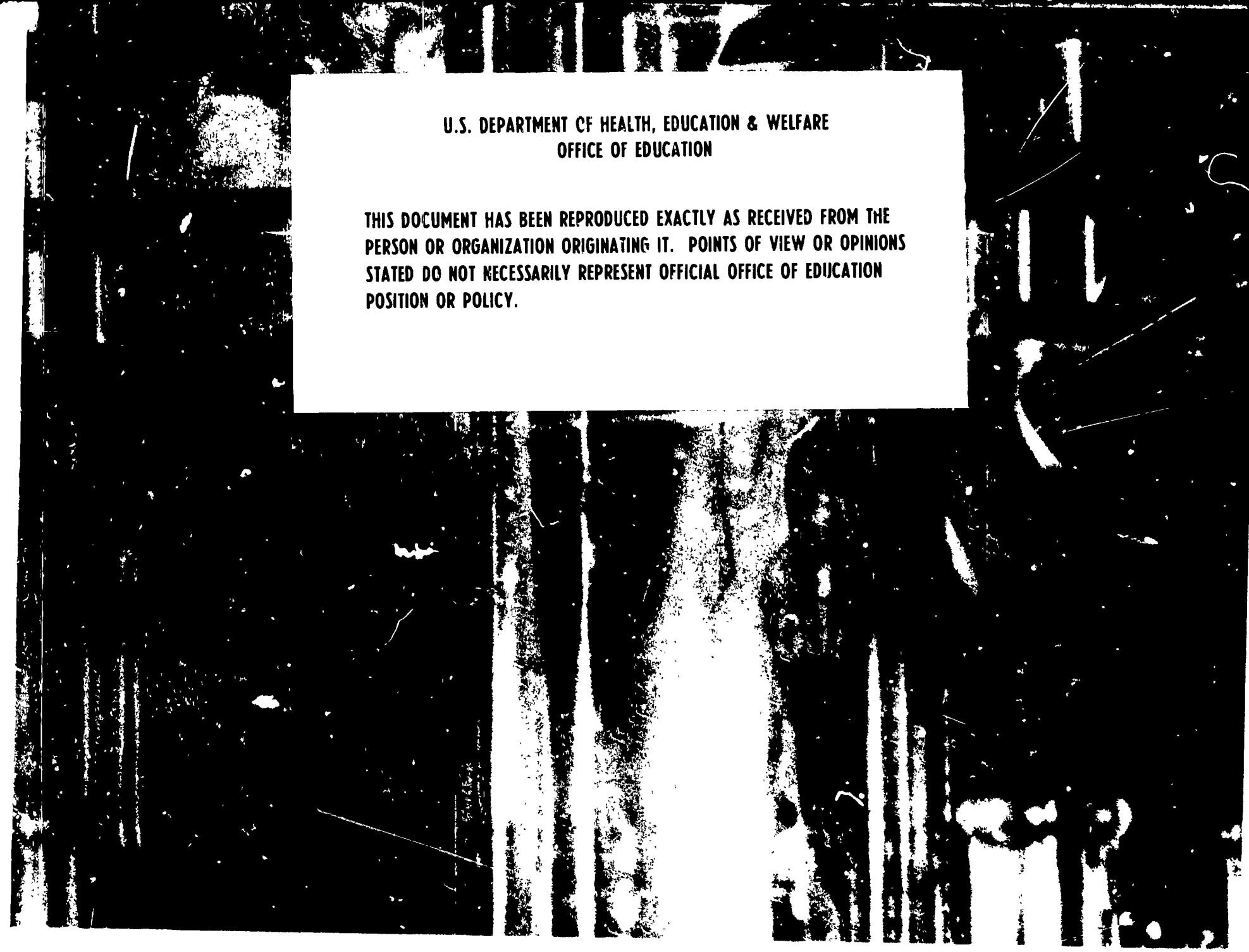
AS DEFINED, HEALTH SERVICE TECHNICIANS ARE NORMALLY PREPARED FOR ENTRY INTO THEIR OCCUPATIONS BY PURSUING A POST-SECONDARY EDUCATIONAL PROGRAM THAT DOES NOT DEMAND A BACCALAUREATE DEGREE BUT USUALLY INCLUDES A COMBINATION OF THEORY, PRACTICAL KNOWLEDGE, MANUAL SKILL, AND WHEN APPROPRIATE, ACTUAL CLINICAL PRACTICE. EXAMPLES OF SUCH TECHNICIANS INCLUDE X-RAY TECHNICIAN, R.N. (A.D.N.), MEDICAL RECORD TECHNICIAN, DISPENSING OPTICIAN, OCCUPATIONAL THERAPY ASSISTANT, AND INHALATION THERAPY TECHNICIAN. NEW CONCEPTS OF INSTRUCTION ARE BEING INTRODUCED THROUGH TELEVISION, VIDEOTAPE RECORDING, AND THE DEVELOPMENT OF TECHNICAL CENTERS FOR HEALTH CAREERS. ALTHOUGH PROBLEMS OF STANDARDS ARE GRADUALLY BEING SOLVED THROUGH LEGISLATION AND LICENSING REQUIREMENTS, THERE IS STILL WIDE DISPARITY IN DEPTH AND BREADTH OF TRAINING PROGRAMS. DEFECTS IN MANY COLLEGE PROGRAMS ARE CONTINUING AND WILL REQUIRE CLOSER ANALYSIS AND ATTACK BY COOPERATING PHYSICIANS, DENTISTS, TECHNICIANS, AND EDUCATORS. THIS DOCUMENT IS ALSO AVAILABLE FROM THE AMERICAN ASSOCIATION OF JUNIOR COLLEGES, 1315 SIXTEENTH STREET, N.W., WASHINGTON, D.C. 20036, FOR $1.00. (AL)



EDUCATION FOR HEALTH TECHNICIANS — AN OVERVIEW

ROBERT E. KINSINGER / A REPORT TO THE AMERICAN ASSOCIATION OF JUNIOR COLLEGES

EDUCATION FOR HEALTH TECHNICIANS — AN OVERVIEW

Report to the American Association of Junior Colleges

By Robert E. Kinsinger

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PREFACE

The American Association of Junior Colleges in recent months has stepped up its efforts to provide national direction and assistance in the planning of semiprofessional and technical education programs in two-year colleges. These efforts have been made in growing recognition of the fact that education beyond the high school is required to prepare men and women for occupations in today's technological society, and that junior colleges are ideally suited to this task because of their flexible admissions policies. orientation to community occupational needs, emphasis on guidance and counseling that will help students to make appropriate career choices, low cost, and the proximity of these institutions to the students to be served.

The Association, which represents a majority of the nation's junior colleges, in 1964 published a bulletin, *Technical Education in the Junior College / New Programs for New Jobs,* which has become a nationally recognized guide for planning semiprofessional and technical education programs. AAJC has initiated conferences with representatives of various federal government departments, other education associations, and colleges and universities to explore means of coordinating efforts in occupational education. The National Advisory Committee on the Junior College, a 15-member citizens' panel, formed to advise AAJC on the role of the junior college in higher education, issued a public statement pointing up the need for more vigorous development of occupational education programs in junior colleges.

With financial support from the Alfred P. Sloan Foundation, the Association in 1964 undertook to survey present activities in technical education in junior colleges with a view toward identifying programs that could serve as prototypes for new colleges and for institutions embarking on new courses of study. Investigations were to be conducted in three broad areas: industrial/engineering, business related fields—and in the health fields.

One of these studies, that in the health fields, has been completed; the others are still in process. The investigation of health service technology programs was conducted by Dr. Robert Kinsinger, nationally recognized authority in education for health careers, who is director of the Community College Health Careers Project for the New York State Education Department.

After reviewing Dr. Kinsinger's report on the project, it was felt by the AAJC staff that this important effort should be shared with member colleges and others interested in this vital subject. We are pleased, therefore, to present Dr. Kinsinger's report in the following pages.

Edmund J. Gleazer, Jr.
Executive Director
American Association
of Junior Colleges

FOREWORD TO THE SECOND EDITION

In the short time that has elapsed since the first printing of this report many national, regional, and local groups have convened joint planning conferences, undertaken new educational programs, and in general intensified their efforts to cope with many of the concerns identified in the following pages.

The issues are unchanged and the need is no less acute. However, we would be remiss if we did not suggest a modification to the first paragraph on page eleven which calls for more coordination, a better flow of information, and an improved system of guidance and consultation for agencies and institutions seeking assistance in planning programs for health service technicians.

Soundly planned demonstration programs have recently been launched in several parts of the country, and the health professions, in many instances, have established a permanent dialog with leaders in the education field.

A set of guidelines for the establishment of technical programs is currently being developed by a joint committee of the National Health Council and the American Association of Junior Colleges. AAJC has augmented its staff to provide consultation to educators seeking guidance in this field.

The federal government has broadened its concern in this area and has assigned top priority to broad planning activities and financial support for qualified programs.

Education for health technicians is coming of age as this second edition goes to press.

Robert E. Kinsinger

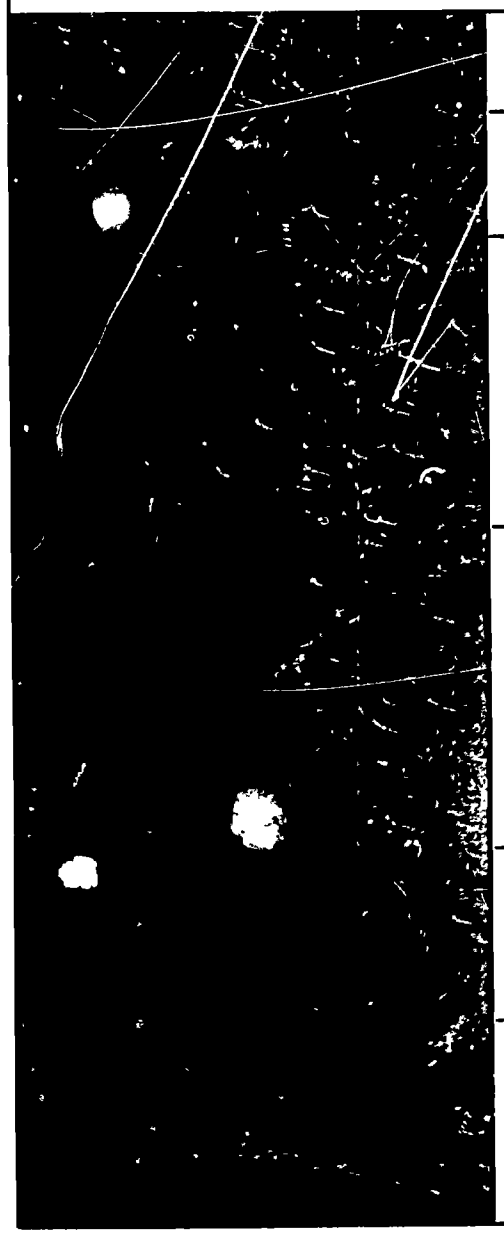
BACKGROUNDS: EMERGING PROBLEM

"Nationally the most evident and emergent need (though by no means the only one) created by population growth and scientific advances is the expansion and coordination of educational opportunities for health professional personnel . . .' * This statement poses an urgent challenge to institutions engaged in technical education for there is ample evidence that technically prepared personnel in the health field are, almost daily, accounting for an increasing proportion of the service force that provides for our nation's health needs.

This report is concerned with contemporary trends, problems, and selected, but indicative developments in education for health technicians. It serves neither as a national survey of the field nor as a comprehensive discussion of the subject. Rather, the following report is intended to provide an initial, brief introduction to an emerging and significant educational problem.

To help the reader relate the technical level of preparation and service to the broad spectrum of health service personnel (professionals, technicians, and practical aides), the following chart has been prepared. Health service technicians, indicated by underlined examples, are normally prepared for entry into their occupations by pursuing a post-secondary educational program that does not demand the completion of requirements for a four-year baccalaureate degree but usually includes a combination of theory, practical knowledge, manual skill, and, when appropriate, actual clinical practice.

THEORY - SKILL SPECTRUM IN THE HEALTH FIELDS



RESEARCH SCIENTIST

PHYSICIAN AND DENTIST PRACTITIONERS

PARAMEDICAL - PARADENTAL:

R.N. (B.S.)
Dietician
Pharmacist
Medical Record Librarian
Occupational Therapist
Physiotherapist

TECHNICAL ASSISTANT:

X-Ray Technician
R.N. (A.D.N.)
Medical Record Technician
Dispensing Optician
Occupational Therapy Assistant
Inhalation Therapy Technician

PRACTICAL ASSISTANT:

Licensed Practical Nurse
Psychiatric Aide

AIDE:

Orderly - Nurse Aide
Dietary Aide
Housekeeping Aide

* New York State Committee on Medical Education, *Education for the Health Professions.* A comprehensive plan for comprehensive care to meet New York's needs in an age of change, p. 3, Albany, New York, Board of Regents, New York State Education Department, June 1963.

Many educational leaders throughout the country seem to be aware of the critical shortages of adequately prepared technical personnel in the health field. In response to this awareness, there are surprisingly widespread but often uncoordinated efforts to develop education to alleviate these shortages. The plans and the programs range from poorly advised, to moderately helpful, to inspired. Junior-community colleges, technical institutes, hospitals, professional schools, vocational centers, proprietary schools, federal, state, and local government agencies, and professional organizations are all involved. New federal legislation, such as the Vocational Education Act of 1963, the Nurse Training Act of 1964, and the Manpower Development and Training Act of 1962, will have great influence on future developments in this field.

Regulatory Bodies, Standards, and Leadership

There are numerous regulatory bodies, both official and voluntary, that are struggling to assure orderly development of education programs. However, in the face of acute shortages and pressures for crash programs,* their efforts are sometimes less than successful. By virtue of their legal powers, state licensing bodies are the most influential, but licensing requirements vary greatly from state to state, and many fields are not covered by licensure.

Voluntary accrediting bodies and registries, often working through professional societies, have provided leadership in many instances. However, in other cases, their assistance has not been solicited, their guidelines have been ignored, and their conditions for approval have been judged unrealistic and inappropriate. The degree to which the professional associations have been able to appropriately modify their requirements as a number of educational programs for technicians have moved from hospital control to college control has frequently determined how great an influence they have been able to maintain. A document representative of the most helpful kind of professional leadership is the *Guidelines for the Development of Medical Record Technician Programs in Junior Colleges*, prepared by the American Association of Medical Record Librarians. In the introduction the following appears:

> . . . interest on the part of accredited junior colleges should be encouraged as it expresses a need felt in the communities which they serve. So that the medical record profession, and specifically the AAMRL, may benefit by the interest junior colleges have in vocational training for hospital careers, these guidelines have been developed by the education and registration committee, to encourage effective use of these facilities for training medical record technicians. It is particularly important to the profession at a time when many hospitals are finding it necessary to discontinue conducting schools for medical record personnel because of difficulty in financing them.

It is not within the scope of this report to judge the value of leadership or lack of it being provided by each of the societies and agencies that have set up standards for the health technologies. However, educational institutions should be aware that standards have been formulated for many

* See Crash Programs, page 29.

educational programs for medical and dental auxiliary personnel. Accordingly, a list of these approving bodies and related committees of the American Medical Association and the American Dental Association is appended. (See Appendix I.)

There is no single group that can hope to coordinate the growth of educational programs for health technicians. However, the American Association of Junior Colleges, working with other groups, could help to provide some degree of uniformity and quality for programs developed in two-year colleges. For example, the Association could publish periodically a roster of representative health career programs that might serve as models. A clearing house for information and, if possible, for consultation also would do much to assure creation of sound programs. If such a service were available, colleges planning to establish new programs would at least be spared the necessity of rediscovering in each instance what standards and regulations have already been developed; what has been tried and what has failed; and what has proven successful. It would not relieve the colleges of the task of developing their own programs to fit their unique situations, but it would help avoid costly mistakes and unnecessary friction with approving agencies.

Technicians in Medicine and Dentistry

The lone practitioner of medicine is an anachronism, as is his counterpart in other professions. The knowledge explosion has overwhelmed the professional and escalated his responsibilities. Increasingly he analyzes, plans, and administers services which are provided by others—others to whom he delegates in large measure routines carried out under his direction. The "others" are technicians and assistants. In medicine and dentistry, the list of supporting technicians is long. Some of the names are well known—such as medical laboratory technicians, x-ray technicians, opticians, inhalation therapy technicians, and dental hygienists. Others, many others, are doing the work, but their role as medical and dental assistants is less well developed. For some we even lack names. They not only assist the physician and the dentist, but, in this expanding field of knowledge and service, there is need for technical assistance for the professional nurse, the physical and occupational therapist, the medical record librarian, the dietitian, and many others. Where are these workers needed? What do they do? How are they presently being educated? What are the implications for technical education?

Where They Are Needed

The great bulk of workers are needed in our hospitals and nursing homes, but, to the dismay of hospitals competing for their services, the same skills are needed in public health departments, social welfare agencies, private medical and dental offices, and even in industry. The need in terms of numbers is disconcerting, but complicating the matter further are elusive facts in relation to the kinds of service these technicians will be called upon to perform and the educational background they will require. In 1960, a committee of the American Medical Association identified over fifty allied medical occupations. In the committee's words, "It is estimated that there are already some eight individuals in allied health activities for each physician engaged in patient care."[1] An even greater number and more diverse groupings are predicted for the future.

There are roughly 120,000 individuals working as auxiliary personnel in the dental field. Dental assistants, dental hygienists, and dental laboratory technicians outnumber practicing dentists by over 20,000 but many more are needed.[2]

Dental auxiliary students get practice for the job ahead

The nursing shortage is well known. The rapidly growing demand for nursing services, due in part to increased utilization of hospitals, has affected the fundamental role of the nurse. Even though the number of actively employed registered nurses has been on the rise, the increase has not been sufficient to satisfy the new and expanding needs within (and . nout) the hospital.[3]

The eight allied medical fields which have educational standards approved by the American Medical Association are occupational therapy, medical technology, physical therapy, medical record library science, x-ray technology, cytotechnology, and inhalation therapy technology. There are only 186,000 certified practitioners in these fields compared with 274,000 medical doctors and doctors of osteopathy. The demand continues to increase in all of these recognized fields, for both professional and technical personnel, but this is still only part of the story.

Developing Fields

A vast number of technical workers are currently needed to provide new health services which are a direct outgrowth of recent scientific advances. For example, radioisotope technicians and biomedical electronics technicians are needed to service, maintain, and operate the growing list of machines used in conjunction with medical care and for scientific research. In other cases, shifting medical service and social patterns have created new demands for trained technical personnel. A dramatic example of such a shift is the "ambulance problem." It is true that not all of the difficulty is due to the lack of prepared personnel. Poorly equipped ambulances, inadequate rules governing their operations, as well as inadequately trained or nonexistent attendants are to blame. Only 162 out of a nationwide sample of 900 cities and towns require attendants to accompany ambulance drivers.

Dr. Oscar P. Hampton, speaking before the American College of Surgeons, suggested that, "casualties on the streets should get as good treatment as those on the battlefield." The fact is that thousands of victims do not get this care.

> The ambulance attendants and equipment on the scene are critical factors. The American College of Surgeons' symposium pointed to the need for 25 items of equipment including splints, tourniquets, oxygen tanks, and tubes to maintain an air passage to the lungs and the need for men who can use the equipment. Dr. Robert H. Kennedy, head of a field program on ambulance service for the American College of Surgeons suggests that ideally attendants should be able to perform tracheotomies. "If the patient can't breathe," says Kennedy, "he has four minutes before he's either dead or a vegetable for life because of oxygen deprivation." [4]

Leadership Responsibilities

Is not the increasing demand for more and different types of health workers the direct responsibility of health agencies?

Hospitals have assumed a traditional three-part service function: *patient care, research*, and *education*. However, the rising costs of the educational function have recently become of increasing concern to hospitals. To quote a recent study, *Factors Related to Hospital Cost*.[5]

> Paramedical education programs are concentrated in larger hospitals, although hospitals in the 100-499-bed range are also quite active in this area. Nursing education involves by far the largest number of students. Nursing school costs must face reexamination. Patients and prepayment agencies bear an increasing share of the cost of these paramedical programs. Accrediting agencies, in attempting to raise educational standards, have reduced the amount of student service to patients and have upped teaching costs. The dual impact has raised total costs significantly and caused several hospitals to close their programs in nursing.

The rising costs of nursing and other allied medical education to the hospital, and thus to the patient, is only one complication of hospital sponsored programs. The hospital, primarily a service institution, almost inevitably faces a conflict between service and education. Even graduate medical education, which depends on hospitals for further educating those holding internships and residencies, faces problems of differentiating clearly between service and education.

Dr. George Miller, writing in the December 21, 1963, issue of the *Journal of the American Medical Association*, states:

> The question might reasonably be asked why hospitals take on this crushing burden of education. For university hospitals the answer is clear: education is their business. But nearly half the internships and residencies are offered by institutions which have no affiliation with universities or medical schools. Here the answer may not be so evident. It is true that the Hippocratic Oath requires physicians "to teach this art," and this professional commitment must play a part in the willingness of nonaffiliated hospitals to develop an educational program. But a far more important reason is the simple fact that house officers, interns, and residents

—provide an immensely valuable service to hospitalized patients.

It is this dilemma in which the great modern hospital is caught. Internships and residencies are intended to be educational experiences. Interns and residents render important medical care in the course of their learning. At what point does the service load on house officers get in the way of their learning opportunity? [6]

This same dilemma and a reluctance to forego service in the interest of education often impedes educational progress in relation to nursing, medical record technology, x-ray technology, and other fields traditionally offered by hospital schools. The procurement of instructors has also become a problem for the hospital. The clear-cut emphasis of the college on educational objectives to the exclusion of conflicting needs for patient service, the academic ethos of the college, and the prestige of faculty appointment have tended to draw more and more of the scarce number of instructors from the hospitals to the college campuses. There has been, in addition, a preference for working closely with faculty members in other disciplines and with resources more readily available in a multipurpose college than in a single-purpose school. The growing number of high school graduates who are going to college has also tended to shift students from hospital-centered to college-centered programs.

If the number and size of hospital schools for health technologies is static or in some cases declining and the need for more and different types of graduates continues to increase drastically, there should be supplemental programs. There are, or, more exactly, there can be. The junior-community colleges and technical institutes are currently preparing for this challenge. The evidence can be seen all across the land.

Out of a pioneer national research project, using the two-year college as a base and nearby hospitals and other health agencies as practice laboratories, grew the rapidly developing associate degree nursing program.

These programs, in general, adhere to the following guidelines: (a) students are treated as regular college students—with a major in nursing; (b) nursing students take all but nursing classes with other college students (*applications* of principles taught in regular biological and physical science and humanities courses are taught by the college nursing instructors in the classroom and at the patient's bedside); (c) college nursing instructors select appropriate clinical practice for students at nearby hospitals and other clinical facilities that have agreed to permit college nursing instructors and students to use the patient service areas as part of the college's extended campus; and (d) the program prepares the student at the time of graduation to take the state licensing examination for registered nurse (RN) and for a beginning position as a staff nurse giving direct care to patients.

The original seven pilot programs of the middle fifties have grown to 130 programs today, and the pace is accelerating. Over 200 junior colleges not now offering such programs are considering the inauguration of this new nursing curriculum leading to state licensure for registered nurses. Other examples of the rapidly growing interest in meeting the vital needs for paramedical education are less widespread but growing.

REPRESENTATIVE DEVELOPMENTS: SELECTED PROGRAMS

Many educational institutions, particularly two-year colleges, are innovating and experimenting in health technician education. A few of these developments are described here to show what can and is being done. There are others, perhaps even better examples, but these should serve to indicate the variety of programs and to illustrate the potential for original planning to meet new needs in the health fields.

Education for the Prosthetist: Filling A Gap

Advances in a field create a need for technicians to serve that particular field. As the body of knowledge in a field is expanded and professional responsibilities become broader, a larger and larger gap grows between the semi-skilled or skilled worker and the professional. The gap must be filled by technicians who can work with the craftsman below and the professional above. This evolution is most clearly seen in the field of engineering, but the same forces are frequently at work in the health fields. The principle is generally operative in expanding fields. The educator as well as the professional practitioner should be sensitive to changes taking place, be ready to develop an educational program for technicians when conditions warrant.

One of the best examples of an action program brought about by growth and refinement of a health-related field is the current planning at Chicago City Junior College and Cerritos College in California to prepare technicians in the field of manufacturing and fitting of artificial limbs and similar aids for the handicapped. Craftsmen and fitters have been serving physicians in this field for many years. An American Board for Certification in Orthotics and Prosthetics maintains a voluntary program of certification in an effort to raise standards in the field. However, with advances in the fields of prosthetics and orthotics, the gap between the craftsmen and fitters, trained on the job, and the professionally trained physician has widened. A program for a college trained technician in this field was suggested. Two colleges have elected to respond to the challenge.

At Southeast Junior College, a branch of Chicago City Junior College, a joint venture has been planned by officials at the prosthetic-orthotic education center, operated by the Northwestern University Medical School, Department of Orthopedic Surgery, and the junior college. The partnership makes available to the junior college special consultants and teachers in the field of prosthetics. Shops at the center regularly used to manufacture and adjust prosthetic devices are available to provide benchwork experience for students. However, the indispensable ingredient of the educational program is clinical experience. A clinic maintained by the center pays handicapped patients to keep regular appointments, thus enabling staff and students to work with patients in need of the services of prosthetists and orthotists.

Prosthetist students attend courses in general education, physical and biological sciences, and other subjects, as well as the courses in their specialty. During the second year, in which the major courses are concentrated, the federal vocational rehabilitation administration provides grants to the school on the basis of the number of students enrolled in

The student of prosthetics must learn to adjust and repair artificial limbs

recognition of the important contribution that the graduates of the program will make to the handicapped of the nation.

Vital Link to Eye Care: Ophthalmic Dispensing

The course in optical technology at Erie County Technical Institute is a typical example of a program developed in response to scientific progress and demands for better technical services for the public. Advances in professional ophthalmic fields concerned with refraction and the prescription of optical corrections has called for greater skill, accuracy, and service in the prescription laboratory and in the final fitting and adjusting of completed eyewear.

Seventeen states have laws licensing ophthalmic dispensers, and unregulated opticians serve the public throughout the rest of the country. However, there are only three college-based courses in ophthalmic optics in the United States. The existing programs are at Los Angeles City College, Ferris Institute in Michigan, and at Erie County Technical Institute in Buffalo, New York. The great majority of the practicing opticians have gained what knowledge and skill they possess largely through apprenticeship. The three existing programs offer students specialized training in the scientific, business, and technical aspects of manufacturing and dispensing of spectacle lenses and ophthalmic products. The courses stress the fundamentals and practical skills of optics. Graduates take positions as ophthalmic dispensers, as representatives of manufacturing and wholesale or prescription laboratory companies, as mechanical optical experts, or are associated with research laboratories in industry, government, or colleges and universities.

Course objectives in ophthalmic dispensing generally include: ability to interpret the doctor's optical prescription, skills in making eyeglass adjustments, a familiarity with the structure of the eye, ability to talk intelligently with the doctor regarding optical correction and even to question possible mistakes in prescriptions, a knowledge of optics for benchwork, and familiarity with contact lens adjustment and fitting.

Unlike a number of other health technologies, there is no clinical practice in the program of optical technology, although this possibility may yet be developed. At Erie County Technical Institute some initial experiments aimed at developing clinical practice at a school for the blind have been undertaken. The requirements for laboratories and faculty make the program, as with most technologies, more expensive than general education. At Erie County Technical Institute there are three laboratories that contain surfacing equipment, equipment for benchwork (cutting and edging), and a dispensing laboratory. There are four full-time faculty members teaching optical technology for an entering class of sixty students. Between thirty and thirty-five students generally graduate at the end of two years. The full-time teachers have a work background as ophthalmic dispensers and at least a baccalaureate degree. The head of the department is an engineer with a specialty in optics. An ophthalmologist serves as a guest lecturer for discussions of the normal and abnormal physiology and anatomy of the eye.

There are few textbooks in ophthalmic optics. Instructors must write their own manuals, develop their own courses from a knowledge of the field gained from years of experience, and continue to seek some means of providing clinical experience for students. The three colleges that have developed pioneer programs are providing an important service, but others should be developed to serve a public increasingly aware of the importance of having well prepared persons to serve their needs for visual correction.

Seven in One: St. Mary's Junior College

Picture a girl of Protestant background, attending a Roman Catholic College, practicing beginning nursing skills in a Jewish hospital. This ecumenical approach is not unusual at St. Mary's Junior College in Minneapolis, Minnesota, where a new two-year college offers only educational programs in seven health technologies.

The college provides a case study in successful use of advisory committees, thoughtful preliminary study of other programs already established, and liaison with professional societies that offer voluntary approval and guidance. In addition, the concept of a core curriculum for all students destined to work in one of the health technologies has been extensively studied and developed at St. Mary's Junior College.

The seven programs offered are: (1) medical laboratory assistant program; (2) medical record technician program; (3) medical secretary program; (4) nurse-technician program; (5) occupational therapy assistant program; (6) radiologic technologist program; and (7) food service supervisor program.

The heart of all seven programs is the policy statement of the college regarding the relationship of didactic instruction and laboratory experiences:

Work in the laboratory requires patience and attention to detail on the part of students

St. Mary's Junior College will utilize these facilities (hospitals and health agencies) to provide true "laboratory hours" in the courses of which they are a part. This kind of "real life" laboratory experience offers great teaching possibilities in the health fields. It is no mere "work experience." The students' clinical laboratory experiences and assignments are carefully chosen, directed, and evaluated by instructors. In addition to offering guidance during the laboratory experiences, the instructors in each section meet the students before and after each laboratory period. The introduction of a discussion period—both preparatory and retrospective—enables the instructors and students to exploit the learning possibilities in each laboratory period to the utmost. It is our contention that laboratory experience, thus conceived and carried through, correctly discriminates learning-centered technical education from training-centered vocational education.

The series of core courses for all of the seven major curriculums in the health field includes (1) an orientation to the college; (2) health concepts for paramedical fields; (3) human anatomy and physiology; (4) written English; (5) general psychology; and (6) man in society (an elementary sociology course). The introductory course for all students, titled "Health Concepts for Para-Medical Fields," is an experiment in team teaching offered by a group of the college faculty that includes representatives from each of the major fields offered at the college. The college secured grant funds for a summer faculty workshop to evaluate and strengthen this course, originally described as a "General introduction to the health team, personal qualities and occupational ethics necessary for participation in health services, a survey of the course and effect of disease, and an environment conducive to patient welfare."

The college is an outgrowth of a sixty-five-year-old school of nursing at St. Mary's Hospital. The college will continue to utilize St. Mary's Hospital and Mount Sinai Hospital as clinical laboratories for each of the health fields offered, as well as other nearby hospitals and health agencies.

An advisory committee of outstanding administrators and faculty members from adjacent University of Minnesota volunteered to assist the college in its development. Planning for the new college also was based on an extensive series of field visits to other institutions, as far away as New Orleans, that were already successfully offering similar programs. Initial planning also included a study of guidelines and criteria for approval of paramedical programs developed by the Council on Medical Education of the American Medical Association.

The college has plans for follow-up, on-the-job evaluations of all of its graduates. It also is setting high standards for its faculty. Academically prepared individuals with adequate work experience and background in several of the technologies that are being offered are extremely scarce. Nevertheless, firm institutional policy calls for all faculty members who head a program to have earned at least a master's degree by the fall of 1967. In addition, this specialized college is seeking to stretch its instructional talent by use of programed instruction, television, and extensive use of a multimedia approach to learning.

Protection for the Public: The Medical Emergency Technician

Development of educational programs for the preparation of workers in already recognized technical health fields presents a challenge. However, to respond educationally to a newly identified kind of health technician is an even greater responsibility. Pioneer work involved in training emergency and rescue squads has been carried on for eight years by the Ohio State Department of Education in conjunction with Ohio State University. This project can provide an educational base for a technical occupation just emerging as an identifiable health activity.

The need for well trained ambulance attendants to give emergency care in the absence of physicians and nurses has become more pressing as additional unregulated carriers have entered the field and professional personnel have ceased to "ride ambulance." However, there must be a change in the operation of ambulance service generally offered to communities before well educated attendants can make the required impact on emergency care. The American College of Surgeons and other medical and hospital groups are currently working to effect the necessary changes. Meantime, the Ohio State University program offers a basis for further development.

To take full advantage of the technical skills and knowledge of a well trained ambulance attendant and to bring about salary increases commensurate with his educational background and responsibility, the job description must be broadened to include work as an emergency room assistant during periods between ambulance runs. Such a job description would be based on the development of hospital-based ambulance services and would call for a broader title, such as Medical Emergency Technician (MET).

The work at Ohio State University has been based on preparation of emergency and rescue squad personnel, primarily firemen and policemen who must be ready to function as medical attendants at the scene of fires, explosions, and accidents. The course has been developed by a male nurse with extensive background as a squad man and in the emergency room. Active consultation and support has been provided by a state medical advisory committee.

The textbook on which the course is based, *Emergency Rescue Squad*, has almost two-thirds of its content devoted to emergency procedures at the technical level. The topics include emergency vehicles, equipment, personnel, operations, safe driving practices, controlling the situation, victim care (twenty-five topics covered), resuscitation, unusual situations, records and reports, postmortem conference, and legal aspects.

The Ohio program has been based on an instructor training program offered by Ohio State University and, in turn, classes conducted throughout the state by part-time instructors who have received this training. The instructors have functioned as representatives of the Division of Vocational Education of the Ohio State Department of Education.

Technical education for the health fields involves pioneering approaches to evolving needs. Junior-community colleges could make a vital contribution to emergency medical care by building on Ohio's experience.

NEW CONCEPTS OF INSTRUCTION

Television's Role in Teaching

Much has been written about the potential for better teaching and utilization of instructional talent through television, and education in the health field is uniquely suited to applications of instructional television's six functional categories. "Educators have insisted that the intensely personal task of education cannot be mixed with the cold scientific approach of technology. The literary tradition of education sits uneasily with the scientific tradition of the technologies,[7] but television already has been used imaginatively and effectively for education in many health fields. Medical, dental, and health technology educators have used television for:

(a) *Transportation:* of students to surgery, psychiatric interviews, clinical demonstrations, etc., of instructors to the student at the bedside.

(b) *Magnification:* to see what is really happening in the test tube, the mouth, or on a gauge during a detailed demonstration.

(c) *Memory:* to record for later analysis at a post-clinical conference or to transfer to film as part of a permanent clinical library.

(d) *Transformation:* to see through body tissues with x-ray image intensifiers, in the dark with infrared sensitive tubes, and within body cavities with fiber bundles.

(e) *Associations:* making simultaneous comparisons by using actual pictures in conjunction with diagrammatic drawings and by alternate use of live film and videotape presentations.

(f) *Multiplication:* by showing the same image at close range to any number of students in large auditoriums, separated rooms, or even separated buildings.

A substantial portion of the educational process has always involved awkward and imperfect translations. The teacher must translate previous visual experiences into word descriptions. The student, hopefully, reconverts these descriptions into something approximating the teacher's original mental image. The potential for circumventing these awkward translations is one of the great hopes of those working with television in the clinical setting. The television camera comes closer to becoming the "fly on the wall" than was ever possible with the bulky motion picture camera. Perhaps the greatest benefit to clinical education will be TV's contribution to what Dr. David Ruhe calls *sensiture*, as a counterpart to literature, our great store of written knowledge. The precise illustration, the elusive example, the classic case can be identified and transferred to film as a permanent contribution to the teaching process. Skillful editing can gradually bring into being a vast storehouse of material that will enable the student and instructor to figuratively move to the bedside of appropriate patients in the educational process.

Community colleges are beginning to use television to great advantage for teaching the health technologies. Three of the most soundly developed programs, using quite different approaches, are at: (1) St. Petersburg Junior College, where a studio-based closed circuit system at the college is used very effectively for nursing demonstrations; (2) St. Mary's Junior College, which uses a television camera at the college

Nursing instructor teaches from a television monitor center

Students and teachers analyze quality of student nursing care by means of a videotape recording

for magnification, and the services of broadcast TV from KCTV in St. Paul; and (3) Bronx Community College, which uses a fifteen-camera system installed in the hospital where college instructors do their clinical teaching.

Technical Center for Health Careers

At least three community colleges are considering the development of special health career technical centers located near medical complexes.* One college has been established adjacent to a hospital and bases its entire curriculum on programs leading to employment in the health technologies.** The paramedical technical center plan envisions a faculty and administrative staff that would utilize the adjacent medical center as a vast laboratory; not only to provide educational experiences for students but to help the faculty keep abreast of current developments in allied medical and auxiliary dental fields.

The concept of a special community college technical center designed to concentrate only on education for health technologies seems to be based on the following premises:

1. The constantly changing nature of medical and dental practice mandates a corresponding need to modify the role of assisting personnel. Such role modifications should, in turn, be reflected by changes in the curriculum for technical workers; changes that do not lag too far behind practice. In fact, careful analysis of trends and thoughtful planning should enable the faculty in some cases to plan curriculum in anticipation of changes in practice. Only through close association between the faculty and medical center activities, made possible by the administrative convenience of a technical center, can such continuing and realistic planning take place.
2. A substantial part of many education activities in the health technologies necessarily takes place in the clinical setting; the hospital, the clinic, the dental laboratory, the rehabilitation center, and other facilities of the medical center. Therefore, these facilities should be treated as part of the college campus, and, to be most effective, should be closely allied to the community college both administratively and geographically.
3. The heart of any educational program is its full-time faculty, but, in the health fields, leaders in the practice of medicine and dentistry are invaluable resource persons who should be readily available to the college for an occasional lecture, and, from time to time as indicated, to participate in class discussions. Only close proximity and the constantly maintained relationships that a technical center could make possible would provide for the desired participation of medical and dental specialists.
4. The kind of core curriculum that can be developed in a health careers technical center makes possible an efficient use of faculty and facilities. In addition, it enables students to appreciate the way in which their technical specialty fits into the broad spectrum

* Bronx Community College, Chicago City Junior College, The Junior College District of St. Louis-St. Louis County.

** St. Mary's Junior College, Minneapolis, Minnesota.

of health care. It fosters a team approach to patient care.

5. Travel time between classroom and hospital for both students and faculty is not substituted for instructional time.

To the person who interprets the premises cited above as simply an argument for a medical center based and operated educational program, the college proponent might add the following points in defense of the community college as the controlling institution.

1. A college based program assures a full time teaching staff not subject to the conflicts between education and service sometimes experienced by hospital centered programs.
2. The quality of collegiate education takes place under the critical eye of the regional accrediting association and those officials responsible for the integrity of the degree offered by the college.
3. The general college provides a broad base on which to build technical specialties through its well prepared full time faculty in the sciences and the humanities.
4. A college centered program assures students access to a whole range of educational facilities and services starting with a college library and including science laboratories, counseling services, a social and cultural program, contact and competition with students majoring in other fields, a physical education program, a placement service, and negotiable academic credits in general education for transfer later to a four-year college if desired.
5. Finally, the college proponent would cite the lower costs and better cost controls of an institution dedicated solely to the business of education and the broad base for student recruitment furnished by a multipurpose college.

The concept of a community college technical center for health careers will soon be operative in several different settings. Other colleges will be watching the development with interest. The experiment could have implications for action for many other large urban colleges. A well planned evaluation, after a few years of operation, would help determine whether the efficiency and educational effectiveness of the specialized technical center is superior to the centralized multipurpose campus.

A working knowledge of microbiology is fundamental to most health service technologies taught in a paramedical technical center

CONFLICT IN EDUCATION: AN ILLUSTRATION

There appears in the laws of the State of New York the following passage:

> It is declared to be the policy of the State of New York that the health and safety of the people of the state must be protected against the harmful effect of excessive and improper exposure to ionizing radiation. Such protection can best be accomplished by requiring adequate training and experience of persons operating x-ray equipment.

Thus did a state legislature in 1964 recognize the relationship between the quality of an educational program for technicians and the safety of the public. However, neither the law nor the X-ray Technician Board of Examiners, which it created, can provide a sure prescription for the development of a sound educational program.

Curriculum development should be based on the terminal behavior expected of graduates of an educational program, but the New York law does not spell out such behavior beyond the following generalities:

> *X-ray technology* means the use of x-rays or x-ray producing equipment on human beings for diagnostic or therapeutic purposes . . . and
> *X-ray technician* means a person . . . who uses x-ray on human beings and it shall include a person who actually handles x-ray equipment in the process of applying radiation on a human being . . .

To each school is left the final decisions regarding what an x-ray technician must be able to do, what skills and knowledge he needs to do it, and what kind of educational experiences will most effectively enable a graduate to perform as expected.

Licensing boards, such as in New York State, can demand minimum times during which students must be exposed to a variety of subjects listed by name. Boards can also insist that each school shall follow certain general policies in regard to administration, organization, faculty, educational facilites, students, and curriculum and instruction. Professional societies can publish comprehensive teaching guides and the Council on Medical Education and Hospitals of the AMA can develop "Essentials of an Approved School of X-Ray Technology" but the heart of program development remains the responsibility of the staff of each individual school. Even AMA approved hospital schools, supposedly following the published criteria for approval, vary greatly in practice as suggested in the following excerpt from a survey of 260 approved schools in forty-five states:

> 37 per cent (95) taught courses in positioning
> 35 per cent (90) taught courses in anatomy and physiology
> 27 per cent (70) taught courses in protection
> 29 per cent (76) kept records of students' grades
> 25 per cent (65) kept master experience records
> 8 per cent (20) required transcripts of previous scholastic records
> 13 per cent (34) stated that they kept no records at all.[8]

The x-ray technician gains skill in producing quality radiographs

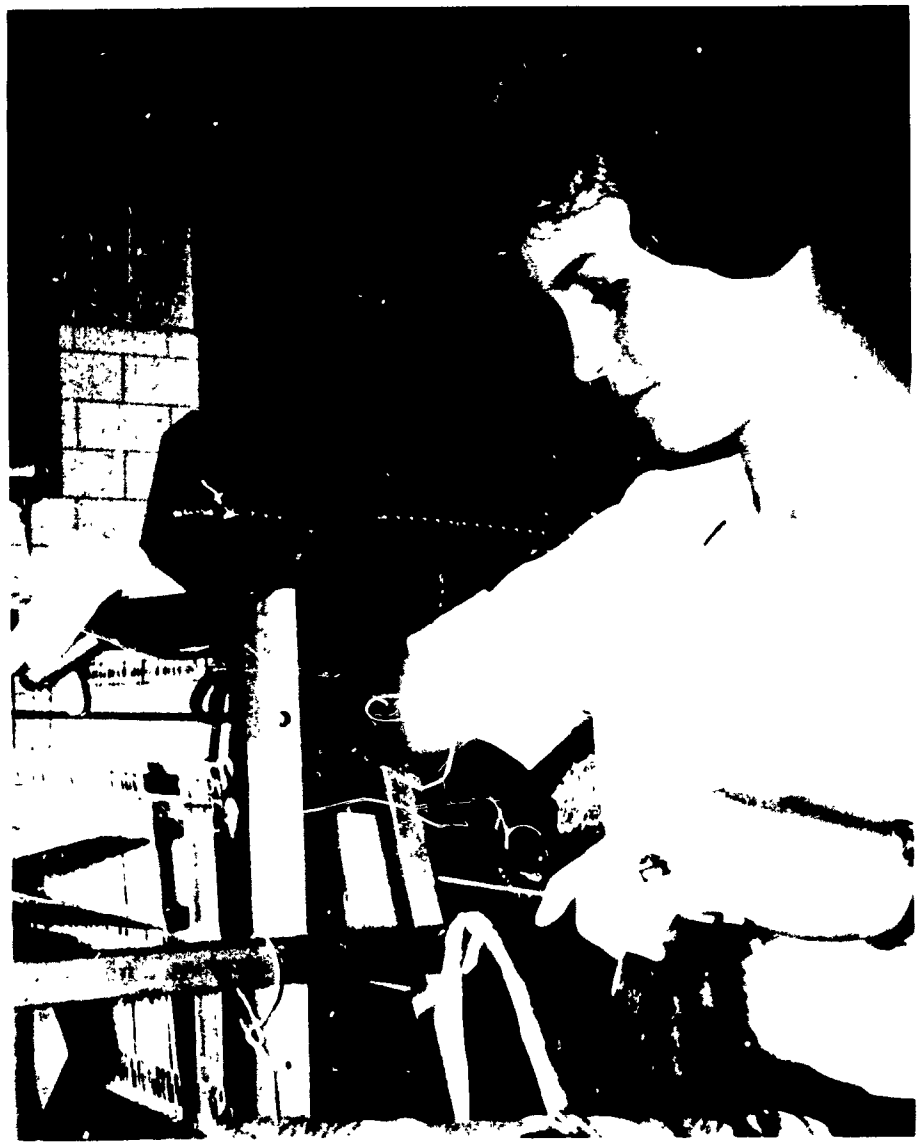
To what experiences should a student be exposed? In a critical review of practices in schools of x-ray technology, Sister Mary Johnita, RSM, the x-ray supervisor at Mercy Hospital in New Orleans, writes, "Students should be taught how to process films, perform office procedures in the departments and should be taught to leave the rooms in order; but when this is a constant day-by-day assignment it must be admitted that not only are they being substituted for technicians, but also for the nonprofessional workers of the department."[9]

Junior colleges, hoping to create more opportunities for the preparation of x-ray technicians, and to use the existing framework of the two-year college to develop new educational programs tailored to the needs of students and the field of x-ray technology, established the first such programs in California. As a first step two x-ray technicians representing the California Society of X-ray Technicians surveyed the radiologists of California. The survey indicated that radiologists approved the inclusion of college work in a course for x-ray technicians. "Many of the radiologists stressed the need for more general education, particularly English and other subjects which would give the technicians a better professional bearing."[10] However, the first educational plan growing out of this survey was essentially a pre-professional curriculum followed by a year of full-time hospital experience. No x-ray technology courses were included in courses to be offered at the college. There were no takers. In 1954, the first junior college x-ray program was established at Orange Coast College as a project of the California Society of X-Ray Technicians. The curriculum consisted of two academic years followed by 15 months of full-time hospital training. There was very little practical experience offered during the college years. Therefore, the program at the college was known as the "Pre-X-Ray Technology Curriculum". Later, more applications to the practice of x-ray technology appeared in the Orange Coast curriculum, and similar programs have developed, but a basic conflict continues to exist: should the junior college x-ray program be a transfer program of general education and x-ray survey courses offered by the college with x-ray technology taught subsequently by a hospital school, or should the junior college x-ray program include the necessary clinical practice and be complete for its purposes, as are other technical programs, and lead to an associate degree, registry, and direct entry into the field? Inspection of the curriculums of various two-year colleges in this field reveal readily the point between the two positions on which each college has settled.

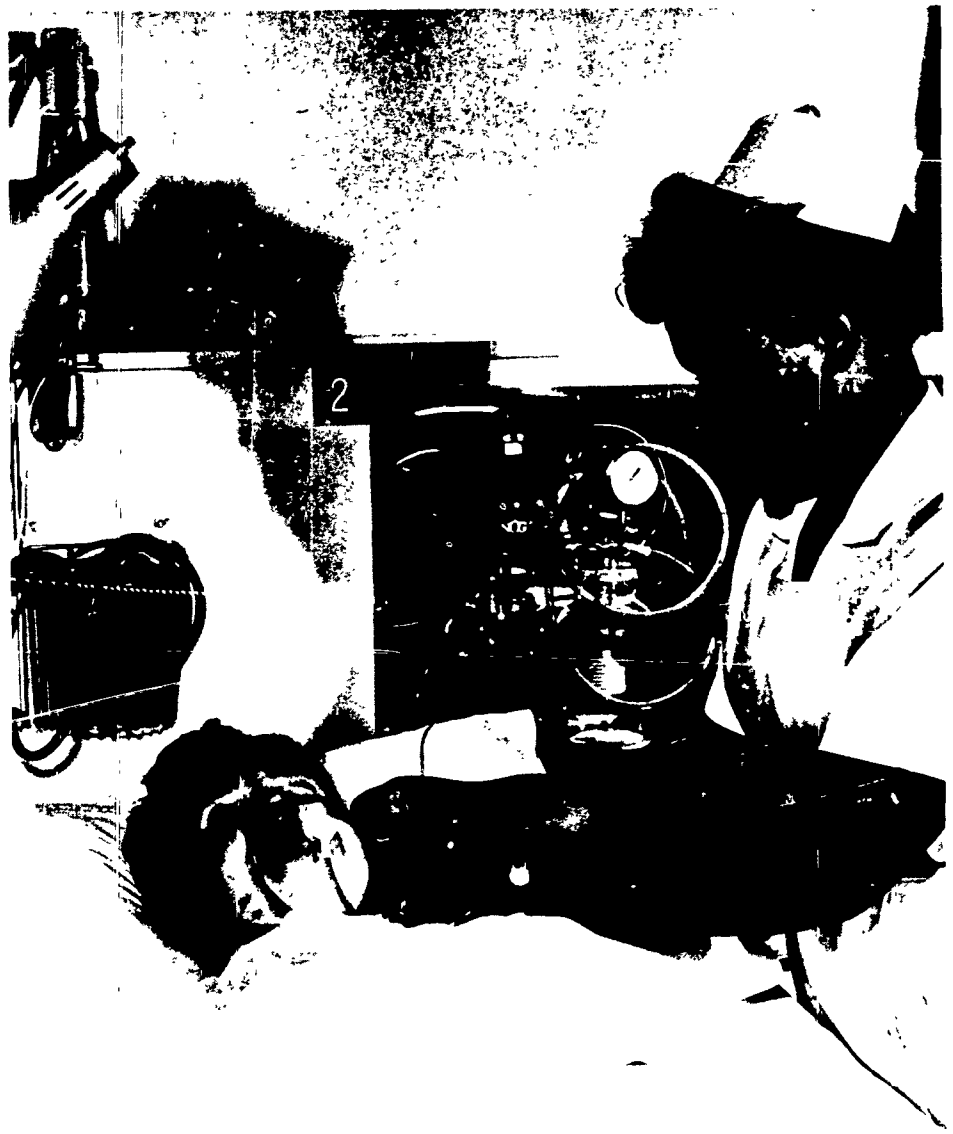
The resolution of the educational conflict has been and continues to be complicated by: (1) the AMA endorsed "Essentials of an Approved School of X-ray Technology" based on requirements originally developed for educational programs offered by a service centered institution and requirements that "the responsibility for the entire program shall be vested in the hospital school of radiologic technology;" (2) difficulties in arranging for adequate student clinical experience in hospital radiology departments under the supervision of college x-ray instructors; and, (3) a drastic shortage of instructors with adequate background and experience in x-ray technology, teaching experience, and a knowledge of collegiate education.

The stimulus of a new mandatory law for licensure of x-ray technicians in New York State, cooperative activities of

the New York State Health Department, Education Department, State University, a foundation supported Community College Health Careers Project, and an enlightened X-Ray Technician Board of Examiners may soon help to shed new light on the problem of college education for x-ray technicians.



The student preparing to become an occupational therapy assistant must learn to teach patients crafts



Nursing and other health education programs require mastery of many skills

PLANNING FOR HEALTH TECHNICIAN EDUCATION

Crash Programs

There are pressures throughout the United States working at cross purposes to a program for the sound development of education for the health technologies. Rapidly expanding health facilities and increasing demands for health services have placed a strain on hospitals and other health agencies. Institutions, physicians, and dentists must find assistance quickly to meet the mounting needs of the public. Hastily conceived on-the-job training programs are often the result. Sometimes based on the assumption that anyone on the job is better than no help at all, short-term training programs are instigated for unskilled and therefore unemployed individuals who frequently have low scholastic aptitude. Graduates of such training programs, admittedly stimulated by praiseworthy motives, often offer their services to health agencies after acquiring only limited skills and knowledge. Under the pressures of personnel shortages, these individuals are sometimes required to provide services to patients far beyond their ability. Such an approach is perhaps more defensible in trade and industry where the principle of *caveat emptor* is operative. However, the ill and otherwise handicapped are least able to defend themselves from inept service.

Short-term, quickly developed training programs are by no means the only threat to safe patient services. The same pressures for technical health personnel are at work on two-year colleges. Crash programs undertaken to alleviate critical shortages suffer to varying degrees from a series of planning errors or omissions. Once an inadequately planned educational program has been inaugurated prematurely, it is much more difficult to modify than it would have been in the planning stages. Health technology programs developed under forced draft usually suffer from some or all of the following planning defects:

1. There has been an inadequate discussion with potential employers, institutional managers, and professional practitioners regarding the nature of employment that will be available to graduates, and the kind of skill and knowledge they should bring to a beginning position.
2. Plans for use of clinical facilities and other learning facilities outside the jurisdiction of the college are loosely formulated, not based on written contracts, and subject to frequent breakdowns because of lack of clear-cut plans, or personnel changes at the hospital or college.
3. The curriculum has not been built on adequate study of already existing programs, expert consultation, consideration of available criteria formulated by professional societies, boards of registry and licensing bodies, but, rather, depends on untried hypotheses and trial and error adjustments.
4. There is no sharp distinction regarding educational responsibility for the entire curriculum making it possible for the quality of the educational program to fall in a grey zone of shared responsibility between

the college faculty and the staff of the clinical facility.

5. The "internship" concept is misused as a postgraduate work experience to fill gaps in the basic program or to provide indentured and inexpensive labor for a service facility.
6. Educational blocks of theory and of practice are completely separated due to lack of time to plan careful and important integration of the two.
7. Faculty without adequate background in the subject to be taught, or familiarity with the organization and conduct of collegiate education are employed on the assumption that they can learn on the job.
8. Library resources, college laboratory facilities, audiovisual materials, reading lists, syllabi, and other tools of education are inadequately provided.
9. Hastily recruited students are afforded little counseling regarding the nature of the field they hope to enter or the attitudes or academic rigor that will be required of them.

To alleviate public pressure for educational programs in the health fields, colleges may sometimes establish programs in name only. A series of courses in the sciences and humanities fundamental to the health field are offered together with one or two introductory survey courses relative to the technology. The program is then mislabeled a curriculum for technicians. Actual instruction in the skills and knowledge of the technology is provided following the completion of college classes (during what is sometimes euphemistically termed a practicum) under the jurisdiction of a hospital or other clinical facility.

Another expedient, often the product of pressures brought about by manpower shortages, is the narrowly conceived collegiate program which trains only for a limited range of skills. The curriculum provides no theoretical base, little of the "why" of the technician's job, no general education to help the graduate adapt to his changing role in a particularly fluid vocational setting. The need for skills training programs in contrast to broader educational programs may be justified in isolated instances by severe time restrictions, but it penalizes and sharply limits the continuing usefulness of the graduate. It is a less than satisfactory approach to providing long-term solutions to personnel shortages in the health fields.

Foundations, professional associations, and federal agencies have taken some encouraging initial steps to counteract these problems.

A limited number of foundation grants have been offered to community colleges to enable them to employ faculty six months to a year before students are admitted to a new program, thus assuring adequate planning. A few teacher-training programs for instructors of health technologies have been partially underwritten. Some workshops and short-term training grants, both pre-service and in-service, for potential or actual college teachers of health technologies, have been supported by foundation grants and governmental subventions. A long-term study and action program for community college health careers is being supported in one state. A beginning has been made toward organized assistance for colleges. However, mounting demands for crash programs will continue to challenge educators to resist expediency in favor of quality.

Attacking the Problem

Given a vital and growing need and an apparent readiness on the part of the junior-community colleges to tackle the problem of preparing technicians for auxiliary dental and allied medical services, what is the best plan of attack?

First, it must be recognized that there are a number of indispensable groups that must work together in a partnership. This is particularly true when shifting patterns of health services demand educational innovation, and a willingness to experiment and to radically modify long-standing patterns of education and health service. During the period of curriculum planning there are three key partners: (1) *the employer* (both the health professional seeking an assistant and the health agency administrator if the service is agency-centered); (2) *the technician* (if the field is already recognized and organized); and (3) *the educator*. Each partner has an important role that cannot be overlooked. The employer knows what he wants the graduate to know and do for him. The technician from experience knows what knowledge he must have and what skills he must possess to accomplish his job. The educator, working with the employer and the technician, must translate what he learns from them into a series of learning experiences to which the student will be exposed, *i.e.*, the curriculum.

Unique Difficulties

The planning and operation of college-based technical programs in the health fields pose unique problems. In most cases the laboratory, so essential to the educational process, is not under the control of the college. Clinical practice for students is subject to the approval of a separate institution or a professional practitioner primarily concerned with patient service rather than education. The pitfalls and nuances of this necessary relationship are many and worthy of an entire treatise. However, the mutual interest of all parties in securing large numbers of quality graduates has usually overcome the conflicts that may occur. The hospital or medical practitioner cannot permit the presence of students to upset the service routine too severely or to have the quality of service impaired. The college, on the other hand, cannot have its curriculum so badly distorted by service needs that essential learning experiences are not available or are available at the wrong time. The problem is difficult but it has been overcome again and again. If there is one key to the resolution of this problem it is a *written* contract and a code of relationships, procedures, and responsibilities of the two parties to the contract.

The problem of faculty procurement, an old story in all fields of education, has a few additional facets in the field of auxiliary dental and allied medical education.

There is a much larger proportion of women engaged in the health technologies than men. It is from this pool of womanpower that most recruits must be drawn and prepared as instructors. The Bureau of the Census tells us that most adult women are wives, and that most wives are mothers and/or homemakers. These conflicts with a teaching career for women are familiar to all educational administrators. In addition, most medical and dental technicians presently on the job have acquired their knowledge and learned their skills either in an apprenticeship program or in a non-collegiate training program. Technicians frequently lack a familiarity with the college educational setting, and the

average technician's knowledge of the technology to be taught is little more than that expected of new graduates of technical programs. The technician's knowledge of *what* to teach may be limited, but often she has had no opportunity at all to learn *how* to teach. *Programs for identifying outstanding technicians and preparing them as instructors must have high priority in any plan for meeting the challenge for technicians in the health field.*

Local and Regional Planning

Local or regional planning should precede any attack on the problem of preparing technicians for the health fields because of varying local dental, medical, and health agency needs. As a focal point around which to organize initial discussions, groups made up of physicians and dentists, technicians, and educators might consider the following list of questions:

1. Is there a vocational field worth differentiating? Is it emergent or obsolete?
2. Is preparation for practice in this field one that can be effectively taught in a college? If so, is the community college the appropriate institution?
3. What skills, knowledge, and attitudes must one possess to function successfully in this field?
4. Where and under what conditions are the necessary knowledge and skills being developed; *i.e.*, classroom, laboratory, on-the-job?
5. Where and under what conditions can the necessary knowledge and skills be provided optimally?
6. What segments of the curriculum require close direction by the teacher? What segments could be adequately handled by independent or semi-independent study?
7. What kinds of formal education, work experience, and preparation for teaching are presently utilized, and what alternatives will best prepare an instructor for this field?
8. Is the field presently ready to set educational standards, or accept existing standards of professional societies? If so, what are the standards?

There are, of course, other considerations that regional study groups should not ignore—such as student recruitment and the logical corollary employment and pay-scales of graduates; the possibility of developing core courses for clusters of occupations; the need for follow-up evaluations of graduates on the job and feed-back to the college for curriculum modifications; and the possibilities of using a multimedia approach to learning by employing films, television, programmed instruction, graphics, simulators, and computers.

SUMMARY

We find our society faced with a growing and shifting need for technicians and assistants in the health field. Hospitals are turning over some of their educational activities to two and four-year colleges. Community colleges have already demonstrated their ability to successfully prepare health technicians in selected fields. Some well conceived pilot programs give promise of a willingness on the part of the colleges to expand their activities. New educational programs to meet the needs must be regionally developed by study groups of health professionals, technicians, and educators. The colleges must establish relationships with health agencies for use of clinical facilities. Most important of all, a corps of outstanding technicians must be identified, recruited, and prepared as teachers before there is much hope of meeting this challenge for better health care. The problem is urgent but can be resolved by imaginative planning and bold leadership on the part of junior and community colleges.

FOOTNOTES

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4. "Ambulances in a Jam." *Newsweek*, November 2, 1964, p. 92.
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6. George E. Miller, M.D. "Medical Education and the Rise of Hospitals," *The Journal of the American Medical Association.* Vol. 186, No. 12 (December 21, 1963) p. 1076.
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9. Sister Mary Johnita, R.S.M. "Weaknesses in Schools of X-ray Technology," *Hospital Progress*, (March 1963).
10. William E. Hoskins. "History of X-ray Technology in California Junior Colleges," City College of San Francisco, (Mimeographed).

Appendix I

AGENCIES, SOCIETIES, AND ASSOCIATIONS CONCERNED WITH STANDARDS FOR ALLIED MEDICAL AND AUXILIARY DENTAL FIELDS

Standards in allied medical and auxiliary dental fields are promoted by:

1. State licensure
2. Registration or certification of practitioners
3. Voluntary accreditation of the educational programs

All fifty states require licensure for nursing (R.N. or L.P.N.) and for dental hygienists. Physical therapists must have either licensure or certification in thirty-nine states.

Educational standards have been developed by the American Medical Association's Council on Medical Education and Hospitals (535 North Dearborn Street, Chicago, Illinois 60610) for: a) occupational therapy, b) medical technology, c) physical therapy, d) medical record library science, e) x-ray technology, f) cytotechnology, and g) inhalation therapy technicians.

Programs in three dental auxiliary fields are accredited by the American Dental Association's Council on Dental Education (222 E. Superior Street, Chicago, Illinois 60611). Standards have been developed for a) dental hygiene, b) dental laboratory technician, and c) dental assisting:

Standards for nursing education programs have been developed by the National League for Nursing (10 Columbus Circle, New York 19, N.Y.).

Other associations or boards concerned with health technicians and assistants include the following:

(a) The American Dental Assistant's Association
410 First National Bank Building
La Porte, Indiana

(b) The National Board for Certification of the National Association of Dental Laboratories
201 Mills Building
Washington, D. C. 20006

(c) The American Association of Medical Record Librarians
840 North Lake Shore Drive
Chicago, Illinois 60611

(d) The American Occupational Therapy Association
250 West 57th Street
New York, New York 10019

(e) The Board of Registry of Medical Technologists of the A.S.C.P.
3729 W. Jackson Street
Muncie, Indiana 47344

(f) The American Registry of Radiologic Technologists
2600 Wayzata Boulevard
Minneapolis, Minnesota 55405

(g) The American Board of Opticianry
821 Eggert Road
Buffalo, New York 14226

(h) The American Board of Certification in Orthotics and Prosthetics
919 - 18th Street, N.W.
Washington, D. C. 20006

(i) The American Registry of Physical Therapists
30 North Michigan Avenue
Chicago, Illinois 60602

(j) The American Association of Certified Orthotists
200 First Street
Rochester, Minnesota

(k) The American Association of Inhalation Therapists
332 South Michigan Avenue
Chicago, Illinois 60604

(l) The American Society of Medical Technologists
Merman Professional Building
Houston, Texas 77025

(m) The American Society of Radiologic Technologists
537 South Main Street
Fond du Lac, Wisconsin 54935

(n) National Committee for Careers in Medical Technology
1785 Massachusetts Avenue, N.W.
Washington 36, D. C.

(o) National Council on Medical Technology Education
1025 E. H. Crump Boulevard
Memphis, Tennessee 38104

(p) American Association of Medical Assistants
510 North Dearborn Street
Chicago, Illinois 60610

Appendix II

CRITERIA FOR AN ORGANIZED OCCUPATIONAL CURRICULUM *

1. High school graduation (or its equivalent), but no work beyond the high school, is required for admission to the curriculum. The general level of these curriculums is the first one to three years beyond high school.

2. The curriculum is a series of required and elective courses constituting an integrated program prescribed by the institution to assist in the general education and training of the individual, but more particularly, in his training as a future practitioner in a given occupation or cluster of occupations. A group of courses, even though all of them be in a given occupational area, does not necessarily constitute a curriculum.

3. The curriculum is designed to prepare students for immediate employment in an occupation or cluster of occupations. Individual courses in the curriculum may be creditable toward a bachelor's or first professional degree either in the institution or by transfer; however, the curriculum as an organized program is designed to educate or train primarily for occupational competence, rather than for transfer or degree credit. *The curriculum, itself, and its objectives should be classified, not the intentions or possible subsequent careers of the students involved.*

4. Completion of the curriculum requires at least 1 but less than 4 years of full-time attendance, or the equivalent in part-time attendance over a longer period. A "year" means an academic year of approximately 9 months.

5. The curriculum leads to a certificate, diploma, associate degree, or other formal award, signifying that the student has completed an organized curriculum in an occupational area; or the State grants a license or other formal recognition, without examination, to all graduates of the curriculum.

* Adapted from U.S. Office of Education data.

Appendix III

Some Representative Community College Career Programs in Allied Medical and Auxiliary Dental Occupations

Biomedical Engineering Technician	X-Ray Technician	Inhalation Therapy Technician
Dental Assistant	Occupational Therapy Assistant	Surgery Technician
Dental Hygienist	Medical Record Technician	Ophthalmic Dispenser
Dental Laboratory Technician	Medical Secretary	Radioisotope Technician
Director of Hospital Volunteer Services	Medical Assistant	Prosthetist
Medical Laboratory Assistant	Medical Emergency Technician	Environmental Health Technician
Nursing (ADN)	Food Service Supervisor	Ward Manager