Training Within Industry in the United States

by

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The practice of training workers systematically while they are at work in the factory was developed and expanded considerably during the war, and the possibility of further developing such training is arousing a great deal of interest. A description of the programme and administrative operation of the United States Training Within Industry scheme was included in the report on vocational training[1] prepared for the Conference of American States Members of the International Labour Organisation at Mexico City in April 1946. The Conference adopted a resolution expressing the desirability of promoting the organisation of training-within-industry programmes, "with the co-operation and participation of the workers' representatives in the undertaking or of the trade unions concerned", and requested the Governing Body of the International Labour Office to consider the possibility of placing the question of "training within industry" on the agenda of an early session of the International Labour Conference. The author of the following article was Director of the United States Training Within Industry Service during the war, and was vice-chairman of the committee to which the Mexico Conference referred questions on vocational training.

WE learned a great deal in wartime which we can and must carry over to peacetime in that field of industrial activity, which, for lack of a better name, is called "training". This discussion of "training" is based on a concept of training as "a way used by the plant management to solve a specific production problem which

[1] Third Conference of American States Members of the International Labour Organisation, Mexico City, Apr. 1946, Report III: *Vocational Training*, I.L.O. (Montreal, 1946).

involves people". Such a definition should clearly distinguish "training" from "education", since "education" means to most people anything and everything from developing a background of information to acquiring a specific trade skill which helps an individual to meet the requirements of society. Education has to do with knowledge and understanding, whereas training as discussed here is directed action in the use of knowledge. Industry has the opportunity now to build a bridge from knowledge to action, to put knowledge to use in the shortest possible time.

The Necessity for Training

Training is not a departmental activity. It is not an employee benefit, nor is it something to be left to the ambition of individual employees. Rather it is a management tool whereby specific people are given help in acquiring definite skill in overcoming underlying causes of problems that currently exist or that are anticipated by management. Training is not something that is done once to new employees — it is used continuously in every well-run establishment. Every time you get someone to do work the way you want it done, you are training. Every time you give directions or discuss a procedure, you are training. Therefore, training is not something which, though desperately needed when industry was expanding to meet war orders, can be forgotten now that plants are shrinking in size and going back to civilian work and the latest labour recruits are being replaced by employees home from the wars. In many cases, especially where a change-over in products or in processes is involved, it will be just as essential to successful operation as it was with new employees in wartime.

During wartime, plants needed to use training in order to supply the needs of the armed forces. Now, plants must use training if they are going to survive in competitive situations and if they are going to keep on providing jobs and wages for workers.

The Development of a Specific Training Plan

The Responsibility for Training

Responsibility for training cannot be shunted off on a training man with a direction to go ahead or do what he pleases as long as he does not bother line supervision. Training, to be effective, must be accepted by the management as an integral part of production procedure, and the line supervision in the plant must be responsible for training the men they supervise. The line organisation itself must name its problems, must dig into the reasons why they exist, must help to work out what would bring about an improvement

and specify the needed knowledge or skill, must actively take part in the operation of the training, and must evaluate the results.

However, in any plant (size will determine whether this is a part-time job or a job requiring one or several persons), there should be staff assignment of responsibility for analysing production problems, and supplying technical help in methods of instruction. This is the training man's function.

Discovering the Kind of Training Necessary

The training director must know which people require training, and of what kind. He must find out what serious problems face management, supervisors and workers, and what failures occur in specific departments. Many problems are uncovered by reviewing records — performance, cost, turnover, rejects, accidents. Some coming problems can be foreseen by considering the effect of future changes in product, in organisation, or in policies. Serious problems exist in any plant — variation comes in the number and degree. Some plants are perpetually trying to get up to a standard, to stop losing money; others are trying to improve their own standards and to increase their profits. In any of these circumstances, production, office or sales problems exist — perhaps all three. Production problems are not discovered by someone who sits at a desk. The person responsible for training has to get out in the plant and work with operating supervisors to find the problems which are solvable through training.

When the underlying causes of a problem have been discovered, the contributing factors towards failure can be ascertained, and appropriate training given where it is necessary. A realistic plan of training can thus be drawn up.

This kind of analysis was applied in one plant which was looking for a way to improve its record of only 80 per cent. productive use of total capacity. In the plant in question, there were 1,000 jobs, of which 950 were filled, but there were never more than 900 men at work on any day. It was found that there was 15 per cent. absenteeism among the men of less than three months' service, and a 30 per cent. turnover in the third shift among men who had less than six months' service. It was further found that ten months were needed on the average at the plant to earn the guaranteed piece rate. The remedy for the last item lay obviously in training the supervisors to instruct, and the workers to do their jobs; other kinds of training however were necessary to remedy the evident dissatisfaction shown in the large turnover and absenteeism. The following is a selection from the plant's findings:

PRODUCTION PROBLEM: PRODUCTION 80 PER CENT. OF STANDARD

Reasons for leaving	Training needed — for whom?	In what?
Poor transportation, third shift	Supervisors	Organisation of driving clubs
Didn't think post-war prospects good	Supervisors	How to "sell the future"
	Workers	Conversion, expansion plans
Thought work dangerous	Supervisors	Safe practices
	Workers	Safe practices
Didn't like pay	Workers	How pay is calculated
Reasons for absenteeism		
Looking for other jobs	Workers	Importance of jobs and prospects
Didn't think work important	Workers	Importance of jobs and prospects

From just this section of this plant's analysis of its problems it is readily seen that several very definite kinds of training are actually needed.

Planning the Programme

Analysis of a production problem points to the areas where training is needed, and roughly names the training, but the detailed work of planning the training remains to be done. Only one kind of training, for just one specific group of supervisors or workers, can be planned at a time.

"Content", or what the group (or an individual) is to learn or become able to do, is listed first. The person who is planning the training may well need help in planning content, particularly if the field is specialised or technical. For each item of content, the method of instruction must be considered. If a man is to learn to do something with his hands, there is no substitute for practice, but much time can be saved by following a planned schedule and by having the skilled man who is doing the instructing also skilled in the technique of instruction. If the objective is to get a group of supervisors to understand and accept a new policy, it is wise to consider giving a real explanation and having full and free discussion, so that questions can be raised and answered technically and the answers accepted officially.

The person who will do the training is very important. A selection must be made, considering both knowledge of the content and ability to impart that knowledge to others. He may need help in both. The time — both how long the training takes and when

it will be scheduled — has to be considered in relation to the importance of the problem and the present production schedule of the plant.

When training is planned, the place for the training has to be considered. The people and the machines will have to be brought together. If supervisors are going to be given explanations of an organisation, change, a quiet room with a conference table and a blackboard are needed. Circular announcements, which may give the facts without ensuring understanding, are unsatisfactory.

In planning the training which the plant needs, it is only good business to consider any available public facilities. If new people are to be hired, the possibilities of pre-employment training in schools should be considered. Likewise people now on the payroll might be much more useful if they were given assistance through supplementary training either inside or outside the plant.

Training Action

After someone has analysed a problem, and made plans to meet it through training, there still has to be action taken to overcome the conditions which cause management to say a problem exists. The plan must be accepted and sponsored by management, and acted on by the workers.

One of the difficulties with the training function in most companies is that training men and management alike take a superficial view. Influencing the way men conduct their daily jobs is, in actual fact, one of the most difficult undertakings in the whole field of industrial management. Any training man who wants to measure up to the size of the job that he holds should start by recognising with great confidence yet with proper humility that the job is big and is difficult, and that he can only hope to get it done through the line organisation. An "expert on training" cannot do it all himself. He can only win acceptance as a helper. In short a training director has two big jobs aside from giving technical direction to training, namely, (1) to keep himself from doing all the training, and (2) to get the line organisation to do it or to use it.

Checking the Results of Training

A company may take various means to see that the supervisors and the workers who have been instructed — either in group sessions or through personal instruction — use what they have learned. Naturally the only persons who can insist on use and build real values are those in the line organisation. However, a staff person usually has an important place in helping the plant to get results.

Such a staff person gets his management to remind the line organisation from time to time that continuing results are expected. He also provides technical assistance to the line organisation on exactly how to use the knowledge acquired through training. Analysis of a production problem in many instances has given a factual basis against which the training can be measured.

Often people are thought to be trained when they have been given certain information. The *use* of knowledge constitutes training. There must be evidence that the employee really possesses the knowledge and has skill in its use.

The Plant's Overall Training Programme

When this problem-solving technique is used, various training needs emerge, several perhaps coming from every problem. Within the limits of facilities and time available, several kinds of training (especially if they meet recurring needs of different groups) can be operated at the same time. In this way the quality of workers and supervisors can be improved in the specific fields where the plant needs better performance, apprentices can be prepared, staff men can be trained to give better service, and leaders can be developed.

The analytical approach, amounts to this: "Do no training unless you have to, and then do only what must be done to aid production". It will cut the waste of interesting but aimless and time-consuming programmes and stimulate real training — the kind that helps the plant to get out greater quantities of higher quality products at lower cost, and in a way that both supervisors and workers like. Obviously this does not rule out some long-range plans that build better morale and understanding.

The T.W.I. Approach in the United States[1]

Training Within Industry was an emergency service to the nation's war contractors and essential production. Its staff was drawn from industry to give assistance to industry, and its official war history covers the time from the Fall of France to the end of World War II — from the summer of 1940 to the autumn of 1945. T.W.I.'s objectives were to help contractors to get out better war production faster, so that the war might be shortened, and to help industry to lower the cost of war materials.

There is nothing new about T.W.I. programmes — they are built on accepted principles. The only new thing is that something was done about getting them used. T.W.I. soon learned that the

[1] This part of the article is drawn from *The Training Within Industry Report, 1940-1945* (Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 1945).

establishment of principles alone has practically no value in increasing production. To know what to do is not enough. It is only when people are drilled in how to do it that action results. Industry's own men collected, standardised, streamlined and developed techniques for industry itself to use, on a volunteer basis. The four programmes, job instruction, job methods, job relations and programme development, are methods of group instruction whereby plant people learn through practice on their own current problems to use these specific four-step methods, so simple that each is printed on a pocket card. These methods resulted in 1,750,650 certifications of supervisors in 16,511 plants and unions during the war.

How T.W.I. Has Worked

Training Within Industry has done three things: given advice and information, trained industrial people to handle their own problems, and solved problems for plants.

T.W.I.'s first year was largely spent on the "advice and information" level. It was hoped that an "eye opening" job would be enough. During that first year, T.W.I. people went into plants, made surveys to spot training needs, and mapped training programmes. But the bulk of T.W.I.'s work was in its assigned field of service — "training industrial people to handle their own production problems through training". People have to learn to do jobs. They can learn by being trained or they can learn through mistakes. One can repair machines, repeat work, pay the accident costs, or one can train people to do work correctly. In wartime, wasteful practice was against national interest. In peacetime, competition takes care of poor business management.

T.W.I. trained management in what training is, and what it can do for the plant; it trained line executives and supervisors in the use of three supervisory problem-solving methods; and it trained staff men with functional responsibility for planning training in the use of a method for solving production problems through training.

The "Lens Grinder" Study.

During the very first week of T.W.I.'s existence the first assignment was received. All through the summer of 1940 there had been much discussion of shortages in particular lines of skilled work. One of the most serious shortages was in lens grinders and polishers for Government arsenals and navy yards. This problem was presented to the T.W.I. directors and on 28 August 1940 they called a conference on lens grinding and precision instruments.

The original problem in the lens-grinding field was to assist

Government arsenals and navy yards to get 350 properly qualified lens grinders. It was considered that a qualified learner did well to master the art in five years. Upon studying the problem, it was found that twenty jobs are really included in lens grinding. It had been assumed that a lens grinder must be able to perform all twenty jobs. In the emergency, the specific solution recommended was to upgrade workers then employed on precision optical work to the most highly skilled jobs, and to break in new people on just one of the simplest jobs. This required production specifications and intensive training.

One kind of work was found to include fourteen operations. Each of these fourteen operations was isolated by an experienced worker and made full-time work since the volume of production warranted it. Much of this supposedly difficult work was relatively simple and easy. A few critical points determined whether the whole operation was successful. Furthermore, it was possible to isolate these critical points, which were the keys to good work and good lenses, and were soon referred to as "key points". Thus was born a phrase and a conception that some months later was to form the cornerstone of a nation-wide production training effort.

The Instruction Process.

Careful thought was also given to the process of instruction itself by which a lens-grinding operation, with its key points, could be taught to a learner. Based on the instruction steps developed by C. R. Allen in World War I, the following method was recommended by T.W.I.: (1) show him how to do it; (2) explain key points; (3) let him watch you do it again; (4) let him do the simple parts of the job; (5) help him do the whole job; (6) let him do the whole job — but watch him; (7) put him on his own.

In November 1940 these steps[1], along with the key points idea, were incorporated in a bulletin, *Helping the Experienced Worker to Break in a Man on a New Job*. T.W.I. thought that, by this demonstration, and by using the specific steps outlined in its instruction bulletin, a plant could break down its own skilled jobs. This stress on the value of key points and of taking small instruction steps one at a time, plus the outlining of a good method of instruction, were expected to equip plants to go ahead on their own.

It was soon learned that the statement of principles and the outlining of steps were not enough. Plants needed a complete programme defining exactly what to do, when, and how. The

[1] Later reduced to four steps as explained further on in this article.

T.W.I. supervisory programmes were therefore developed for groups of ten supervisors, who attended and participated in five two-hour sessions conducted by a specially prepared man called a trainer.

The Supervisory Programmes.

In any of the T.W.I. supervisory programmes the first session is very important. If the content of the ten-hour programme is analysed, the first session in job instruction or job methods or job relations would be called a demonstration of need, good and bad procedure, or simply "selling". The other four sessions are the real training sessions, where the supervisors learn by doing. This first session in any one of the programmes is designed to get conviction that (1) the supervisors' own habits are just about like everybody else's, (2) they are not particularly effective, and (3) there is a method which will get better results.

In order to get conviction on these three points, a standard device is used. The trainer illustrates what a supervisor does. This demonstration has to be something which makes supervisor after supervisor say or think, "I've done the same thing myself". But the demonstration has to end in poor results, so obvious that supervisor after supervisor will say, "That's not very smart". The stage is then ready for the trainer to demonstrate a method that will get improved results. The trainer has thus spent the first session getting the supervisors interested in learning the method before he tries actually to teach that method. Each supervisor then demonstrates his understanding of the particular method by presenting his use of it as a demonstration before the other nine members.

Reproduced below are the texts of the four pocket-cards giving the T.W.I. programmes. The aim of the first programme, *Job Instruction*, is instruction in how to teach a man a job; *Job Methods* gives training in the systematic examination of the existing method of doing a job, and finding improvements in it; *Job Relations* provides training for supervisors in handling men; *Program Development* is a five-day course devised for plant representatives who have the functional responsibilities of planning the training to meet their own organisation's production problems.

The "Five Needs" Concept.

T.W.I. drew up a statement about supervisory needs that proved very useful in outlining what T.W.I. was prepared to do, and making clear the fields in which the plant would have to develop its own programmes. It proved effective in discussing the

JOB INSTRUCTION CARD

HOW TO GET READY TO INSTRUCT

Have a Time Table —
how much skill you expect him to have, by what date.

Break Down the Job —
list important steps.
pick out the key points. (Safety is always a key point.)

Have Everything Ready —
the right equipment, materials, and supplies.

Have the Workplace Properly Arranged —
just as the worker will be expected to keep it.

Job Instruction Training

TRAINING WITHIN INDUSTRY
Bureau of Training
War Manpower Commission

KEEP THIS CARD HANDY

HOW TO INSTRUCT

Step 1 — Prepare the Worker
Put him at ease.
State the job and find out what he already knows about it.
Get him interested in learning job.
Place in correct position.

Step 2 — Present the Operation
Tell, show, and illustrate one IMPORTANT STEP at a time.
Stress each KEY POINT.
Instruct clearly, completely, and patiently, but no more than he can master.

Step 3 — Try Out Performance
Have him do the job—correct errors.
Have him explain each KEY POINT to you as he does the job again.
Make sure he understands.
Continue until YOU know HE knows.

Step 4 — Follow Up
Put him on his own. Designate to whom he goes for help.
Check frequently. Encourage questions.
Taper off extra coaching and close follow-up.

If Worker Hasn't Learned, the Instructor Hasn't Taught

JOB METHODS CARD

HOW TO IMPROVE
JOB METHODS

A practical plan to help you produce GREATER QUANTITIES of QUALITY PRODUCTS in LESS TIME, by making the best use of the **Manpower, Machines and Materials, now available.**

STEP I — BREAK DOWN the job.

1. List **all** details of the job **exactly** as done by the **Present Method.**
2. Be sure details **include all:**
   —Material Handling.
   —Machine Work.
   —Hand Work.

STEP II — QUESTION every detail.

1. Use these types of questions:
   WHY is it necessary?
   WHAT is its purpose?
   WHERE should it be done?
   WHEN should it be done?
   WHO is best qualified to do it?
   HOW is the "best way" to do it?
2. Also question the:
   Materials, Machines, Equipment, Tools, Product Design, Layout, Work-place, Safety, Housekeeping.

STEP III — DEVELOP the new method.

1. ELIMINATE **unnecessary** details.
2. COMBINE details when practical.
3. REARRANGE for better sequence.
4. SIMPLIFY all **necessary** details:
   To make the work easier and safer:
   —**Pre-position** materials, tools and equipment at the best places in the **proper work area.**
   —Use gravity-feed hoppers and **drop-delivery** chutes.
   —Let **both hands** do **useful** work.
   —Use **jigs** and **fixtures** instead of hands for holding work.
5. **Work out** your idea **with** others.
6. **Write up** your proposed **new method.**

STEP IV — APPLY the new method.

1. **Sell** your proposal to your "boss."
2. **Sell** the new method to the **operators.**
3. Get final approval of all concerned **on Safety, Quality, Quantity, Cost.**
4. Put the new method to work. Use it until a better way is developed.
5. Give **credit** where credit is due.

JOB RELATIONS

A SUPERVISOR GETS RESULTS THROUGH PEOPLE

Foundations for Good Relations

Let each worker know how he is getting along.

Figure out what you expect of him.
Point out ways to improve.

Give credit when due.

Look for *extra* or *unusual* performance.
Tell him while "it's hot."

Tell people in advance about changes that will affect them.

Tell them WHY if possible.
Get them to accept the change.

Make best use of each person's ability.

Look for ability not now being used.
Never stand in a man's way.

People Must Be Treated As Individuals

HOW TO HANDLE A PROBLEM

DETERMINE OBJECTIVE

1.—GET THE FACTS.
- Review the record.
- Find out what rules and plant customs apply.
- Talk with individuals concerned.
- Get opinions and feelings.

Be sure you have the whole story.

2.—WEIGH AND DECIDE.
- Fit the facts together.
- Consider their bearing on each other.
- What possible actions are there?
- Check practices and policies.
- Consider objective and effect on individual, group, and production.

Don't jump at conclusions.

3.—TAKE ACTION.
- Are you going to handle this yourself?
- Do you need help in handling?
- Should you refer this to your supervisor?
- Watch the timing of your action.

Don't pass the buck.

4.—CHECK RESULTS.
- How soon will you follow up?
- How often will you need to check?
- Watch for changes in output, attitudes, and relationships.

Did your action help production?

PROGRAM DEVELOPMENT CARD

PROGRAM DEVELOPMENT

How to Meet a Production Problem through Training

1. SPOT A PRODUCTION PROBLEM

- Get supervisors and workers to tell about their current problems.
- Uncover problems by reviewing records — performance, cost, turnover, rejects, accidents.
- Anticipate problems resulting from changes — organization, production, or policies.
- Analyse this evidence.
- Identify training needed.

Tackle One Specific Need at a Time.

2. DEVELOP A SPECIFIC PLAN

- Who will be trained?
- What content? Who can help determine?
- How can it be done best?
- Who should do the training?
- When should it be done — how long will it take?
- Where should it be done?

Watch for Relation of This Plan to Other Current Training Plans and Programs.

3. GET PLAN INTO ACTION

- Stress to management evidence of need — use facts and figures.
- Present the expected results.
- Discuss plan — content and methods.
- Submit timetable for plan.
- Train those who do the training.
- Secure understanding and acceptance by those affected.
- Fix responsibility for continuing use.

Be Sure Management Participates.

4. CHECK RESULTS

- How can results be checked?
- Against what evidence?
- What results will be looked for?
- Is management being informed — how?
- Is the plan being followed?
- How is it being kept in use?
- Are any changes necessary?

Is the Plan Helping Production?

Responsibility for Training Results

The LINE organization has the responsibility for making continuing use of the knowledge and skills acquired through training as a regular part of the operating job.

The STAFF provides plans and technical "know how", and does some things FOR but usually works THROUGH the line organization.

special needs of a plant, and made "our business is different" concepts clear in relation to basic needs of all supervisors. The statement, which has become part of T.W.I. thinking and publications, reads as follows:

EVERY SUPERVISOR HAS FIVE NEEDS

(1) Knowledge of the Work — materials, tools, processes, operations, products and how they are made and used.

(2) Knowledge of Responsibilities — policies, agreements, rules, regulations, schedules, interdepartmental relationships.

These two knowledge needs must be met currently and locally by each plant or company.

Such knowledge must be provided if each supervisor is to know his job and is to have a clear understanding of his authority and responsibilities as a part of management.

(3) Skill in Instructing — increasing production by helping supervisors to develop a well trained work force which will get into production quicker and have less scrap, rework and rejects, fewer accidents, and less tool and equipment damage.

(4) Skill in Improving Methods — utilising materials, machines, and manpower more effectively by making supervisors study each operation in order to eliminate, combine, rearrange, and simplify details of the job.

(5) Skill in Leading — increasing production by helping supervisors to improve their understanding of individuals, their ability to size up situations, and their ways of working with people.

These three skills must be acquired individually. Practice and experience in using them enable both new and experienced supervisors to recognise and solve daily problems promptly.

Training Within Industry assisted companies in giving their supervisors a start in acquiring these skills through the three ten-hour programmes in job instruction, job methods and job relations.

Getting the Support of Management.

The training man must convince management of the practical utility of planned training in the solution of management's most urgent problems. If executives are concerned about products that fail to pass inspection, about goods that customers are rejecting, a plan to improve quality interests them. If top management is interested in costs, a way to reduce costs gets attention. The active support of top management must be gained if a training plan is to be successful. Interest is not enough, acceptance is not enough. A genuinely good training programme means that line operating people have identified problems, have helped to plan the specific

content of the training programmes which will overcome the underlying causes of problems, and are ready to assist in the actual training. But passive acceptance by management, indifference at the middle levels — both of these can nullify thoroughly good planning of training.

It is necessary for the training man to do such good work that he is ready to promise results in tangible terms — money, quality, time, manpower — that he gets not merely support but a management demand that the plan be used and the expected results produced.

Coaching.

Training must be followed up by coaching. In the T.W.I. coaching procedure, again there was nothing new except putting action into accepted principles. In athletics, in music, in industrial sales training, coaching is normal. And, in industry, managers usually follow up and assist on many of their other operating procedures. Training is too rarely included.

In order to assist plants with the coaching, T.W.I. prepared a coaching guide for each of the "Job" programmes (issued in July 1944). The same five points of how to coach a supervisor appear in each one of these guides: (1) give reasons and advantages; (2) get understanding of the principles; (3) select a problem and work on it together; (4) ask him to work another problem alone; (5) give credit for good results and good effort.

In all the T.W.I. programmes the objective of the ten-hour sessions has been to impart a certain amount of basic instruction to all members of the group. Naturally people in the group will differ. Some really would need less than ten hours and some do not get a good picture by the end of the ten hours. Accordingly, T.W.I. has stressed with management, when a programme is first undertaken, the importance of providing on-the-job coaching. It is not possible to specify exactly what and how much will be done for any one supervisor, since that will be determined by his own individual needs and interests. Coaching starts at a different point for each supervisor.

T.W.I. has learned that the coaching method is always the same, although the degree varies widely. The first step is to find out whether the supervisor is using the method in which he has been instructed. This is discovered by asking him to demonstrate its use on a problem. Questions are then invited. He is given help where he needs it and where he wants it. This individualised approach to coaching on the job evolved after T.W.I. had experimented with many complicated group procedures.

Coaching is designed to increase skills. These skills are developed by solving one problem, then another, or by practising. The objective of a T.W.I. programme, and the objective of coaching, is not to solve a problem, but to develop ability to solve any problems that arise. Coaching is something which is done frequently, for an indefinite time, in the plant, in the line, on the job.

T.W.I. and Organised Labour

T.W.I. worked with representatives of organised labour from the beginning. There was at all times on the paid headquarters staff at least one man chosen because of his background in organised labour. T.W.I. always had labour advisers as well as management advisers and technical consultants, both at headquarters and in the districts.

In September 1940, when T.W.I. was barely a month old, *Business Week*[1] gave an account of the "labour section of the Defense Commission", and predicted that intensive job specialisation would replace "hectic competition for craftsmen". This article also talked of T.W.I.'s upgrading policy as a "fair shake" for unions.

When a job instruction or job methods programme was started in a plant, the union which had a contract in the plant was informed in order to avoid any misunderstanding. Before the job methods programme was released for national use, it was discussed and previewed by national union leaders in order to prevent any feeling that it was "efficiency engineering" or a "speed-up". The use of Training Within Industry's job relations programme by union stewards, and later the development of a special version, called *Union Job Relations*, was a natural development. Some unions, wished to carry on the programme as part of their own operations, felt that acceptance would be improved if all references to supervision and management were removed. Accordingly, T.W.I.'s development group, aided by additional labour consultants, began trials of an all-union version. The union job relations programme was made available in early 1945. Like the supervisory programme from which it grew, it is a ten-hour programme for groups of ten stewards. It is exactly the same as the standard job relations programme in its structure and principles.

Results

T.W.I. programmes were well received. T.W.I. headquarters, for a year and a half after the national launching of the scheme,

[1] *Business Week*, 21 Sept. 1940, p. 55.

was satisfied with getting the voluntary approval of managers. Little effort was made to get from plants any specific information on production results. For one thing, T.W.I. did not want to seem to pry into company affairs.

In May 1943, the House of Representatives Appropriations Committee asked T.W.I. to state its net results in overall increases in production, reduction of scrap, and other savings. It was not possible then (or now) to get total figures, but some figures on results in individual plants were available. More than 600 voluntary plant statements were used to make up the first summary. In each, the percentage of change (whether an increase in production or a reduction of scrap) was calculated, and these percentages were tabulated in four groups — those under 25 per cent., between 25 and 49 per cent., between 50 per cent. and 74 per cent., and those of 75 per cent. and over. The table reproduced below gives the percentage of plants that reported improvements of 25 per cent. or more.

PERCENTAGE OF PLANTS REPORTING IMPROVEMENTS OF 25 PER CENT. AND OVER

Kind of improvement	May 1943	Sept. 1943	Feb. 1944	Nov. 1944	April 1945	July 1945	Sept. 1945
Production increased	37	30	62	76	64	63	86
Training time reduced	48	69	79	92	96	95	100
Manpower saved	11	39	47	73	84	74	88
Scrap loss reduced	11	11	53	20	61	66	55
Grievances reduced	(Not reported)		55	65	96	100	100

This, of course, does not give any picture of the individual results from which the summary was made, of the occasional production increases which ran over 500 per cent., of training time reduced by 90 per cent., or the virtual elimination of grievances. It does show what percentage of the results were in what T.W.I. felt is a "more-than-your-money's-worth" classification. Money savings and time savings could not be tabulated, but they have perhaps been of even greater importance to plants, the Government, and to taxpayers.

In addition to the provision of the programmes to industrial supervisors, the T.W.I. programmes were made available to the U.S. Army Service Forces (325,000 certifications), to the Civil

Service Commission (113,000 certifications), and to other U.S. Government groups (35,000 certifications).

Adaptations of the T.W.I. Programmes.

The T.W.I. programmes have been used in a wide variety of situations. Sometimes this has meant an adaptation of the programme, sometimes only the materials used by group members needed change, and often it was found that the standard programme really was appropriate.

At first T.W.I. complied with requests for adaptations and developed detailed variations for offices, hospitals, housing projects and agriculture. As requests from additional fields came in, T.W.I. made a number of field enquiries with the result that there are now two adaptations of the job instruction programme only, for offices and hospitals. These are simple reminders to the trainer that, instead of saying "bench", it is more reasonable to say "desk" in an office group and "table" in a hospital group. Examples are given of breakdowns and timetables in offices and hospitals. It is found that this natural transposition is all that is necessary.

The hospital adaptation of the job instruction programme has resulted in the extension of all the T.W.I. programmes to many hospitals. Early endorsement by the Mayo Clinic was very helpful. At the request of the University of Minnesota, assistance was given to those who were carrying on the training in the Kenney treatment of infantile paralysis. The National Red Cross was given special assistance in streamlining their Home Nursing programme by use of breakdowns and individual practice. Many T.W.I. staff members have in their own time made T.W.I. techniques available to important groups which were not eligible for war training. Great interest in job methods was generated in libraries. Job instruction has been used at the Maryland Workshop for the Blind, and the card has been reproduced in Braille. Job instruction has also been used for deaf mutes. The United States Department of Agriculture, through its extension service, has promoted the use of the T.W.I. programmes. The T.W.I. instruction methods have been made available through the State Extension Services also. County agricultural and county home demonstration agents have been active. The use by housewives of the job methods programme in particular has received considerable newspaper publicity in the New York and New Jersey areas. The United States Office of Education through its business education service has provided an adaptation called "How to Teach an Employee" and a programme called "Human Relations Training" which was

adapted from the T.W.I. job relations programme. Those Office of Education programmes are in the retail merchandising field.

Use in Foreign Countries.

In Canada the job instruction programme was introduced in Defence Industries Limited, and the manual was introduced in both English and French. Later both job methods and job relations programmes were also adopted by the Department of Labour.

In February 1944 the British Ministry of Labour sent a representative to T.W.I. Headquarters for six months to learn the T.W.I. programmes. During the first year after his return to England he launched job instruction, job methods and job relations training in some of England's most important industries.

The job instruction programme has been started in Saudi Arabia through the Arabian-American Oil Company, and the Bechtel, McCone and Parsons project. In addition to this Arabic version, Standard Oil has also been responsible for the introduction of *Job Instruction* in Spanish in South America. Spanish versions have also been put out in Mexico, being made available to the Cananea Copper Company.

Job instruction materials have also been transmitted to representatives of Australia, the Netherlands, New Zealand, Norway, Poland, Sweden, the Union of South Africa and Venezuela. Training bulletins were made available to Brazil, Cuba, India, Mexico, Puerto Rico and the Soviet Union.

Fundamental Principles of the T.W.I. Approach

The wide use of the T.W.I. programmes has been possible only because of the way in which they were developed. No T.W.I. programme was drawn up on theory only. All grew from demands for assistance on definite common needs; all went through many try-outs with groups of supervisors in plants. These programmes for industry came from industry — the experience of many people in many plants was pooled, individual approaches were merged. The nation's war plants provided both the materials and the proving ground. No one person was individually responsible — it was group work, on a large scale.

A common thread runs through all the T.W.I. programmes. Many points were determined in advance, others "happened" once and proved so successful that they were made "musts". Experience led to the adoption of the following principles:

(1) It is necessary to have a specific method or pattern which

the plant must use factors in solving his own problems. The method must be simple, and it must be briefly stated. Each of the four T.W.I. programmes has a four-step method.

(2) The method is to be applied as a production tool. Therefore, it should be stated in shop terms, not in academic language.

(3) Technical perfection alone is not enough. There must be something in the programme which gets acceptance and use. Advertising men talk about "believability". Training designers have to watch for "believability", acceptability, and usability.

(4) In order that members of training groups can "learn by doing", groups must be kept small enough to permit time for guided, individual practice of the method on their own everyday problems. There is no substitute for practice.

(5) There must be a definite outline of exactly what will be covered, how much time will be given to each point, and how it will be done in order that there may be a recognised universal standard for the training sessions.

(6) Ten hours of content is best put across in five two-hour meetings. A two-hour session does not need to be interrupted by an intermission. Time spent in opening and closing the meeting is no greater for a two-hour session than for a one-hour meeting.

(7) Five meetings should be spread over no longer an interval than two weeks. When new material is being learned, progress in acquiring skill is most rapid when the subject is fresh. Compact scheduling means that operating people are not tied up over long periods.

(8) Since training is an operating tool, it is wasteful to conduct it on a voluntary basis. Management must select the supervisors who are to be trained. Since training is a technique which is designed to improve production, training should be conducted in company time at company expense.

(9) When a programme is being operated nationally, quality control is necessary so that there can be a guaranteed quality standard, nation-wide, and so that poor local results will not have an unfavourable reaction on the national programme.

(10) The trainer who puts on each of these T.W.I. ten-hour programmes has been prepared in a two-weeks course (one week spent in group work, and one week of practice under observation and coaching). In order to make economical use of T.W.I. staff time it was specified that no prospective trainer would be admitted to a course unless he were going to conduct at least five supervisory groups. It was also required that the trainer should conduct at least one group in every ninety-day period in order to remain qualified for active service.

The use of the word "job" in the names of the T.W.I. programmes was not just an accident. Before any of these programmes was developed, it was determined that whatever was done would have to be both fundamental and simple. It would have to be something that was a part of everyday work for everyday supervisors. It must be on the job level. This was a very important factor in determining the content of the programmes and outlining the whole approach. For that reason, each of the programmes carried the word "job" in its name as a promise to plants and a reminder to training people of this down-to-earth philosphy.

In all four T.W.I. methods, fact-finding and an analysis of the facts are basic. This means the making of a job breakdown and training timetable in job instruction, the listing and questioning of details in job methods, the getting of facts and feelings and weighing them in job relations, the location of underlying causes of production problems and analysis for training needs in programme development. In all four programmes, action (instruction, improvement, handling a problem involving a worker, providing necessary training) must be taken, and the results checked. Management must participate, and all programmes must be applied in a way which gives consideration to the individual people involved.

Much technical advance has been made as the result of research in the laboratory. There, scientific problems are isolated and tackled, and solutions are sought. New knowledge and new methods evolve. In the field of human relations, the workplace is the laboratory. When people work together, the inter-relationships of job and supervisor and worker introduce many variables. The environment and atmosphere of the working conditions cannot be transplanted for experimental purposes. Change one condition and a whole situation is affected. This means that future progress will depend upon the willingness of industry to carry on development work under its own auspices, and also to share the results with other plants. The experimenting must be done where the work is done.

There must be, within industry, people interested in such development work and competent to carry it on to meet new needs of workers, of management, and of industry. These people inevitably can do much to increase the effectiveness of industry in making its maximum contribution as a vital social institution in a democratic world.