NATIONAL COLLEGE FOR HEATING, VENTILATING, REFRIGERATION AND FAN ENGINEERING

UNDER the auspices of the National College, a tour of Switzerland was made recently by a party of lecturers, students and others.

At the Federal Institute of Technology, Zurich, three interesting lectures were given. The first, on panel warming, was given by Dr. Brown, of Sulzer Brothers. The second was on automatic controls, by Herr Spau, of Sauer Brothers. The party visited a local hospital where a new wing, including a panel warming scheme, was under construction. The coils were laid and graded ready for pouring the concrete, so the visit was most opportune.

Herr Üllen, who, as assistant to Professor Bauer, is in charge of the district-heating scheme which is supplied from the Institute and includes a large number of important buildings within a square mile around the Institute, gave a comprehensive lecture on the district-heating scheme, including full particulars of the heat pump which supplies part of the heating load. The remainder of the load is supplied by oil-fired and electrode boilers. This lecture was followed by a visit to the plant and control rooms.

Later Dr. Brown gave another lecture on such subjects as panel heating, ventilating and drying, waste heat regeneration and thermal-electric power stations with comparisons of steam and gas turbines.

A visit was paid to Baren office block, Jelmoli warehouse and the local swimming baths. The last-mentioned presented a unique problem in that three of its walls and the greater part of the roof were of glass—and almost every other surface was used for panel heating! In this case a heat pump was used, again the source of heat.

Then the party visited the Kegerebraus which houses, among other interesting items, the much-discussed Lébre air-type heat pump. The students showed so much interest in this plant that the engineer went to great trouble to run the plant, illustrated the defrosting cycle and generally to dissemble anything in which they showed an interest.

At St. Gallen they visited the Perosa hosiery factory, which has an interesting air conditioning plant, and at Winterthur they visited Sulzer Brothers and had a lecture with lantern slides and an extensive tour of both of their factories.

Back at Zurich they visited a window manufacturer.

This factory had an extremely well-laid-out extract system for the sawdust and wood chips. One of many items of interest here was the method by which a moving machine was connected to the extract system by an ingenious “sleeve and toggle” arrangement of duct work. The party also visited the Stadthaus to see a large heat-pump installation, the evaporator of which was inserted directly into the river.

The fan engineers expressed a desire to see the Escher Wyss factory, so a visit was arranged and proved very interesting. They saw turbines of all sorts, pelton wheels cast in one piece and a seven-stage axial-flow compressor designed to handle 40,000 c.f.m. against two atmospheres of pressure. This job was of special interest in that it was capable of varying pitch at each stage.

At Baden they visited Messrs. Brown Boveri. This was another place where a few days would not have been too long. Heat pumps, compressors,

The general impression gathered throughout the trip was that the standard of engineering in Switzerland is very high indeed. One is constantly aware of craftsmanship and a certain feeling of “pride in the job.” Every boiler house and plant room looked as though it had been newly scrubbed and painted, in spite of the fact that Switzerland had a shortage of labour. They do, however, appear to be weak in air conditioning and ventilation. Time and again the students expressed disappointment in the general design of these systems. For the heating and heat-pump installations, however, they had nothing but praise.

Throughout the trip the students conducted themselves admirably. They showed a keen interest in all that they saw, asked intelligent questions and generally created a good impression.

The party included: Lecturers,—Mr. D. G. Lewis, Mr. H. Bell and Mr. B. Lawrence.

Education Board for the Heating and Ventilating Industry
COMPETITION IN DESIGN, 1949

The Education Board for the Heating and Ventilating Industry has arranged a competition in Heating and Ventilating Design open to all students attending the full-time courses at the National College for Heating, Ventilating, Refrigeration and Fan Engineering during the session 1948–49. The following are the conditions:

1. Competitors will be provided with plans and will be required to:
   (a) Design and size a low-pressure hot-water heating installation and domestic hot-water supply.
   (b) Design and size a ventilating system.
2. A prize of £10 10s. will be awarded to the competitor who, in the opinion of the adjudicators, submits the best designs.
3. The designs and calculations are to be completed and sent to the Secretary of the Education Board so as to reach him not later than July 1st, 1949.
4. Entry forms for the competition may be obtained from the Secretary and are to be completed and returned to him by April 30th, 1949.
5. All entries, when submitted, must be accompanied by a statement that the work is the unaided effort of the competitor.
7. All designs submitted in connection with this competition will become the property of the Education Board.
8. Plans and details of the requirement will be sent to all competitors as soon after April 30th as possible.

NEW AGENTS.—Paramount Alloys, Ltd., Slough, Bucks, have appointed Padley & Venables, Ltd., Super Works, Livery Street, Birmingham, 3, their agents for stainless steel castings in the Birmingham area.

LEAD SHEET AND PIPE “PLENTIFUL.”—The Lead Industries Development Council announces that lead sheet and pipe are now in plentiful supply at reduced prices, and there are no restrictions on their supply. Commenting on the recent Ministry of Supply decision to reduce the price of virgin pig lead to £100 per ton, the association states that after a long rise in world prices, virgin pig lead has fallen from its peak, and the Claus price is now approximately the equivalent of £99 per ton. In Britain since 1939, when lead was £14 12s. 6d. per ton, prices went up swiftly and reached £90 per ton on September 1st, 1948, £110 on October 1st, and reached £100 on January 1st, 1949, when the Ministry of Supply fixed the price at £123 per ton. The fall in price is attributed to increased production but to reduced consumption caused by high prices.

SUMMARIES OF GERMAN REPORTS.—Listed below are some summaries of reports on German water and industrial techniques considered unsuitable for publication and which may be inspected at the Technical Information & Documents Unit, 40, Cadogan Square, S.W.1, quoting the appropriate F.D. reference numbers:
- F.D. 3681 49.—Mechanical Pumps and Function of the “Pausent” Rotating Sprayer for Biological Pesticides of Water (T.O.R. 74 (Netherlands Mission)).
- F.D. 3683 49.—Visit to Opal Factories at Randhawa (F.I.A.T. 1460).
Technical Education in the Heating and Ventilating Industry
With Special Reference to the National College*

By DOUGLAS H. INGALL, D.SC., F.R.I.C., F.INST.P., HON.M.I.E.E.

TECHNICAL education is both fascinating and fearsome. This is inevitable as, in common with other branches of education, it deals with people and, in particular, mostly with young people at that crucial stage in their lives when they have left school and are trying, often with considerable apprehension, to adapt themselves to an entirely new environment known generally as "Industry."

In these formative years technical education can play a most important and even vital part in determining the future status and happiness of each young person in industry.

Organisation

Lack of space precludes a detailed survey of the development of facilities for technical education in heating and ventilating engineering, and in any case it is probably fairly well known. In general, it is sufficient to state that there is no other industry which, as a whole, has had greater foresight and has taken more comprehensive steps to make adequate provision for such excellent facilities.

There are, of course, three major organisations within the industry as follows:

Institution of Heating and Ventilating Engineers.

The Association of Heating, Ventilating and Domestic Engineering Employers.

The National Union of Operative, Heating and Domestic Engineers and General Metal Workers.

The employers' association, in conjunction with the trade union, have for many years established a Joint Industrial Council of the highest repute, and the J.I.C., in association with the Institution, have established an Education Board. To the Education Board is delegated the responsibility of encouraging, initiating and developing technical education appropriate for the whole industry.

In addition, the Education Board is the consultative advisory body for the heating and ventilating activities of the National College to which special reference is made later.

A new activity, with the support of the J.I.C., is the holding of an annual competition in design for diploma students of the National College for which prizes are awarded.

In connection with instruction for operative personnel and, in particular, apprentices, the Education Board functions in the main through close co-operation with the local branches of the J.I.C. in addition to the Council itself. It is about to publish a text-book covering the first two years of the City and Guilds course, and thereby fulfil a long and much desired need. It is also evaluating a schedule of practical methods common to fabrication and installation of heating and ventilating plant and equipment to assist firms in the practical training of their apprentices for attaining the requisite technical skill of a good fitter.

Operative Training

The requirements in technical education for operative apprentices are provided in the City and Guilds courses covering the intermediate, final and full technological examinations. These courses have been modified recently on the basis that it is not reasonable to expect all the apprentices to be able to take the whole course and attain the high standard which the final and full technological examinations require. The intermediate course, requiring normally two years of part-time study, is designed to have a standard within the intelligence level of most of the apprentices recruited to the industry at the present time. In some centres, however, it has been found advisable to precede this course with one year of preliminary training.

Only a limited number of the students taking the intermediate course will probably be able to pass successfully through the final and full technological courses and these students will comprise, other qualifications being equal, the source of potential foremen and supervisors for the future.

In the training of operative personnel there are other important factors which are essential and complementary to the part-time study.
The more important of these are outlined below.

Recruitment

It would merely state a truism to say that the industry needs the best recruits possible and that, broadly speaking, the better the recruit the better and more valuable can be the training given subsequently. There are some commendable instances where the happiness and contentment of the father have attracted the son but, unfortunately, this is not universal and cannot be entirely relied upon. It may be a shock to some members of the Institution to learn that many boys leaving school have never heard of the heating and ventilating industry, but this is true. An obvious first step is to put this right and the best way is to establish cordial and co-operative relations with adjacent juvenile employment exchanges. This has already been done at headquarters level and, locally, by some of the branches of the J.I.C.

Having made the industry known, the next step is to attract. This is not so easy in view of the special requirements of the industry with regard to the heavy nature of the work and the period of time to be spent away from home. The old days are gone for ever when a boy leaving school without influence wandered round asking for a job. The more ambitious school-leavers to-day know quite well that they have a market value and, in general, they ask two quite natural but pertinent questions: How much are you going to pay me? What will you do for me to enable me to progress in my occupation? The answer to the first question is set out in the scales of wages agreed between the Employers’ Association and the Trade Union. The answer to the second question places the industry in competition with other neighbouring industries who not only have training schemes of their own, but also make provision for part-time release to enable their young people to take full advantage of their technical education under the best conditions. The industry must give serious consideration to these and other factors mentioned subsequently if it is to hold its own in the competition for the best recruits.

Technical Skill Training

The general policy which, with few exceptions, has always been followed in this country is that industry itself is responsible for training its apprentices in technical skill and that the technical colleges provide the complementary technical education. By establishing and supporting the City and Guilds courses already mentioned, the latter part of the apprentices training has been provided but, up to the present, the training in technical skill has always been undertaken individually by each firm. On the whole this had hitherto been quite satisfactory as evidenced by the standard of skill of the fitters in the industry. Under a new agreement between the Employers’ Association and the Trade Union, all future fitters must be trained under an apprenticeship scheme, and it is obviously desirable that this training should reach the highest possible level. There are some important factors bearing on this, i.e.:

(a) There is quite a wide variation of practice with regard to the type of work carried out between the various firms.

(b) Some firms are almost entirely concerned with ventilation and air conditioning, whilst others are almost wholly heating, and there are yet others who hold an intermediary position between these two extremes.

(c) The advent of new techniques such as welding must be expected from time to time.

Owing to the ever-rising temperatures and pressures at which plants are required to function, it may be that the standard and the extent of the skill which will be required by the future fitter will be such that, in some cases, certain firms will find it difficult or even impossible to provide the requisite training within their own practice. In such an event it may be highly desirable to give consideration to the establishment of co-operative training whereby a group of firms exchange apprentices for suitable periods of time during their training.

There is one other point which may have a bearing on this problem. In some other industries where training in technical skill is carried out by means of apprenticeship schemes, it is the general practice for each individual firm to appoint an Apprentice Master.” Such an appointment is usually to an individual either of the foreman or supervisor grade or a member of the drawing office. The essential duty of such a person is to take under his wing the welfare, contentment and progress of each of the apprentices. There does not appear to be any information as to how far this practice is general in the heating and ventilating industry, but, undoubtedly, such practice has been found most beneficial.

This arrangement, where the possibility of co-operative training might arise, would be of special value as a committee of the apprentice
masters concerned would ensure the progressive and satisfactory training of the apprentices.

Part-time Day Release

Owing to the nature of the industry, the difficulty of firms in making provision for the release of their apprentices for one whole day per week for technical education is universal.

It is equally true to say that the same reason spells the death knell if any attempt is made to provide this education by part-time evening study. In some cases a compromise has been adopted by using Saturday mornings but, frankly, this is not satisfactory. There are two major factors in connection with this problem:

(a) The clause in the Education Act of 1944 requiring the compulsory release of all young people between school-leaving and the attainment of 18 years of age will, undoubtedly, be implemented as soon as buildings and staff make this possible.

(b) Where firms are faced with competition in recruitment, part-time day release is one of their strongest weapons in the fight.

With reference to (a) above, and where, at present, it is impossible to provide apprentices with the appropriate educational facilities, it is suggested that consideration might be given to the establishment at suitable centres of full-time courses covering the City and Guilds syllabuses and examinations. Such courses would require, approximately, on a corresponding time basis to the part-time courses, a period of one term or 13 weeks for the intermediate stage and two terms or 26 weeks for the intermediate and final stages of the City and Guilds course.

It would appear that such courses will be essential when the compulsory release clause of the 1944 Act is implemented if all the apprentices of the industry are to have facilities for their technical education and some initial experience in the running of such courses would, undoubtedly, be a real advantage.

Instructors

The provision of suitable instructors for the specialist portions of the City and Guilds courses is an ever-present problem as such instruction can only be given satisfactorily by appropriate personnel from the industry itself entailing the corresponding loss of time of valuable people.

The whole of the specialist instruction for the intermediate examination could be given by a first-class fitter who was capable of conveying his knowledge to his class.

The most suitable arrangement, however, is for a good fitter to take the practical work and for a member of the drawing office staff to take the lecture portion. The latter would also take the specialist instruction required for the final examination.

To relieve the onus placed on the industry of providing these instructors it has been suggested that the situation might be met by the use of peripatetic full-time teachers. In actual fact a start on these lines has already been made by other industries. Such an arrangement entails the fulfilment of certain essential conditions to safeguard the pension rights of the teacher. It would be required that:

(a) The teacher is appointed by and based upon a given college of one authority, and hence,

(b) the teaching in centres under other authorities and the share of the costs must be pre-arranged and agreed.

(c) Sufficient heating and ventilating classes to occupy the teacher for five whole days per week for over 30 weeks per year would have to be guaranteed unless the teacher had other qualifications as well as heating and ventilating which could be used by the college upon which he was based.

Regional Organisation

The Ministry of Education has divided the country into ten regions for the purpose of organising and co-ordinating technical education within each region.

This organisation can be of the utmost value to the industry in connection with the provision of City and Guilds courses for the operative apprentices. As has already been stated, the major problem is that of numbers and in some instances it is only by grouping apprentices from firms in adjacent towns that the requisite minimum number can be achieved to establish classes as far as the intermediate examination. For the final examination for which the numbers will be less it will be impossible to provide the training unless a larger grouping arrangement can be made and the appropriate machinery for doing this is Regional Organisation. This organisation would also be essential for the establishment of full-time peripatetic teachers.

Some of the local branches of the J.I.C. have already taken steps to establish themselves within Regional Organisation following a special meeting of Branch Chairmen in November, 1948. It will be to the real advantage of the industry when this step has been completed by all the branches of the J.I.C.

(To be Concluded)