

purpose educational centers. In like manner, USDA, Health, Education, and Welfare (HEW), Interior, and others should be active participants in environment ecology education.

T. W. Schultz implied a responsibility for redirection of programs and interagency cooperation at all levels with this charge, "had the agricultural colleges, the USDA, and the farm organizations thought through and provided the economic rationale for Federal funds for rural elementary and secondary schools, the problem of this part of the necessary financing of these schools could have been resolved long ago."

We must think about America and our rural youth as it will be in 1980 or 2000—a nation with perhaps as many as 300 million citizens, with different kinds of schools and different kinds of teaching and learning programs; and we must do this right now. There is no time to lose. The key to human survival is Education.

Vocational Education

EDGAR J. BOONE,
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VOCATIONAL education links man and his work. Currently referred to as "occupational education" by many authorities, it should be a vital part of the total process of education. It prepares people of all ages for productive and satisfying occupations in the world of work.

The modern concept of vocational education encompasses all levels of education including secondary, post-

secondary, and adult programs, as well as programs for persons with special needs.

Approximately 8 million persons participated in vocational education programs in 1969. The American Vocational Association has estimated that enrollment in all phases will come to approximately 14.6 million by 1975.

The need for functional, expanding vocational education programs in the United States is highlighted by a number of factors. There is no place in the world of work for the uneducated or the educated person who has not learned how to work; just as there is no place for the person who has not learned how to learn. Thus, the total educational process is increasingly tied to the work required by society.

Technology has created a dynamic relationship between man, his education, and his work in which education is placed between man and his work for practically all men and all occupations. Both the nature of society and work have changed. The more rapid the change, the greater the interdependency between education and work.

Acceleration of technology and automation have had a profound effect on the labor market and the kinds of jobs it offers. Examples often cited are automated elevators displacing 40,000 elevator operators in New York City; 15 Census Bureau statisticians in 1970 doing the work that required 300 in 1960; 30,000 cotton pickers replaced by machines in Georgia; 75,000 coal miners producing more coal during 1970 than 400,000 did in 1960.

Although many low-skill jobs have

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disappeared, new jobs have been created as a result of technological developments. In 1966 the job market called for 1.4 million new workers. This was 600,000 above the number of new workers, aged 18 to 19, who were entering the work force. The 600,000 had to be drawn from the ranks of the unemployed who needed some preparatory training.

Hence, our technological advances have caused an increase in jobs, not a decrease—although there has been a shrinkage in occupations such as agriculture, mining, and some types of manufacturing.

This overall increase in available jobs has resulted in the shortages of many skilled workers in areas for which secondary and post-secondary schools and adult programs have been supplying the workers.

A good bit of the breakthrough in technological developments, and hence the increase in jobs and the need for skilled labor to fill them, is due to research directed at discovering and developing new products for public consumption.

Supporting these technological developments for consumer use are accelerating activities in research and development.

The more than 3 million scientists, engineers, and technicians in the U.S. work force of more than 80 million presages even more rapid technological changes in the future which will affect both occupations and the preparation programs for them.

Results of research on the labor market can best be seen in requirements of the following fields for installation and maintenance technicians:

Systems engineering (mechanical and electronic combined)—involves new developments in power control and the rapidly developing field of fluid power.

Automation engineering technology (production and manufacturing)—requires new knowledge and skill in dealing with power sources, control mechanisms, and study of

the economic feasibility of such developments in manufacturing.

Instrumentation technology (hydraulic and electronic controls).

Materials engineering (new synthetics as well as new uses for existing materials)—the production and development of metals, plastics, ceramics, gases, liquids, and fibers.

Biomedical engineering (instruments and devices).

Oceanographic research, including aquanautics.

Astronautical research and developments.

Water use and treatment, including pollution prevention and control, as well as desalinization.

Agricultural technology and research, new sources of food.

Conservation of natural and human resources and technologies.

Government and municipal services and technologies, including law enforcement, food science, and traffic control.

Quality control technology.

These are but a few of the many new occupations which have come into being during the past decade. Well-trained workers possessing high-level intellectual and physical skills are needed in the new occupations. Technological developments in new products and services require precision, accuracy, and reliability. Vocational programs must develop these concepts, skills, and values.

The technological explosion since the turn of the 20th century indicates that the total target population for organized vocational education programs potentially includes the entire labor force.

It is not anticipated, of course, that all of the approximately 100 million projected to be in the labor force in 1980 will be enrolled in organized vocational education programs at any one time. However, it is reasonable to assume that a majority of the labor force, at one time or another in their lives, will have participated in some type of organized vocational education.



Vocational education in North Carolina: Machine shop at community college, marine technology, ornamental horticulture, and cosmetology at technical institute.



Alterations in the skill requirements of existing jobs as well as the creation of new jobs will require additional training or retraining throughout man's life span. Many educational experts feel that vocational education should begin with early childhood education and extend throughout the life span.

A number of educators also feel that increased emphasis should be given to conceptual learning and value formation in vocational education at all levels to provide workers with the intellectual tools to perform proficiently jobs that are subject to constant change—the nature and intensity of which are difficult to predict. It is reasoned that as future and present workers use these intellectual tools, they will develop the ability to modify and adapt such concepts to meet and satisfy the changing requirements of their chosen occupations.

More people are now investing more time in education in the early part of their life span in preparation for full-time entry into the work force. The average age of entry of men into the work force is now over 19. Because of the added years of life expectancy, even with the delay in entering the work force, men spend more years working than ever.

Following a decade of studies and discussion, spearheaded by the National Society for the Promotion of Industrial Education, Congress in 1917 enacted the Smith-Hughes Act providing Federal aid to the States for vocational education of less than college grade.

This legislation, which embodies the grants-in-aid concept to the States, specified agriculture, home economics, and trades and industries as occupational categories for which State and local training costs would be eligible for partial reimbursement by Federal funds. Subsequent enactments continued the pattern by designating other occupational categories in which training could be supported.

The George-Deen Act of 1937

added the distributive occupations (that is, marketing, retailing, salesmanship, etc.) and was superseded by the George-Barden Act of 1946, which provided for a major expansion in vocational education. Separate amendments of the Act in 1956 added practical nurse training and comparable preparation in other health occupations, and authorization for training in the fishery trades and industries. The National Defense Act of 1958 authorized training of technicians in occupations needed for national defense.

The Vocational Education Act of 1963 continued the previous authorization for training in specified occupational categories, but added the office occupations. It also permitted States, at their option, to transfer Federal funds from one category to another.

In addition, the 1963 Act offered States additional funds for training specified population groups—regardless of occupational objectives of the training. Target population groups designated in the Act are high school youth, post-school youth, adults enrolled in full-time instruction, youth and adults enrolled in other courses, and people with special needs.

The 1963 Act was amended in 1968 to provide many more "people-oriented" services and activities. This legislation provides funding to promote such activities as cooperative education programs, training for the disadvantaged as well as the handicapped of all ages, consumer and homemaking education, residential schools, and guidance.

The legal bases for vocational education are the Vocational Education Act of 1963 as amended and the earlier Smith-Hughes and George-Barden Acts. All are now administered as a single legislative act.

Besides this specified vocational legislation, reference should also be made to the Manpower Development and Training Act (MDTA) of 1962, which was aimed at serving a growing number of people with special vocational education needs. The special

groups include migrants, the educationally deprived, the economically disadvantaged, and the physically handicapped.

MDTA programs are administered jointly through the Department of Labor and the Department of Health, Education and Welfare.

Programs of vocational-technical education aided by the Federal vocational education acts are the largest component of the Nation's organized efforts to reduce unemployment and eliminate occupational shortages.

These State-Federal cooperative programs, supported by the U.S. Office of Education, are supplemented by other programs for specified groups (for instance, high school students, out-of-school youth, neighborhood youth corps participants). However the State and local programs partially funded by the Federal Government remain the major permanent thrusts for preparing entrants to the labor force and improving the productivity of those currently at work.

Each State is responsible for its vocational education program. The State board of education or a separate board for vocational education serves as the responsible administrative agency. The U.S. Office of Education deals with this one central board or agency having responsibility for vocational education within each of the 50 States, Puerto Rico, and the District of Columbia.

Supplementing these efforts of the official board or agency in each State is a State advisory council appointed by the governor or by an elected State board of vocational education. Advisory councils are authorized to obtain the services of professional, technical, and clerical personnel needed to carry out their functions.

A State plan for vocational education must be prepared in consultation with the advisory council. The public must be given an opportunity to express its views on program matters and the council must provide one public meeting for this purpose.

The State board of education or

board of vocational education has the responsibility of seeing that the State plan and recommendations of the advisory council are put in effect.

Organization of vocational education varies greatly at the local level. In most States, administration is conducted through local boards. Exceptions include State-operated vocational schools that serve an area of several school districts and correctional schools. In many States county administration also rests between the State and local levels. The county administration usually serves several local levels.

Institutional arrangements and program offerings vary greatly at State, area, and community levels. The range of program offerings has broadened in recent years to include training or retraining in most occupations other than those designated "professional" by the U.S. Commissioner of Education or those that require a baccalaureate or higher degree.

A growing trend in program offerings has been the combining of two or more related fields, like marketing and agricultural production courses.

Most vocational education offerings in secondary education institutions are under the auspices of programs authorized by the vocational education legislation at the Federal level. Some of the major program offerings at this level include agriculture and agribusiness, home economics, distributive education, trades and industrial education, practical nursing, and office occupations.

There is no one single pattern of institutional arrangements or program offerings in vocational education at the post-secondary level in the various States. Programs are offered by a variety of institutions, which include high schools with evening adult programs, area vocational schools, technical institutes, community colleges, special State schools, and the 4-year senior colleges and universities.

Many high schools are expanding their programs to offer vocational courses that are taught during the



Ohio farmers in a Federally-supported vocational agriculture program listen as the instructor discusses diseased corn stalk.

evening hours, especially for adults. These usually include agriculture and agribusiness, home economics, distributive education, industrial and technical education, and office jobs.

Some high schools offer adult basic education designed specifically to help adults acquire the necessary skills needed to read, write, and compute at a level at which they can function in society.

The area vocational school usually is operated as an adjunct of secondary schools in a particular area. However, these area schools also include program offerings for out-of-school students. High school students are bused to the vocational school from surrounding high schools for a part-day program. The vocational area school also may enroll special students in Manpower Development and Training Act programs and, at night, enroll adults in vocational programs.

Course offerings in the area school range from simple crafts to highly specialized technical areas.

Technical institutes and community colleges are gaining in prominence in the American educational system. These institutions provide vocational and technical education programs.

The technical institute offers vocational programs consisting of courses and curricula designed to equip persons for a particular trade, such as agricultural and biological, art and design, business, and engineering technologies; health occupations; and public service technology.

Community colleges differ from technical institutes in that besides offering comprehensive vocational and technical education programs and general adult courses, they have a 2-year college-parallel curriculum.

Generally, both technical institutes and community colleges have an

open-door policy and will admit to an appropriate program all persons who are high school graduates or are 18 or older.

An estimated 3.5 million adults participated in vocational and technical education programs offered by technical institutes and community colleges in 1969. There are currently over 1,000 of these establishments in the United States.

Four-year colleges and universities also are deeply involved in vocational education programs. Almost all offer vocational-oriented curricula at the baccalaureate and subbaccalaureate levels. Curricula are generally available in agricultural, engineering, health and medical, and business technologies.

Besides formal organized vocational curricula in the secondary, post-secondary, and higher education institutions, many other sources of vocational preparation exist in the United States. Among these are private schools, home study schools, and business and industry.

There is no one best way to organize, plan, and conduct vocational education programs at each of the several levels of government. The number and types of program offerings depend upon such things as sources of funding, and the philosophy of administrators and institutions, as well as labor needs evident within a given geographic setting.

Future effectiveness and impact of vocational education programs obviously will depend largely upon the leaders in that field (1) maintaining a continuing sensitivity to the vocational needs of people and (2) developing programs specifically tailored to meet such needs. Opportunities should be provided for related agencies and organizations to become involved in planning and putting in effect vocational education programs at the local, State, and Federal levels.

CAMPS—Cooperative Area Manpower Planning System—is an example of a planning effort whose objective is the coordination of policies, plans,

and activities of all agencies, institutions, and organizations involved in carrying out manpower development programs.

Included in activities of this group are many programs directly related to vocational education, such as New Careers, Neighborhood Service Centers, and others. The program operates at four levels—national, State, regional, and local. U.S. Department of Agriculture representatives at all four levels are among the personnel of eight Federal agencies designated to participate in CAMPS.

Technical Action Panels (TAP's) represent a second type of educational activity at all levels. A TAP coordinates the program efforts of all Federal agencies in a rural area in developing and carrying out rural community development programs. Primary responsibility for TAP programs lies with USDA. Planning for and coordinating occupational education programs might be one of the activities of a TAP.

USDA representatives also are responsible for providing many supportive roles to local occupational education programs. High school vocational education efforts, technical institutes, area vocational schools, and other programs can benefit from contributions by many of the USDA agencies.

Vocational education is becoming a dynamic force affecting the thought procedures, habits, economic status, and social interaction of people from many walks of life throughout the country. It is becoming a major, integral part of the American educational system.

As vocational education expands and improves the quality of its program offerings, continuous attention should be given to the concept of vocational education in a complex, changing society.

The Advisory Council on Vocational Education in 1968 provided these thought-provoking ideas about an expanded concept of vocational education being needed to service



Modern rural vocational education includes not only basic industrial skills like welding but service vocations like dental assistant and nursing. Many skills are needed for a growing rural America.



future occupational needs of the American public:

- Vocational education cannot be limited to skills needed for a particular occupation. It is more appropriately defined as all those aspects of educational experience which help a person discover his talents, relate them to the world of work, choose an occupation, refine his talents, and use them successfully in employment.

In fact, orientation and assistance in vocational choice may be more valid measures of employment suc-

cess, and therefore more profitable uses of educational funds, than specific training.

- In a technology where only relative costs, not engineering know-how, prevent mechanization of routine tasks, the age of "human use of human beings" may be within reach—but those human beings must be equipped to do tasks which machines cannot do.

Where complex instructions and sophisticated decisions mark the boundary between the realm of man and the role of the machine, there is no room for any division between intellectual competence and manipulative skills and, therefore, between academic and vocational education.

- In a labor force where most have a high school education, all who do not are at a serious competitive disadvantage. But at the same time, a high school education alone cannot provide an automatic ticket to both satisfactory and continuous employment.

Education cannot shed its responsibilities to the student (and to society in his behalf) just because he has chosen to reject the system or because it has handed him a diploma. It is not enough to dump the school-leaver into a labor market pool. Society must provide him a ladder, and perhaps help him climb it.

- Every educational experience must include some type of formal occupational experience. Although final occupational choice may well be delayed until all the alternatives are known, no student should leave the educational system without a salable skill.

In addition, given the rapidity of change and the competition from generally rising educational attainment, upgrading and remedial education opportunities are a continual necessity. Those who need occupational preparation the most, both preventive and remedial, will be the least prepared to take advantage of it and the most difficult to educate and train.

School Bells Ring for Adults Through Life

CHARLES W. MCDUGALL and
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IT MIGHT be a good idea to inscribe on every college diploma a warranty that reads, "This education is valid for 24 months or 24,000 miles, whichever comes first." Perhaps we then should offer each college graduate a "tuneup" in education every 2 years.

The dynamic world we live in requires that each adult American update his supply of knowledge frequently.

The young scientist, farm manager, or engineer may find, as he steps out of college and into his first job, that many of the techniques and much of the theory he has learned already have been superseded by better ways and fresher ideas. He then realizes it is not possible to have a "completed" education that will satisfy his lifetime needs.

An insurance executive recently pointed out that we now move from new idea to application almost "overnight." In contrast, it took 112 years for the process of photography to develop. The telephone took 56 years, radio 35, television 12, and transistors 5 years.

The time span from idea to application has been drastically reduced. This same insurance executive predicts that 9 years from now most people working in industry will be making products which have not yet been invented.

Contemporary systems of continuing education have their roots in the basic notion that knowledge and skill are means of self-improvement,