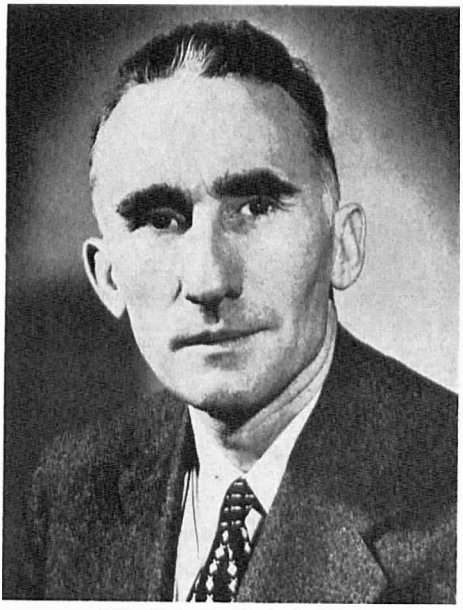
Training Solution For Engineering Shortage

A concrete proposal for cooperation between industry's training directors and evening colleges in organizing a program to alleviate the engineering shortage now, as developed at a meeting of the New York City Department of Commerce by Dr. Love, Chairman of the Committee on Cooperation with Business of the Association of University Evening Colleges.

THE SHOE was on the other foot last month as college professors accused businessmen of taking an "academic" approach to the current engineering personnel problem.

The professors called for a "now" approach to the problem which would use the materials now at hand—the personnel available now and the training facilities now in operation—in an attack on the shortage of engineering personnel. Instead of a "now" approach businessmen have adopted a five-year-plan of waiting for a supply of academically trained engineers, the college leaders said. There is no basis for the assumption that every job requiring analytical thinking calls for an academically trained engineer, the professors said, and if this supply does arrive it will be too late to answer a problem that needs answering immediately.

The answer, the professors said, *lies in up-grading employees now on the fringe of engineering jobs and breaking down jobs now handled by engineers into their component parts for handling by a "non-engineer."* Under the professors' plan, the qualified engineer would become a supervisor or executive rather than a mechanic merely throwing switches according to a plan. Engineers would be freed to handle the creative work necessary to expanding defense production lines.



DR. ROBERT A. LOVE

Dr. Robert A. Love, who is Chairman of the Committee on Cooperation with Business of the Association of University Evening Colleges (AUEC), delivered the professors' argument to a meeting of engineering executives in the

Council Chambers of the City of New York. The meeting, which was attended by more than 100 executives from the New York area, was called by Commissioner Walter T. Shirley of the New York City Commerce Department July 24th, 1952. Shirley said his department was concerned by the critical shortage of engineering personnel in the metropolitan area. The severe "pirating" of engineering personnel by firms within the area as well as firms from outside the area aggravated an already menacing situation, Shirley said in his invitation to the meeting.

One Proposal

The catalyst which brought about Dr. Love's plan and the "academic" charge was a meeting of sixty educators called by the Office of Education of the Federal Security Agency in Washington, November 17, 1951. The meeting went on record for support of a program to interest more high school students in science courses and ultimately in studying for an engineering degree. The New York Times quoted Watson Davis, director of the Science Service, as telling the meeting, "What we should say from this conference is 'Let's go boys and girls!' There are thousands eager to have fun in science."

Solution Now

While commending the Education Office's program, Dr. Love cast around for a practical solution which could be applied *now* with immediate results. He reasoned that high school students would need five to seven years to become academically trained engineers; that a great many high school graduates and graduate engineers would be taken into the armed services; that the lower birth rates of the thirties were being felt in college enrollments now. He consulted with engineers and came up with a plan which was sent to the 87 members of the AUEC in December, 1951. The plan he presented to the Commerce Department's meeting was substantially the same as that contained in his report to the AUEC.

Dr. Love's plan called for cooperation between industry's training directors and evening colleges in organizing a program to alleviate the engineering shortage immediately. *He emphasized in his report that the plan was not a substitute for company training plans but a special supplementary method for speeding up training to meet some of the immediate needs for personnel in production.* In the case of the company that is too small to mount a training program of its own, the plan would be invaluable.

Survey of Need

At the request of the New York City Commerce Department Dr. Love surveyed the need for engineers in the metropolitan area. The survey was based on reports from the New York State Employment Service, an analysis of newspaper advertising for engineers, and reports from individual companies in need of engineering personnel.

The survey confirmed the findings of Dr. Love's first report and he took immediate steps to particularize the plan

of his AUEC report for the New York area. In effect the plan reversed the usual company procedure for building a staff for carrying on production. The usual plan calls for a broadly trained engineer, who takes two years to become adapted to the company's specific practices. This new plan recommends selecting persons already familiar with the firm's operations and training them for specific parts of the jobs now often done by the graduate engineer. Dr. Love did not claim that the plan would give companies engineers, but he claimed that it would give them urgently needed performance within a period of weeks and months rather than years.

The Plan's Major Steps

Three major steps were cited in the plan:

1. *Engineers should be relieved of those duties which can be performed by non-engineers.*
2. *Non-engineers can be trained to undertake specialized tasks which are customarily assigned to engineers.*
3. *Many persons with engineering degrees can be trained in a relatively short time to become more effective supervisors of non-engineers doing technical work.*

Prior Experience

Love didn't need the advice of outside sources to assure him that the plan was feasible. As Director of the City College's Evening and Extension Division of the School of Business, he heads an evening training program which has trained more than 70,000 adults for business since World War II. A special activity of the Evening and Extension Division, the Intensive Business Training program (IBT) has up-graded employees of hundreds of companies and cooperated with 100 business associations in initiating special training programs for the industries the associations represent. The IBT program has stimulated cooperation between training directors and the college and the result has been a strengthening of the business community.

Love was able to assure the executives that he was not basing his plan for up-grading non-engineers on a theoretical concept because of the success of IBT and because of the experience during World War II, operating the Engineering Science Management War Training Program. He told the Commerce Department meeting he was confident there was definite correlation between training employees intensively for business and for "non-engineering" jobs. He said, "Intensive Business Training operates on the established fact that adults already employed can be given in short periods of instruction time—in most instances not more than 450 hours—a thorough grounding in one field of business specialization, and certainly this fact holds true for 'non- engineering' jobs as well."

Non-Engineering Jobs

Reading chapter and verse to the engineering executives present at the meeting, Love cited a number of em-

ployment categories now using engineers which could be filled by upgraded employees, such as:

Production Control	Methods Study
Quality Control	Job Simplification
Plant Layout	Job Analysis
Maintenance	Safety
Materials Handling	Job Evaluation
Purchasing	Wage Incentives
Inventory Control	Job Training
Traffic	Product Design
Time and Motion Study	Package Design
	Merchandise Preparation

Planning Training

Under the plan, each organization would decide what jobs, or functions of jobs, could be re-designed for being performed by non-engineering employees. Some or all of these employees might be trained within the firm itself. In other cases, where speed was imperative or a larger number of employees was involved, the firm might develop appropriate courses for the employees with the college or university in its area, or find such courses already being offered. In technical fields, for example, City College puts the facilities of the School of Technology at the disposal of firms seeking technical training for employees they desire to upgrade.

Similarly, the firm itself might develop appropriate supervisory training conferences for engineers required to supervise non-engineers doing technical work, or develop such courses with the available technical societies, college or university.

The AUEC colleges, representing 87 large urban institutions in all parts of the country, are already training hundreds of employees from industry in semi-engineering skills. The courses cover such fields as time and motion study, production control, quality control, etc. They are commonly completed in evening sessions of one or two terms or shorter periods for day classes. The colleges are meeting with local industries and surveying the possibilities of providing more of this training for non-engineers.

A Company's Experience

Some of the nation's major companies have announced initiation of programs similar to Dr. Love's plan since his report was made to the AUEC. The Minneapolis-Honeywell Regulator Corporation, which has trained salesmen at the City College under the IBT program, has instituted a plan for utilization of its engineering staff over wider areas. In a story in the New York Times, June 8, 1952, a Honeywell vice-president was quoted as saying his firm was "minimizing the effects of the engineering shortage by freeing engineers from routine tasks that can be accomplished by lower echelons and providing thorough and extensive training to increase engineer productivity." The story went on to say, "One of the primary aims as regards engineers, according to the Honeywell vice-president, is to prepare them for executive posts." A list of the tasks once performed for Honeywell by engineers, but now handled by non-engineers, included: testing; quality control and measurement; technical writing, blueprinting and methods work.

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INFORMATION WANTED

July 30, 1952

Editor,
Journal of Industrial Training,

Dear Sir:

In connection with a research study we are conducting for the Department of the Army, we would like your assistance in supplying us with *any materials or bibliographies on training criteria.*

Our preliminary research to date has uncovered vast literature on the subject of training programs and methods, but we have yet to find any significant answers to the following questions:

- *Why was a given training program established?*
- *For a given occupation, on what bases was it determined to provide on-the-job training, as against formal classroom instruction? Or vice versa?*
- *In making the above judgments, what factors or standards were used as a guide?*

If you can give us any guidance on these matters, it would be very much appreciated.

Sincerely yours,

C. Thomas Clifton
President
The Clifton Corporation

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(If you have comments, materials, or bibliographies to offer on these questions, please send them to Mr. C. Thomas Clifton, President, The Clifton Corporation, 1621 Connecticut Avenue, Washington 9, D.C. The questions have been sent on also to Major Albert Sobey, Chairman of ASTD'S Research Committee at the General Motors Institute in Flint, Michigan.–Ed.)

Training Solution for Engineering Shortage

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FUTURE NEEDS

Dr. Love's plan for the alleviation of the engineering personnel shortage is a logical outgrowth of an educational philosophy which he has been propounding all his adult life . . . developing people to do the job. He has discussed with industrial and business leaders whenever he can the real waste in American business, in his opinion, the waste of human resources. He envisions the basis for a 400 billion dollar economy in the not distant future, but is afraid the management "brains" which will be needed to run that economy will not be ready unless we start training people for management now at an accelerated pace. He admits to being an out and out optimist, but he is worried by the dangerously low level of our present training of persons capable of making the decisions which the 400 billion dollar economy will need to keep it from bogging down. Love isn't satisfied that four men thinking as they thought for the 100 billion dollar economic machine will satisfy the needs of the future production-marketing cycle. The complexity of the new economy will require greater business insight and greater business foresight, he feels.

This proposal for alleviating the shortage of engineers, involving cooperation between evening colleges and industry in training technicians to undertake specialized parts of the engineering jobs, is part of the preparation for this new economy, Dr. Love believes.