INDUSTRY

American Industry's M-Day

Swift Mobilization of Workers as Important For Defense as Interchangeable Parts in Machines

By MARJORIE VAN DE WATER

AMERICA'S defense program demands the swift conversion of the machinery of peace into weapons for guarding the nation's safety.

Just as important is the speedy transfer and mobilization of trained workers without whom the machines alone are useless junk.

Standardization, interchangeable parts, mass production made possible America's industrial supremacy. The kind of tools developed for making the family automobile and the farm tractor can now be used to turn out huge quantities of airplanes and tanks. Chemicals, fabrics and processes developed for commerce will serve the nation in arming for defense.

De-specialization Now Needed

But modern industry forced the American worker to specialize. Now the demand on him is for adaptability, interchange, flexibility. If he has trained on an assembly line to fit a certain nut into place, he must now learn to use this skill on other parts of new machines in new industries.

More urgent than the fitting together of the metal parts for airplanes, guns, tanks and battleships, is the best placement of each human mind and hand where manpower must be effectively applied. Each misdirection will involve tragic loss and delay through friction, time waste, and inefficiency.

A thorough assay and utilization of America's most precious resource, her manpower, is a tremendous job requiring all the advice and service that science can give.

If the National Defense Advisory Commission follows the cue of those who prepared America for the World War, they will mobilize all the best brains of the psychological, psychiatric and teaching professions to work with labor and personnel experts on this great job of placement and training.

Thousands of men are already taking training to fill essential places in national defense industries. Are they being placed where their abilities will be put to the greatest possible use?

Fortunately, we are not as unprepared in this field as we were in 1918. We have techniques already developed for sorting out men according to their natural abilities and skills. Much of the research fundamental to any intelligent transfer of workers from one occupation to another has already been done and is awaiting use.

With completion of our census, more will be known about America's human resources than ever was known before. We know now how many are illiterate. We will know the age and sex of our people, what their economic status is, how many are employed in skilled jobs in industry, how many have had military service, how many have completed grade school, high school or college.

First to be included in the national defense industrial program will probably be the great army of the unemployed. And it is on the 5,500,000 applicants already registered at Uncle Sam's employment offices that the most complete information is available.

In the research division of the employment service studies of the greatest immediate value have already been made. These findings of years of patient research have now been put to work in organizing the great defense program.

While this is the time for swift action, for immediate application of scientific discoveries and developments, this is no time to abandon research in this field. Only by eternally seeking new knowledge can democracy be kept at the peak of its functioning.

What Is a Gandy-Dancer?

Did you ever hear of a gandy-dancer, a hot-stuff man, a bull runner, a frog-leg assembler or a vamper (no, not feminine)?

These are all workers in American industry—in construction, bakery, foundry, automobile and shoe work.

Each could fit into an important place in America's great program of national defense. Agencies charged with putting America back to work in a united defense effort face the problem of finding out just what these workers and those on some 55,000 other jobs can do in the Army or in essential industries.

Fortunately, the essential key to the puzzle exists.

It is the *Dictionary of Occupational Titles* developed after years of study by the U. S. Employment Service. Much more than a compilation of odd words, it provides a means by which the job names in various industries can be translated into a common language. It is the first step toward an interchange of workers comparable to that interchange of mechanical parts without which mass production would be hopeless.

Each industry has developed its own names for its own jobs. Many of these workers are duplicated in other industries under other names. Yet the same name may apply to very different jobs in different industries.

Several Kinds of Peelers

A "peeler" has the most famous of all jobs in the Army when he is put on K.P. with the potatoes. But a peeler in the amusement industry is a strip-tease artist. In a sawmill, a peeler takes the bark off logs and may also be called, believe it or not, a "spudder."

A frog farmer actually raises frogs for food, but a frog-leg assembler works on the inside of automobile doors. A bull runner is a pourer in a foundry. A gandy-dancer is a trackman in the construction industry. A hot-stuff man, also known as a shake-out man, is the fellow who dumps hot pans in a bakery. A vamper stitches together the uppers of shoes.

The Dictionary makes it possible for the outsider to list the jobs in any industry or at least to read the list understandingly. Anyone can buy it from the U. S. Government Printing Office. The first volume containing all the definitions costs $2.

A coding system worked out in the second volume makes it possible for an expert to go through any plant and put every single worker on a punch card like those used by the Census so that an immediate count can be made by machine of all types of workers in demand.

But most important of the Dictionary's functions is as a tool for the intelligent transfer of a worker in one industry to another job for which his experience fits him.

The hot-stuff man may not find any job of that name in the airplane industry or the machine shop, but his experi-

ence in skilful work with scorching hot metal pans would be very useful in a large number of occupations.

The Dictionary describes each job and codes it. Thousands of the cards punched by this code and representing all America's great behind-the-lines army of industrial workers can be speeded through a mechanical sorting machine. This will sort out all the workers who, like the hot-stuff man, have worked with hot metal. And this sorting can be used in many other ways—to pick out all who have worked on electrical wiring, or internal combustion motors, or with blueprints.

Thus the hot-stuff man is released from the confines of the bakery to serve wherever need is greatest.

Vital to any sort of selective training and service plan, either compulsory or voluntary, is knowledge of what it takes to do these many jobs essential to defense and who is qualified to learn that sort of work.

An important attack on the first essential—job analyses—has already been launched by Uncle Sam's employment service. Not interested in motion studies or "efficiency," these experts have obtained the cooperation of industry and labor, have gone into plants and shops, talked with workers, and watched them at work. They have found out just what a worker does, what tools he must handle, what conditions he must work under, what sort of promotion he is fitting himself for.

Ten Industries Studied

Such intimate studies of men on the job have been completed now for ten industries. They are: Cleaning, dyeing and pressing, construction, hotels and restaurants, job foundries, job machine shops, laundry, lumber and lumber products, retail trade, cotton textiles, and automobiles. Detailed job descriptions for the thousands of different jobs in these industries have been published and will be invaluable in putting any selective training system into action.

A glance at one of these job descriptions will give you an idea of how it would work. You may think of the hotel and restaurant industry as employing mainly maids and waitresses. But somewhere in the background there is also an electrician.

The hotel electrician, according to Uncle Sam's experts:

"Tests, repairs, and maintains in good condition electrical equipment, fixtures and appliances, refrigerating and air conditioning systems, elevators, and fire alarm, light, service, and power systems; installs conduits for new wiring; may maintain the internal telephone system; makes written or oral reports to management on trouble calls received and their disposition. Worker must be a qualified journeyman (licensed) inside wireman, having sufficient experience and knowledge to locate electrical troubles quickly and to perform all classes of inside electrical work in accordance with municipal regulations and code requirements."

That is the job summary. The description goes on to list the equipment and material with which he works from voltmeters to generator brushes; the hazards of his job, from electric shocks to falls from ladders, the relation of his job to others in the industry; and the qualifications necessary before he could be employed.

It is easy to see how important all this sort of information is to an agency mobilizing workers for defense who might need this electrician badly but who might otherwise never think of looking for him in the hotel business.

In the kitchen, the jobs run the gamut from executive chef to pot washer. The pot washer and vegetable man hold beginners' jobs and need no previous experience. But they must be able to work in a hot room, humid from escaping steam. They must know how to avoid the hazards of scalding water and steam. These abilities would be useful in many other places.

When the doughboy of 1918 was called up to serve his country, his particular niche in the Army was based partly on answers to the famous oral trade tests.

The young American who wants to serve the nation in defense in 1940 may be asked some of those very same questions.

America's new streamlined "Trade Questions," developed by Uncle Sam's employment service, include some of those same questions which served their purpose so excellently 22 years ago.

But they include many new queries based on occupations and processes not even known two decades ago. They are described in a new book, *Occupational Counseling Techniques*, by Dr. William H. Stead, Dr. Carroll L. Shartle and their associates at the Employment Service.

They are not arm-chair questions thought up by some theorist who never looked at the job. As the job analyst of the employment service went through plants and watched men at work, they assembled bit by bit information from which the questions could be formed. It was the exclusive, intimate sort of "inside dope" about a job that you cannot

(*Turn to Page 122*)

MANIPULATION TEST

Mrs. R. B. Robinson is taking a test given to applicants for jobs who apply at many of the Government's Employment Offices. This test is designed to test the hand dexterity of the applicant. It is known as the manipulation test.

QUALIFYING FOR JOBS

This group is taking a clerical test at the D. C. Employment Center in Washington, D. C. Tremendous amounts of "paper-work" in all industrial programs require whole armies of trained white-collar workers.

From Page 119

obtain from reading. It comes from first-hand contact.

Then when the questions had been framed, they were studied by skilled workmen and foremen who criticized them and made suggestions. Other workmen answered the questions. In this last group were men with different degrees of skill from expert to apprentice. Even workers in a different but related occupation were represented. From this sieving were saved the questions which were judged to be fair and revealing and which served to differentiate clearly the skilled workers from those unacquainted with the job.

One sort of question requires a definition, but is informally worded as a workman himself might put the question: "What do you mean by building up a lead (pronounced leed)?" The bricklayer who knows his mortar will not think that this has something to do with publicity for a movie star; he will know that it means building up a section of wall. The carpenter will know that a "shore" refers to an upright brace, not to a place to go swimming.

Another type of question asks for most common methods or the best, largest, most, least, heaviest in a process. The machinist, for example, should know, when using a straddle mill cutter, what is the smallest number of cuts necessary to mill a six-sided nut.

Questions also deal with use, procedures (what do you do to ——?), location, names, purposes (of tools, machines) numbers (how many? how often?). Thus an air-compressor operator must know what to use to clean the regulator. The bricklayer must be able to tell what you do to the outside of a manhole. The asbestos worker must be able to locate where the seam is run in stitching canvas covering over pipes. The blade-grader operator should know what you call the part of the roadway extending from the edge of the pavement to the inside of the ditch. The machinist must know why you do not give the tool a rake in turning brass. And the machinist must know the number of jaws in a universal chuck.

These questions are aimed to measure only the sort of information a man picks up at work on his job. They have nothing to do with his general intelligence. They are not a direct measure of his skill. And they would be useless to show whether an untrained boy has the ability to learn a particular job.

Tests for these skills and aptitudes, however, have been developed and may be used in selection in connection with the defense program. Aptitude tests are ready for 50 occupations—tests of skills for six.

Science News Letter, August 24, 1940

Boulder Dam expects more than a half-million *visitors* this year.

ARCHAEOLOGY—CHEMISTRY

Photochemistry Restores Beautiful Ancient Gloss

See Front Cover

A GLOSSY finish that was the pride of Persian craftsmen 2,500 years ago has been applied to a plaster cast of an ancient lion's head sculpture by a few minutes of photographic "developing" at the University of Chicago. The process was used by Herbert P. Burtch of the University's famous Oriental Institute.

The Institute received from its Persepolis expedition fragmentary stone scraps of lions' heads. Pieced together, the fragments formed a magnificent snarling head in a plaster cast, the archaeologists found, but the cast was a dull, light color, instead of the original shining black of the effigy in ancient Persia.

Confronted with the problem of restoring the original gleam to the head, Mr. Burtch, after some experiments, hit upon the photographic process. The plaster cast was treated with silver nitrate, applied with a brush. Then it was "exposed" like a photographic plate or film, under a strong, even light.

The "bathing" process presented a difficulty, since the surface could not be touched without spoiling the appearance, but it was necessary to slosh the cast in water. A set of clamps and a metal standard provided the necessary purchase, but it took two men to "bathe" the head.

Application of developer with a brush was a final step, and the result was a hard, glossy black, as pleasing as the stone original seen by the Persians two and one-half millenniums ago.

Science News Letter, August 24, 1940