Scientific Management in a Food Preserving Establishment:

The "Géo Factory", Paris

by

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The present article is in continuation of the series of studies on industrial relations published during recent years by the International Labour Office.[1] *It describes the case of an undertaking which, being engaged in the food trade, is subject to working conditions of the most varied character and to fluctuations which can be less readily foreseen than in most industrial establishments. The article below shows how, by a judiciously flexible application of the classic rules for scientific organisation of work, the management of an undertaking may arrive at a satisfactory solution of the most diverse problems of internal economy, at the same time improving both the material and the moral situation of its staff.*

General Features of the Undertaking

THE "Géo Factory", the full style of which is: "Société anonyme des usines Géo Foucault et Schweitzer", is engaged in the manufacture of hams, potted and preserved foods, sausages, salted and cured meats, and condiments. The undertaking was formed in 1908 by the amalgamation of two older firms—the meat-curing establishment of Mr. Foucault and

[1] Cf. in particular: *Studies on Industrial Relations*, Vols. I, II, and III. Studies and Reports, series A, Nos. 33, 35, and 38, Geneva, 1930, 1932, and 1935. Cf. also: "The Scientific Organisation of a Department Store and Its Effect on Industrial Relations: The "Globe Stores" at Zurich", in the *International Labour Review*, Vol. XXXIII, No. 2, Feb. 1936, pp. 194-226.

the canning factory of Mr. Schweitzer. The object of the amalgamation was to stabilise the business of the two undertakings, since the considerable falling off in the consumption of salted foods in summer could be largely offset by the sale of canned foods. The fusion of the two firms resulted in a stabilisation which was advantageous both from the point of view of business and from that of the staff. On 13 November 1913 the undertaking was turned into a joint-stock company with a capital of 3,875,000 francs in 500-franc shares, nearly all of which are held by members of the two families.

The Géo Factory's works are situated at No. 77 Avenue de Fontainebleau, in the commune of Kremlin-Bicêtre (Seine), less than half a mile from the old walls of Paris. The firm's head office is still at the old address—148 Avenue d'Italie, Paris XIII ; but this is now used only for convenience of correspondence, postal deliveries being more frequent inside Paris than in the suburbs.

The main factory covers an area of 15,000 square metres. The buildings are modern in type and date from about 1920. There are also three annexes within a radius of 500 metres : the tin-plate works, covering an area of 2,700 square metres ; the packing factory (wood and cardboard packages), occupying 3,000 square metres ; and the building containing the motor sheds, repair shop, stables and storehouses, covering 6,200 square metres.

Some idea of the size of the undertaking may be gathered from the fact that the Géo Factory takes in an average of 30 to 40 tons of pork daily. The actual quantity of meat which enters the works each day is very variable, however, and is sometimes as much as 70 tons. Only about a third of this consists of whole carcases, the remainder being parts of carcases. Thus between 2,000 and 2,500 hams are received every day. The works also use some beef, though in much smaller quantities, and various other commodities such as cabbages, beans, spices, and the like.

It is more difficult to give exact figures for the firm's output, because it is spread over a great variety of products (about 300), and the production of each may, within certain limits, be expanded or reduced according to current circumstances. But the following figures will give some idea of the quantities placed on the market annually by the Géo Factory : between 600,000 and 700,000 hams, between 8 and 9 million cans of food, and

between 850,000 and 1,100,000 kilogrammes of lard. To these must be added sausages of all kinds, which are one of the firm's staple products, fresh pork-butchers' commodities, etc.

The total staff, including both workers and salaried employees, varies around 800, slightly less than half being women. The undertaking is thus only a medium-sized concern, especially for the Paris area.

The business of the Géo Factory is subject to strong seasonal variations which affect both the buying of the raw meat and consumption. The variations in the price of pigs are fairly regular, but the variations in sales are extremely irregular. There may, for instance, be a very substantial fall in summer consumption if there is a wet August. Lent and the Holy Week have a definite effect on business, and work often has to be suspended on Mondays during Lent. These variations can be stabilised by the manufacture of canned goods, which acts as a kind of stop-gap.

The manufacturing side of the business, too, also has some special features. The undertaking represents a kind of vertical concentration of the pig industry, beginning with the live pig or the slaughtered animal, or merely parts of the carcase, and ending with products ready for consumption. These products are of a great many different kinds, partly owing to the variety of customers' tastes and partly because ways must be found to use up all the eatable parts of the carcase.

As already stated, the Géo Factory produces about 300 different kinds of products, nearly all of which involve complicated processes, such as salting, curing, cooking, canning, and the like. Hardly 1 per cent. of the total output consists of fresh pork, e.g., pork chops. Hams alone are placed on the market in ten different forms. But this large range of products may be divided into a few main categories which in order of importance are as follows: tinned and cured hams, canned foods, fresh pork-butcher's commodities, salted goods, and lard.

Each of these different categories of goods presents entirely different problems as regards rapidity of manufacture, storage, and regularity of sales. Fresh pork-butcher's commodities must be sold immediately, as certain articles such as black-puddings are highly perishable. Others are very slow to manufacture and have to be stored for a long time; for instance, it normally takes about sixty days to cure ham, and most sausages have to be dried for two or three months, while the

preparation of dried hams (which, it is true, are manufactured only in small quantities) takes about eight months.

Lastly, the raw materials used are organic and thus cannot have the same uniformity of quality as mineral products. The best possible use has to be made of pork, the flesh of which varies in texture and in the amount of fat and sinew it contains. Sorting the meat is a process that calls for some degree of judgment and cannot be done by mechanical means. It is usually done by women, who acquire considerable skill at the work after a certain amount of practice.

It is clear that great flexibility was required in the management methods applied in the Géo Factory in order to allow of their adjustment to the differences in the work, both from one workroom to the next and also in the same workroom at different seasons.

Administrative Organisation

Like all joint-stock companies, the firm is under the general supervision of a board of directors, but the actual management is entirely in the hands of the managing director, who for many years past has made a point of introducing the most up-to-date management methods.

The chief general principles by which he has been guided are the distribution of duties and the subdivision of the undertaking into administrative units, the application of the " functional " principle, the co-ordination of the activities of the various subdivisions, the standardisation of methods, the application of the system of " auto-control " to the performance of all administrative duties.

The undertaking is divided into seven departments, each of which is under a manager directly responsible to the managing director. The names of these departments are as follows: production, sales, management, material and supplies, buildings and plant, personnel, and ancillary services. These names indicate the nature of the services concerned and give a general idea of the distribution of functions in the undertaking.

The departments are subdivided into sections. The production department, for instance, comprises nine sections as follows: meat buying; time study; meat production; dried goods; salted goods; lard refining; canned goods; pork-butcher's commodities; laboratory and miscellaneous. Lastly, the sections themselves are subdivided into services.

The duties of each subdivision of the undertaking are laid down in detail by circulars showing the relation of the administrative subdivision concerned to the other parts of the undertaking.

Co-ordination is ensured by the managing director himself and by the Collaboration Board, which comprises both the chiefs of sections and representatives of the staff chosen by their fellows. The duties of this board are described below in the section dealing with the participation of the staff in management. As it is particularly important that the work of the production department should be properly co-ordinated with that of the sales department, the managing director himself is manager of both these departments.

The " functional system ", which consists in setting up special sections to perform their appointed functions throughout the undertaking, has been applied fairly thoroughly in the Géo Factory. Thus, all buying (except the buying of meat, for which the production department is responsible) is done at the request of the various sections by a special section of the material and supplies department. All buying is therefore done on the same system, which ensures that the most favourable terms are secured. To take another example, the laboratory is responsible for centralising, classifying and co-ordinating all suggestions for experiments or alterations in the firm's products, whatever their source. Similarly, the staff section, research section, complaints section, etc., intervene whenever questions falling within their competence arise.

The standardisation of methods has been brought to a high pitch of development. Verbal instructions are used only to deal with incidents arising in the course of the day's work ; all questions of any importance must be settled by written orders. Works memorandum No. 1 of 16 December 1930, under which the whole undertaking was reorganised and subdivided into the branches described above, contains explicit and categorical rules on this point. It provides that all written memoranda shall be submitted on standard forms and divided into works memoranda, circulars and departmental memoranda, according to their importance.

The works memoranda are issued by the managing director alone and deal with general matters or questions of principle concerning the organisation and working of the various branches of the undertaking, and remain in force until amended by a

subsequent memorandum. The circulars are also issued by the managing director and deal with questions of minor importance ; they may either be permanent and applicable until cancelled by another circular, or valid only for a specified time. The departmental memoranda are issued by a departmental or divisional chief and are addressed to one or more subdivisions, whether subordinate to the writer of the memorandum or not. They relate to questions of detail and may be either temporary or permanent.

All memoranda are issued on standard forms containing columns for the entry of a serial number, the title of the memorandum, its source and the names of the persons to whom it is addressed. Each of the chiefs concerned receives a copy and signs the original document opposite his name, as a form of receipt to the office of the managing director which keeps the originals of the memoranda, or, in the case of departmental memoranda, to the office by which it was issued, which is responsible for keeping the original.

The system of " auto-control ", as suggested by Messrs. Satet and Quaglioni, is used to control the performance of all administrative duties. The object of this system, as its name implies, is to oblige every employee responsible for a specific job to check its performance himself. He is provided with a daily form containing a series of questions concerning his work, to be answered by " yes " or " no ", or by a reference number. A special reference column is provided in which he enters the document (file, memorandum, ledger, etc.) by which his statement can be checked. By way of example, some of the questions on the form for the warehouse section are given below :

" Have you returned yesterday's goods receipts?
Number of orders from workrooms refused for lack of supplies ?
Is your warehouse in perfect order ?
Are your stock files up to date ?
Is your receipt and delivery book up to date ?
Are your premises properly kept ?
Have you returned yesterday's delivery orders to the office ? "

On the basis of the number of satisfactory replies and the figures indicating delays, faulty work, etc., the chief of section gives himself a mark ranging from 1 to 5, the highest mark being 1. These forms are collected by the management's secretariat which allots a final mark to each section, and the whole set of forms is then submitted to the managing director in a

cover containing a list of the sections. Opposite the name of each section are the figures 1, 2, 3, 4 and 5, so that by making a cross on the mark allotted and joining the crosses up by a continuous line a curve is obtained which enables the managing director to see at once which are the services which need watching —namely, those for which the curve bends towards the right, that is, towards the higher figures denoting lower efficiency. The managing director can thus see at a glance which of the control forms need closer examination.

The application of the system of " auto-control " in the Géo Factory has proved once more that this method is eminently fitted to strengthen the collaboration between the management and its subordinates by giving to each a sense of his exact responsibilities.

Purchase of Raw Materials and Production

Meat Purchasing

The purchase of meat is an operation of prime importance in the Géo Factory, since, as will be seen below, the activity of the undertaking is governed more by its purchases than by its sales.

The live or slaughtered pigs are purchased by expert buyers on the Paris market at La Villette or at the provincial fairs. The live animals are slaughtered at the firm's slaughterhouses at Aubervilliers, but more than two-thirds of the supplies received by the works are bought in the form of parts of carcases, in particular the 2,000 or 2,500 hams delivered daily from the various pig farms and slaughterhouses with which the undertaking has regular dealings. This makes it possible to overcome the difficulties arising out of the fact that the proportion of meat of various qualities in each carcase is more or less constant, and enables the production of hams to be expanded without a corresponding increase in the output of the firm's other products.

The buyers have some freedom of action, but all buying is co-ordinated by a special section of the production department. In this way the buyers are brought under the direct supervision of the managing director, who has been in the trade for several decades, and is thoroughly versed in all its peculiarities.

Purchases are of course ultimately conditioned by sales. At the same time, however, the volume of purchases cannot be based directly on the sales figures, because of the complicated nature of the relation between the two. As already mentioned, some of the factory's products are sold on the day they are made (fresh pork-butchers' commodities, for instance), while others (e.g. dried hams) are sold over a year later. These various products nevertheless derive from the same animal (the pig), so that the output of some of the products depends on that of others. Hence it is impossible to establish any simple formula relating purchases to sales, and the only possible guide is furnished by experimental data.

These data exist in the form of a remarkable collection of some 50 statistical curves, kept continuously for over 20 years, which give month by month the figures for the receipt, despatch and prices of pigs and of parts of carcases, and of the principal products sold. These data are kept in the office of the managing director, who can thus refer to them at any time. The most important curves are those relating to meat purchases and prices on the markets and at fairs. As the management has been steadily endeavouring to adjust purchases to sales for over 30 years, these curves form a reliable index for the purchase of supplies on an empirical but fairly accurate system, corresponding to the volume of sales. In fixing the amount of purchases, therefore, the factors taken into account are, first, the curves; secondly, the general state of business as indicated by any information available on market conditions; and, thirdly, the stocks held by the firm.

In practice, the buyers regulate their orders mainly by prices, in order to take advantage of current conditions; and the managing director confines his supervision to instructing them to go slow on a certain article or to increase their purchases of another. As the buying is done day by day, and therefore in quantities which are small in relation to the output of the works, it is always possible to check excess in either direction.

The undertaking owns a pig farm which breeds about 1,000 pigs. This would hardly be enough to keep the factory busy for two days, but the farm is extremely useful in furnishing first-hand evidence of breeding conditions and providing a check on the prices asked on the market.

Organisation of Production

The production department covers all the processes by which the slaughtered pig is transformed into products ready for retail sale and for immediate consumption. It places on the market over 300 different products, which fall into the following categories : tinned and dried hams ; fresh and cured sausages ; canned goods, pies, ready-cooked dishes, etc. ; all products generally sold by pork butchers ; lard ; various condiments.

The production department is organised on the same principles as the rest of the undertaking, perhaps applied even more thoroughly. An account is given below of the influence on manufacturing processes of the standardisation of methods, the specialisation of the operatives and the division of work, the bonus system of payment, and the examination of products and control of operations.

The working methods for all the goods produced are strictly standardised by production memoranda couched in the same form as the works memoranda, circulars and other departmental memoranda. The management of the works has defined the characteristics of these instructions as follows :

" These memoranda are drafted by the production department, and give a full and detailed description of the process of manufacture from the following points of view :

Nature, quality and quantity of the materials to be used ;

Labour to be employed ;

Use of mechanical or physical agencies, machine tools, motive power, steam, cold, heat, etc. ;

All other factors entering into the manufacturing process ;

All sections of the production department are required to comply strictly and fully with these instructions. No departure from them is permissible, even with a view to possible improvements, without previous reference to the manager of the production department, who will then make arrangements for any trials that may be considered necessary."

New production instructions must therefore be issued for any change or improvement in manufacturing processes. These are preceded by trial instructions on similar lines, but valid only for a small batch of products. All research and experiment, whether scientific or conducted in the workrooms, is controlled by the laboratory.

It is hardly necessary to stress the important part played by this codification of methods in the organisation of the undertaking's work. For one thing, it greatly simplifies the standardisation of processes and equipment. Great uniformity has in fact

been achieved in the latter throughout the Géo Factory; all products in minced or paste form, for instance, are transported in a standard type of aluminium container. Moreover, standardisation also facilitates the maintenance and constant improvement of manufacturing processes.

The system of the division of work has also been rigorously applied. The work falls naturally into a first division by workrooms as follows: cutting up, trimming and salting of meat; preparation of meat for sausage making; manufacture of fresh and cured sausages; smoking and curing of sausages and hams; pickling, finishing and cleaning of sausages; canning of hams and various other preserved foods; cooking and sterilising of goods for canning; sealing of tins; labelling; manufacture of fresh pork-butcher's commodities; lard refining. The amount of labour employed varies considerably from one workroom to another. A great deal of labour is required to sort the meat, make sausages, and fill and seal the tins; while very little is needed for salting, smoking, drying, cooking and sterilising—operations which have more affinity with the chemical industry and make use of similar equipment, such as vats, tubs, boilers, conditioned air chambers, etc.

The work performed in any one workroom is also of very varied kinds. It is carried out by shifts, each member of which has a specified and narrowly limited task to perform. Chain work is resorted to in many cases, especially in the manufacture and finishing of sausages and the filling of cans.

This system does not exclude all flexibility, as the workers, and especially the women, often have to change over from one job to another when there is a slack period, or to perform cleaning work. Indeed, it is noticeable that the degree of skill and specialisation among the staff of the works varies very widely. The work performed in the production department may be classified into the following categories:

(1) Duties of supervision over workers (foremen and forewomen) or manufacturing processes (directing operations of mincing and beating meat, cooking, sterilising, salting, drying), which require long years of practical experience in the undertaking.

(2) Work requiring a full training in the trade of butcher or pork butcher, i.e. the rough cutting up of carcases and the preparation of fine pork-butcher's commodities.

(3) Skilled work entrusted to workers trained in the undertaking, and requiring either special manual skill (stringing of sausages of the salami type) or an expert knowledge of the qualities of the meat (salting of meat and trimming of shoulders and hams).

(4) Less complicated operations of a more mechanical type but performed by hand. Some of these require a short apprenticeship (manufacture and cleaning of sausages), while others are quite easy (filling and labelling of tins).

(5) Standardised operations involving the handling of a machine (soldering of tins).

(6) Work requiring no special training, such as the handling of heavy or light articles (vats, frames for hanging sausages, or tins) and cleaning.

Women workers are employed mainly on sorting meat, stringing and finishing sausages, filling, sealing and labelling tins, and cleaning.

The principal characteristic of work in nearly all the workshops is its diversity and the large number of workers it requires, although the most modern appliances are used for handling all the goods, including in particular an overhead monorail carrier. It is unnecessary for the purposes of this article to give a full description of all the operations performed in the works. But in order to give the reader some idea of its activities, a brief account is given below of the first processes though which the meat passes, which have some interesting features and provide a good example of the methods of the division of work and payment by results applied throughout the undertaking.

Sorting the Meat and Testing its Quality

All meat delivered to the undertaking from outside comes to the same part of the works, where it is weighed, the separate parts on ordinary scales and the carcases on hooks, and its weight recorded. The meat is then inspected by a veterinary officer from the Seine Health Department, and either dealt with immediately or put into cold storage until required. The carcases are cut up by skilled butchers with the aid of various mechanical apparatus, including in particular circular saws. Certain parts of carcases, such as shoulders, hams and breast, can be treated at once in the trimming and salting departments,

while others go to the sorting rooms, where they are divided into smaller joints of first and second quality meat.

It is these sorting rooms, which employ female labour only, that provide the materials for sausages and pies, and also supply the refinery with fat for lard. The work is very minutely divided, each worker always handling the same part of the animal. The workers must become sufficiently skilled at their job to be able to use every part of the piece of meat on which they work to the best possible advantage. This cannot be done by means of mechanical apparatus, but only by the use of a knife. The work is organised on a kind of chain system; the first worker removes the meat and fat and sorts the various pieces forming one part of the joint, then passes it on to another, who deals with another part.

This kind of work, like that performed in all the other workshops, is paid for at fixed rates, plus an output bonus. The worker must have sufficient skill to remove all the first class—i.e. the most expensive—meat from the piece she is handling, without leaving any of it to be placed in a lower class, the commercial value of which is much smaller. A different rate of bonus is therefore paid for each quality of meat, so that the wages of each worker depend on her skill in removing as much first-class meat as possible from every piece she cuts up.

Hence the time-study office keeps an output curve for each worker, showing both her total output and her output of meat of the various qualities and of fat. The shifts are under the supervision of forewomen, who train beginners, distribute the pieces of meat, and regulate the speed of the work. As the bonus system encourages the workers to produce the largest possible output, the forewomen are instructed to slow down the rate of work rather than to speed it up, in order to maintain a high standard of quality and prevent fatigue.

The curves provide the management with individual output charts, which furnish very useful statistics of the way in which the meat purchased outside the undertaking has been made to yield the highest possible profit.

The testing of the quality of the firm's products is naturally one of the primary concerns of the management. As already mentioned, the managing director is also manager of the production department, and himself tests random samples of the goods turned out by the various workrooms at frequent intervals, a task for which he is eminently fitted by his long and thorough experience of the trade.

But this method can obviously serve only as an extra check, and provision has been made for a special service to exercise constant supervision over the quality of the firm's output. The service responsible for this duty is the laboratory. Two samples are taken of every batch of products manufactured. One of them (tin of food, sausage, etc.) is opened and examined immediately, from the standpoint of its appearance, taste and smell, by persons with the necessary natural gifts; the second is placed in a room heated to a temperature of 35° centigrade for a month, after which it is examined in exactly the same way as the first sample, and should not have undergone any kind of deterioration. Lastly, the laboratory also carries out chemical and bacteriological examinations by the usual scientific methods.

All possible precautions are taken to control and record each of the operations performed during the handling and processing of the raw materials. Thus, the autoclaves and cooking-vats used in the preparation of foods for canning are provided with two thermometers; the first is an ordinary dial instrument which shows whether the process is being performed in accordance with the established standards, while the second is a recording instrument the charts of which are preserved and provide a full record of every batch of products.

There are also recording instruments (thermometers, hygrometers, etc.) in all the pickling rooms, cold storage rooms, drying rooms, etc.

Every batch of products is provided with a means of identification with a view to enabling the origin of any faulty goods to be ascertained. Thus, a slate containing a description of the batch and its serial number is attached to each of the wheeled frames on which the sausages are hung for removal to the drying and finishing rooms. In the case of specially delicate operations, the worker is even required to sign his work; the butchers employed in trimming hams, for instance, each have a special mark with which they sign all the pieces of meat with which they have dealt.

Commercial Services; Accounts; Ancillary Services

These services have had to be organised on rather different lines, and it would take too long to give a detailed description of them. Our account will therefore be confined to describing the special features of the organisation of the Géo Factory,

omitting all reference to those common to other similar undertakings.

Sales and Delivery

The selling is done by travellers paid by a commission on sales and each is responsible for covering a carefully defined sales territory. The management makes a point of ensuring that the travellers keep in close touch with the manufacturing departments, in order that they may have a thorough knowledge of the goods they have to sell. The salesmen, more especially those who cover the Paris area, are required to pay frequent visits to the factory. Samples of new products or products which have been produced in a slightly altered form are laid out for their inspection and opinion.

In Paris and the suburbs, where a daily round of deliveries is made, each customer being visited twice a week in rotation, the delivery men themselves take the orders from regular customers on every other visit, although the travellers must call on them at least once a week. These delivery men also take payment for the orders, so that their duties are threefold. The delivery service for Paris and the suburbs thus has responsible duties to perform, and its organisation is especially interesting.

The delivery men always perform the same round; their route is carefully planned and they are thoroughly well acquainted with the districts they cover. The goods are delivered in one-horse vans, a form of transport which has proved the most practical and economical for rounds on which stops are frequent and often lie less than a hundred yards apart. The orders for Paris and the suburbs are made up in a large room, to which all the goods ordered from the various warehouses and services, in accordance with the orders taken by the salesmen and delivery men, are sent. The weighing men docket all the items belonging to the same order with the same reference number and pass them on to the packers, after which they are assembled van by van. The orders are then passed on to the invoicing department with a weight ticket, and only when this has been done are the vans loaded, the items actually invoiced to the customers being called out one by one. These latter operations of assembling and checking are much more important than the packing itself. When all this has been done the loaded and padlocked vans are put away in a shed, to be collected by

the delivery men on the following morning. The men return from their rounds towards the end of the afternoon, and hand in their account books and the money they have collected to the cashier's office. A record of these payments is kept on special forms, a separate one being made out for each round. When the men arrive at the factory about 5 a.m. on the following morning their account books are returned to them, together with the invoices classified in the order of their round (the same order as that in which the goods have been stacked in the vans), and after checking these documents and seeing that everything is in good order they set out on their round immediately. All the vans must be gone by 6.15 a.m. The delivery men receive a bonus calculated according to the number of orders delivered.

Orders for the provinces, where customers are scattered, and for abroad, are delivered by rail. The factory has a forwarding service, the principal duty of which is to pack the goods strongly and carefully. The work of the packers is facilitated by the internal transport arrangements (wheeled trucks, etc.).

As regards those parts of France in which the Géo Factory has numerous customers, deliveries are made by motor lorries which often complete rounds of over 1,000 kilometres. The measures taken to check the efficiency and regularity of this method of delivery are described below in connection with the transport services.

Cost Accounting

In order to ensure strict control over its production costs by ascertaining the exact origin of all expenses, the Géo Factory has organised a very comprehensive system of cost accounting. This system is based on the autonomy of the various sections, which has been brought to such a pitch that if any equipment is transferred from one section to another it is credited to the first. The management has also drawn up a general list of all the sections and the main operations performed by them, with a view to enabling overhead expenses to be classified. This list also covers all the objects and materials held in stock and used in production, classified not according to their nature and composition but according to the use for which they are intended, a system which greatly facilitates the accurate determination of costs of production. Each item in the list consists of a number, a letter and a reference; this simplifies the drafting of all internal memoranda and prevents mistakes. The time-study

office supervises the expenditure of the various sections and services classified into five categories as follows :

Category A : Expenses connected with production ;

Category B : Expenses over which the chiefs of sections have some control ;

Category C : Expenditure on the consumption of fluids ;

Category D : Special expenditure only partly under the control of the chiefs of sections ;

Category E : Maintenance expenses.

For every section and for each category of costs a chart is established to provide the management with a general survey of the movement of costs. The classification into categories described above facilitates the adoption of any measures which may be necessary to cut down expenses. Such a system of costing naturally depends for its application on a detailed organisation of the warehouses : the delivery of the materials demanded by the different services in accordance with their order vouchers ; a constant check on stocks by means of separate reference cards showing continual balance and recapitulation statements ; the fixing of a minimum and maximum stock for each class of goods ; rational classification in accordance with the general list and with due regard to convenience of handling, etc.

Ancillary Services

Force of circumstances has led to the introduction of a considerable degree of autonomy in certain services with special characteristics, such as the central power unit which furnishes steam, electricity and cold. The object of the almost total independence given to what are known as the ancillary services, which practically form separate undertakings, was, however, purely that of facilitating scientific management. These departments comprise the packing-case factory, which is of recent origin and the organisation of which was completed at the end of 1935 ; the tin-plate works, which manufactures most of the tins used by the firm and has a capacity of about 30,000 tins a day [1] ; the slaughter houses, situated at Auber-

[1] This department provides an example of the strict application of the principle of autonomy. The costs of production of the tinplate works must not be higher than those of competing firms in the same trade. When the canning department needs tins, it asks for quotations both from the tinplate works of the Géo Factory itself and from outside firms, compares the prices, and gives the order to the firm's own works only if the terms it offers are the most favourable.

villiers, where the live pigs bought at local markets are slaughtered; and finally, the garage, the highly developed organisation of which deserves a brief description.

The transport service, which includes the garage, is responsible for managing the following equipment: 23 motor vans, 2 special motor vans with isolating walls for long-distance deliveries, 8 motor lorries for carrying raw supplies, 15 touring cars for the use of the salesmen, 35 horses, 35 horse vans and 20 horse lorries.

It is the duty of the transport service to bring transport costs down to the lowest possible figure. The vehicles are handed over every morning in perfect running condition to the other services, who are charged for them at a fixed rate per kilometre, varying with the tonnage of the vehicle concerned. The running expenses of each vehicle are strictly checked. Each vehicle has a separate file containing all correspondence with outside firms relating to it, the material and time vouchers relating to any repairs done, and a maintenance chart showing when the regular operations, such as changing the oil, decarbonising, etc., were done, and lastly, a monthly account of daily running expenses, i.e. wages of the delivery men, petrol consumption, depreciation, tyres, maintenance, repairs, and a record of the journeys done. These particulars enable the cost per kilometre to be calculated without any difficulty. For every regular round a petrol consumption chart is also kept which shows which vehicles are the most economical for that particular round. Lastly, the transport service draws up a monthly account recapitulating the direct costs of all vehicles in proportion to the distance covered.

Motor lorries making long-distance deliveries in the provinces are fitted with a special kind of registering apparatus called an " autometer ", which automatically records the speed travelled and all stops, and also the total number of kilometres covered during the day.

All these records enable the vehicles to be run under the best possible conditions as regards economy, careful attention to the mechanical condition of the vehicle (on which its satisfactory upkeep depends), control of the work of the staff, and the accurate debiting of transport expenses to the various services. Some of the more delicate mechanical parts, such as magnetos, have their own maintenance and performance charts.

The foregoing account of the ancillary services of the Géo Factory is obviously very incomplete, and the subject should be treated at much greater length in a study of a more technical character. But this brief sketch of its main futures is sufficient to show how the management has succeeded in giving complete autonomy to every part of the complex organism which constitutes the factory, while ensuring that all these parts work harmoniously with each other and contribute to the efficient and economical operation of the whole machine.

Engagement and Dismissal of Staff

Composition of Staff

The Géo Factory employs between 800 and 850 persons, of whom from 300 to 350 are women.

This high proportion of female labour originated in the special conditions prevailing in the industry when the undertaking was enlarged. This was during the years following the war, when labour was so scarce that many industries had to resort to foreign workers. The management of the Géo Factory chose the alternative of engaging French women workers instead wherever possible; and although a certain number of aliens also had to be employed they were gradually eliminated afterwards, until to-day the proportion of foreign labour has fallen to about 8 per cent. In deserving cases the management has done its best to facilitate the naturalisation of its foreign employees.

As regards the standard of skill among the workers, the general position is the same in all mass production undertakings; that is to say, a high proportion of unskilled labour is employed. Thanks to the division of work, any worker can learn a given job within a short space of time, and, as will shortly be seen, quite ordinary workers, whether men or women, can be made in this way to perform work requiring both intelligence and skill.

It must be noted, however, that a certain proportion of the workers employed, and in particular of the male workers, have been previously trained in a trade directly connected with the principal product of the undertaking. These are the pork butchers, who have previously served their apprenticeship and been regularly employed in small shops specialising

in the trade. This class of workers thus brings to the undertaking some previous experience which can be turned to immediate account, although, owing to the scale of production, the variety of products, and the mechanical equipment used, which is beyond the means of the small shopkeeper, the work naturally differs considerably from that of retail tradesmen, which has more in common with the artisan trades. These differences at once give rise to problems unknown to the small undertaking, and more or less the same as are found in other forms of mass production.

Engagement and Medical Examination

The almost entire absence of skilled and specialised trades in the Géo Factory simplifies the problem of recruiting the staff, since no question of special qualifications arises.

The general rule now is that every applicant for employment must fill in an application form giving the usual information concerning his social status and family situation, as required for the award of family allowances. The Géo Factory has deliberately set aside the considerations which in the past have led industrial employers to pass over workers with dependants in favour of unmarried workers because of the special liabilities and risks involved in employment of the former, and gives preference to workers with large families. These latter, owing to their family responsibilities, form a more stable class of workers, who may be expected to remain in the firm's service for a greater length of time—a valuable asset in an undertaking which relies on retaining its experienced staff in order to ensure continuity and regularity of production.

Candidates must also state whether they hold a school-leaving certificate and give the names of the last five undertakings in which they have been employed, stating the wages received and the reasons for which they left.

After these initial formalities, likely applicants are questioned by the person responsible for the engagement of staff. Long experience of these interviews has enabled both unsuitable candidates to be eliminated and suitable jobs to be found for accepted candidates. According to the experience of the persons who are accustomed to engaging labour and who acquire a kind of special psychological knack for the work, it is very seldom that the first impressions obtained at the original

interview are belied by the candidate's subsequent career in the undertaking. For work requiring habits of cleanliness the candidate's general appearance is in itself a valuable indication, while the appearance of the application form also gives a useful insight into the personality of the writer. These preliminary impressions, supplemented by a few minutes' conversation, enable a number of important particulars to be rapidly ascertained, and thus allow an opinion to be formed within a few minutes which, although necessarily only approximate, is nevertheless sufficient for the purpose of the elementary work on which the applicant is likely to be employed at first.

Although married men with children enjoy a kind of prior right to employment, the selection of young workers is also the object of special care. The firm seeks to provide for the future by selecting intelligent young people who are likely to pass into the permanent ranks of the staff after a gradual process of training.

Candidates accepted for employment after this preliminary enquiry are subject to a medical examination. Generally speaking, and although the examination is compulsory for all applicants, workers are not usually rejected on account of any physical defects, except in the case of contagious diseases, the latter being particularly dangerous in an undertaking of this kind. Thus, the staff includes persons suffering from various disabilities who are employed in occupations consonant with their powers and under conditions ensuring that they are not inconvenienced by their infirmities. This principle of not barring workers from employment on account of disease or disability is inspired as much by practical as by humanitarian motives, since if all applicants whose health was below standard were to be excluded it would be impossible to obtain an adequate supply of labour. The only form of disablement which disqualifies workers for employment in the firm is the previous loss of one or more fingers; this is because most of the operations performed in the undertaking call for the full use of both hands, and the strength of each hand is even measured on the worker's engagement by means of a dynamometer. Lastly, it may be mentioned that all persons employed in the undertaking have to undergo a fresh medical examination each year.

The data furnished by the medical examination is recorded on a health card for each worker, which is subsequently kept up to date by means of the annual medical examination.

Applicants are informed of any curable diseases or infirmities from which they may be suffering unawares. Persons suffering from hernia, for instance, are advised how to cure it, and the same course is followed for those with any defects of eyesight. If a serious illness is discovered, the patient is informed of the institutions at which he can obtain treatment before taking up his employment.

The health card contains the usual information concerning the individual himself and his antecedents, and particulars of his height, weight, eyesight, hearing, etc. The worker is also examined for the presence of albumen and diabetes; his chest measurement is taken, and the state of his heart and lungs examined. Lastly, the doctor also adds any further information he may regard as necessary, in particular the jobs, aptitudes, or operations for which he considers the applicant unsuited.

Dismissals

Where dismissals are necessary, whether on account of misbehaviour or of reductions in the staff, a careful investigation is made of every case. Further, facilities are given to any worker who has been dismissed to obtain a hearing from the chief of section superior to the lower executive to whom he is directly subordinate, and he may even appeal to the central management of the undertaking. Each case is examined on its merits. For example, a married woman without dependants will be discharged in preference to a woman who has to support herself. All the considerations which may influence the taking of such decisions are carefully weighed in order to prevent the possibility of justified complaints for reinstatement. This careful procedure cannot fail to have a beneficial psychological effect on the workers, who thus feel themselves safe from any arbitrary treatment.

It must be remembered that stability of labour has very great technical advantages in any form of production which, even when the operations are minutely subdivided, ultimately provides the worker with a practical training of some value. This is precisely the case with many of the operations connected with the preparation of meat, for which an experienced staff is still essential. The undertaking therefore tries to avoid dismissals, which it regards as a technical loss disturbing the regularity of work. It implements this policy chiefly by a system

of transfers within the undertaking wherever possible, and in particular at the changes of season which affect the sale of foodstuffs. If the falling-off in business is too great to be met by these transfers, recourse is had to laying off-workers rather than to definite dismissals. Generally speaking, the slack season falls between April and September. During this period workers are laid off in rotation, in order to ensure that the loss of earnings shall be fairly distributed, beginning with those who may wish to take leave voluntarily for one reason or another. The next to be laid off are persons who have some outside means of support, such as women whose husbands are in steady employment, or persons drawing various kinds of pensions.

Although the workers who are laid off obviously cannot continue to draw their wages, certain payments are made to workers towards whom the management feels itself particularly responsible by reason of their length of service, their necessitous circumstances, or the special services they have rendered to the undertaking.

Methods of Pay and Control of Performance

All work is paid for at a fixed hourly rate, hours of work averaging eight in the day in accordance with the statutory provisions in force in France. To this wage is added an output bonus, even in the case of employees in the offices and delivery service. For work which has to be performed under particularly exhausting conditions, such as unpleasant work or work performed in a very low temperature (e.g. storing, pickling) or a comparatively high one (e.g. sausage drying) an extra bonus is paid in addition to the output bonus.[1] In the Géo Factory, as in all other undertakings in which it is applied, this system of payment is based on two operations : time studies, which show the time to be allowed for the various kinds of work, and the control of actual performance.

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[1] The average annual wages of workers and employees engaged in the production and sales departments are given below. The rates are those applicable to operatives who are thoroughly versed in their jobs, but who have no special ability or qualifications.

	French francs
Men : Butchers or pork butchers	15,000
Unskilled workers	13,000
Clerical employees	14,000
Women : Unskilled workers	9,500
Clerical employees	12,000

Time Studies

Time studies are carried out on actual operations in the workshops and with the consent of the operative studied. They are conducted by persons who are in sympathy with the staff in order that they may be regarded as researches undertaken in a spirit of co-operation and not as tests intended to force down wages systematically. Their true purpose, when conducted in accordance with the best principles of Taylorism, is to establish beforehand standards which cannot be contested by any of the parties concerned. The workers are fully aware, moreover, that the standards established are to be regarded only as minimum times to which the persons concerned are not expected to conform exactly. They represent a maximum rate of work, which is theoretically possible but which cannot as a rule be maintained thoughout the working day, and consequently the standard times are generally increased by 25 per cent. to make up for the losses of time which are inevitable.

By means of a careful analysis of all operations a specified period is fixed which constitutes the standard time allowed. If the worker manages to finish the work in less than the standard time he is entitled to a bonus, the amount of which is proportionate to the time saved. This is the Rowan system, which is applied in a great many undertakings.

It may be stated as a general proposition that in this field what is important is not the system itself, but the way in which it is applied. Used as a method of continually forcing down wages, it is the source of chronic friction ; but if it is applied with the object of obtaining a fair measurement of the amount of work which is reasonably possible it may, on the contrary, help to prevent a great deal of argument. Evidence obtained from the employees of the Géo Factory shows not only that the workers raise no objection to the system, but that in certain cases they themselves have asked for it to be applied, since experience has shown them that it helps to define a normal day's work, and therefore leads to the fixing of fair wages.

It is worth noting that some of these time studies are long and costly to carry out, in particular if they aim at covering all the operations involved in the manufacture of a given product. When the present enquiry was made, time studies of all the operations performed in the undertaking, begun some years before, had not yet been completed. By means of these

studies a systematic and scientific analysis is provided of all the firm's operations, described and measured in detail and recorded in the firm's files.

In fixing the bonus rates for certain kinds of work, the application of intelligence to operations must be taken into account. An example of this has already been given in describing the sorting and cutting up of meat.

The Time Study Department

All the work connected with the control of performance is entrusted to a special department, which has fixed normal standards of output for all the elementary jobs based on the timing of manufacturing operations. These standards are copied on to slips, giving different outputs in ascending order of magnitude (e.g. 10, 20, 30 or 40 hams) on one side, and opposite them the time allowed for each of these amounts. The whole constitutes a vast reference file, since the firm produces over 300 different articles each of which involves a great many different operations and processes.

In order to enable the time-study office to fix the output bonuses, the workshops provide it with the necessary particulars of the work performed as follows.

In the case of individual jobs, the worker fills in a form stating the work on which he was employed during each hour of the day and the time he spent on it. This form is checked by the foreman. It often indicates the performance of very different kinds of work, especially in the case of unskilled women workers, who may be employed for part of the day in manufacturing processes and for another part on cleaning or similar work. By referring to its standards the time-study office is able to ascertain the standard time for the execution of each quantity of work shown on the form, and the worker's bonus is awarded on the basis of the difference between the standard time and the time actually taken.

In the case of team jobs, the foreman fills in a slightly different form relating to the job performed by the whole team, and giving the name of each member of the team and the time taken. The time-study office then calculates the bonus payable to the whole team on the basis of the total standard time and the total time of performance, then distributes it between the individual workers in proportion to the time worked by each during the

day. This system, which is applied with a certain degree of flexibility, is the only one possible since, as already stated, many of the workers may be required to help in the team for only a few hours at a time.

The duties of the time-study office are not confined to calculating the amount and distribution of the bonus; it is also responsible for calculating the labour costs entailed by each product and operation. To this end it draws up tabular summaries listing all the operations performed, and opposite each operation the total amount of time spent on it in the workrooms.

Lastly, in order to check the output of each worker and ascertain her ability, the time-study office makes out individual fortnightly forms showing the different kinds of work performed, the standard times, and the time actually taken. Special columns are provided to show the amount of time lost or gained. The advantages of this system from the standpoint of the efficient utilisation of the abilities of all the operatives are obvious. Moreover, it does not apply to the manual workers alone, but to nearly all the persons employed in the undertaking. We have already seen that output curves in terms of first-quality meat are also established for the women meat sorters.

This constant striving to secure an optimum output, both in quantity and in quality, has helped to create a remarkably corporate spirit within the undertaking. It is certain, for instance, that the effort to improve the quality of the firm's products, with a view to enabling them to be sold at higher prices and hence securing larger and quicker profits, has a very definite influence on the staff, for whom it provides the clearest possible evidence of the way in which the stability of their employment and the security of their position is bound up with the commercial prosperity of the undertaking. The minutes of the Collaboration Committee, to be described below, show the active part taken by the workers in constantly improving quality and in the search for methods of speeding up work.

Like many other undertakings, the Géo Factory has tried to institute a profit-sharing scheme which makes a substantial addition to the wages calculated by the methods just described.

The practical difficulties attached to this problem are well known to anyone who has studied the subject. As in many other undertakings, the first attempt to solve it took the form of New Year gratuities, assessed as fairly as possible but necessarily on a somewhat empirical basis.

Later, attempts were made to introduce a stable basis of calculation by awarding bonuses proportionate to the dividends distributed on the shares, and multiplied by a co-efficient varying with the length of service. Thus a single bonus (one share dividend) is awarded after two year's service, twice this amount after four year's service, and a maximum of ten times the share dividend after twenty years' service.

As regards the various executives, they also receive bonuses based on the relative importance of the recipient's work in relation to the whole organisation.

As in most other cases where this type of scheme has been introduced, the granting of the bonuses is optional, and the management reserves its right to suspend them for disciplinary reasons. Moreover, in principle they are awarded only to members of the staff who belong to the savings and provident fund, set up by the firm and managed by the employees, which is described below. This is not a strict condition for the grant of bonuses, but was designed by the management as a method of inducing its employees to make provision for their own future, national social insurance having been introduced only in 1930, and to popularise the fund, some of its older members having shown a tendency to exclude the more recent recruits to the staff from its benefits.

Participation of the Staff in Management

The Collaboration Committee

One of the most original and interesting features of the internal organisation of the Géo Factory is the existence and activity of its Collaboration Committee. This Committee is divided into six sub-committees, each having its own special task to perform in accordance with the principles of specialisation. The members of these sub-committees are elected by the staff by secret ballot on an extremely broad suffrage basis, all employees over 18 years of age and having served in the undertaking for six months being entitled to vote. Three of these sub-committees, namely, the sub-committee for the supervision of the staff welfare schemes, the savings sub-committee, and that on working conditions and the arrangement of working premises, are elected by the whole staff, this being explained by the fact that the questions with which they deal closely and equally affect every member of the undertaking. As

regards the sub-committees on production and on commercial questions, it is only natural that the right to vote should be restricted to those members of the staff who are specially qualified in these fields.

Half the members on the sub-committees are elected every year. In principle, each sub-committee consists of ten members, six being elected by the staff for a term of two years and four being appointed by the managing director. The latter usually attends the meetings of the various sub-committees, but may be replaced by a chief of section. Each sub-committee meets once a month, the chiefs of section or foremen concerned with the examination of the questions before the meeting being present in an advisory capacity. The members of the sub-committee take turns to act as Chairman.

The Collaboration Committee serves to integrate the powers of initiative of the staff in the technical organisation of the works by fusing the general requirements of the undertaking with the personal concerns of each of its members. This achievement gains an added interest by reference to the objections which have been raised to rigid schemes of scientific management. It was in order to meet these objections and to restore more human flexibility to the general scheme of organisation that Fayol propounded his well-known " bridge " theory, designed to prevent a too watertight separation between different services.

The committee set up by the Géo Factory improves on Fayol's " bridge " system in the direction of greater technical efficiency. The principal aim of Fayol's system was to establish direct relations between the departments which the general scheme of organisation might have left without any contact with each other, or at least only with contact through hierarchical channels. The Collaboration Committee goes much further than this, since it brings together not only the departmental chiefs, but also the operative staff, who are thus given the opportunity of stating their opinion on all the details of their work. It is true that in all undertakings an operative can address himself to his immediate chief if he is asked or allowed to express his opinion, and his views are then passed on through his superiors. But this channel of communication is very much widened in the committee here described, since every employee can obtain a hearing not only from his immediate chief, but from a group of persons interested in different capacities in a par-

ticular branch of work, and even from the highest managing officials of the undertaking.

The Suggestions Scheme

Suggestions from the staff are brought before the committees in two ways : either in the form of written communications placed in suggestion boxes, or through members of the committees who explain by word of mouth any ideas they may have picked up from those around them in the course of their work. Suggestions regarded by their authors as important enough to merit a subsequent money reward are usually placed in the suggestion boxes. Where this is the case, the usual precautions are taken to ensure that the name of the writer is not known until his proposal has been considered, and if the proposal is adopted the board of directors decides what reward is to be paid for it. As regards suggestions submitted to the sub-committee, these are entered on the agenda of the meetings and discussed in due course, those for which there was no time at one meeting being given priority at the next. A report is drafted on each question, and the results and consequences of any decision taken are submitted to a subsequent meeting. In this way every question is regularly followed until it has reached a satisfactory conclusion.

An examination of the documents placed before the various sub-committees provides a striking illustration of the way in which the employees participate in the life of the undertaking, not only by doing their ordinary jobs but by the active interest they take in all the details which are brought into prominence in the course of the discussion of practical suggestions. To take one example, a question of cardinal importance in the constant transport of materials in process of manufacture from one department to another is that of the state of the flooring, any defects making it difficult to wheel the trucks. Hence discussions are constantly arising on this point, in connection with repairs and also with the choice of the materials which will ensure the strongest and least slippery surface. Similar questions arise in regard to the convenience of communicating doors or facilities for the processes of washing. These discussions show that responsibility for the efficient operation of plant and the satisfactory condition of the premises is no longer left to the departmental heads alone, but that each worker is

entitled to report any changes or improvements he considers likely to facilitate his work. As this faculty is by no means illusory, but is constantly and fully used, the freedom to propose and discuss practical suggestions has a visible and important psychological influence on the staff. This influence is especially noticeable in the production and commercial service committees. In these committees it is the vital principles of the firm's existence that are at stake, and all their members vie with each other in searching for new formulæ or better ways of presenting the products with a view to promoting the firm's business. Even sales policy is discussed under certain of its aspects, the committee sometimes proposing that the price of a given article shall be reduced in order to increase sales and enable a more efficient use to be made of the raw materials from which it is manufactured. Moreover, there is no danger that this work of collaboration in which the staff participates will prejudice the general principles of management, since, as already stated, most of the sub-committees' meetings are held in the presence of the managing director or of his representative, who takes an active part in the discussion, helping to regulate and guide it.

What is especially remarkable is the co-existence of these bodies for discussion with an organic and technical structure of the undertaking conforming to the strictest canons of scientific management. Their successful working shows that their existence is in no way incompatible with efficient technical organisation, to which it serves as a valuable adjunct rather than as the hindrance which it is usually considered.

Certain discussions which have arisen out of a kind of general consultation throw an interesting light on what may be termed the mental life of the undertaking. For instance, it may be noticed one day that too much drinking water is being used. A memorandum is accordingly circulated to all the chiefs of section and sub-committees, calling the attention of the staff to the importance of avoiding all waste of water, and after a few days the opinions expressed on this question constitute a file which shows how keenly all the members of the staff have applied themselves to finding ways of effecting the economies demanded by the management. One employee reports cases of dripping taps which could be repaired ; another, rubber tubing which is in bad condition. More important suggestions point out that less water could be used if the order of the washing operations were changed ; or that, as the factory has two water

supplies, one of spring water and the other of river water for purposes which do not call for such strict hygienic precautions, the latter, which is cheaper, might be used for certain processes for which spring water was formerly employed.

The organic system of relations applied in the Géo Factory is completed by an annual report by the head of the firm on the occasion of the general meeting of the pension fund. Without going into details of the progress of the firm's business, this report gives the main facts necessary to form a judgment on the trading results of the current year. This custom too has a certain psychological importance in fostering a good spirit among the staff. In direct contrast to what takes place in many other undertakings, where the workers are kept in total ignorance on the subject and often have no opportunity of ever seeing or hearing the heads of the undertaking in which they work, the regular presentation of this report in itself undoubtedly helps very materially to build up the unity and *esprit de corps* which are a salient feature of the undertaking. In the same connection it is interesting to note that all those who have an interest in the firm are also employed in it, so that the common idea that the staff works for the benefit of unseen shareholders who take no active part in the work entirely fails to apply.

Another original feature of the undertaking is that absolutely no difference is made in the treatment of men and women workers on the one hand and of the salaried grades on the other. Whereas in most undertakings salaried employees are entitled to special privileges, especially in regard to the granting of holidays or bonuses, complete equality is the rule in the Géo Factory, and hence the jealousies usually aroused by such discrimination are also absent. An outward sign of this equality appears in the workers' clothing ; for hygienic reasons the whole staff is obliged to wear overalls and caps, laundered at the firm's expense, which are exactly the same for all categories of its employees.

Social Welfare Schemes

We have seen that the worker's first contact with the firm is made through the medical service on his engagement. Once engaged, he remains under the protection of a highly organised welfare service under a woman superintendent.

For the women workers there is a properly equipped children's nursery, where mothers can leave their babies in the care

of trained attendants. The smallest children are regularly put to sleep, given their bottles, and kept under competent medical supervision. Weather permitting, they are placed out in the open air on a roof garden.

This special service, which is quite expensive to run, is not provided free. A daily charge of 1.50 francs for every child under 18 months and 3 francs for every child between 18 months and three years is made towards the cost of the purchase and laundering of linen, milk and food, and medical supervision. According to information supplied by the firm, this charge covers only part of the expense of maintaining the nursery. It may be added that every precaution is taken to guard the children against any kind of infection, any child found to be suffering from some disease being immediately removed.

For the older children a flat roof in another part of the work was arranged as a kindergarten in 1932. Cloak rooms and lavatories are provided, and a play-room containing various toys and special equipment for small jobs the children are taught to do by the superintendent. There is also a large, well-lighted rest room with camp beds for the children to rest on in the afternoon.

If the mother wishes, the child may be taken home at noon for the mid-day meal; but if she prefers to leave it at the works it is given a meal at mid-day, and something light in the morning and afternoon as well, at an extra charge of 1 franc. Formerly this service was completed by a scheme to send children to a holiday camp organised by the Managing Director, but for some years past the management has confined itself in this field to making suitable arrangements with outside organisations. In 1926, however, the Social Welfare Committee proposed that a special holiday camp should be formed for the Géo Factory, and this is now in process of organisation.

As regards other measures for child welfare, it may be recalled that recent French legislation, namely the Family Allowances Act of 11 March 1932, requires industrial employers to pay special allowances to workers with dependants and prescribes the setting up of an equalisation fund for each large industrial category. In the pork-butchers' trade this Act has been applied only since 1 March 1935. But long before family allowances were made compulsory by law the Géo Factory had introduced a similar scheme for those of its workers who were family breadwinners. As early as 1920 the firm introduced a scheme

of allowances at rates which have since been gradually raised to keep pace with the cost of living, and at present are as follows :

Number of children under 14 years	Allowances paid to Workers and salaried employees	Allowances paid to Self-supporting women workers and employees
	Francs	Francs
1	30	60
2	70	120
3	120	200
4	200	280
Each additional child	80	80

Since the Family Allowances Act came into force, i.e. since March 1935, the special rates for allowances to self-supporting mothers have been abolished and only those given in the first column now apply. Moreover, the allowance is now normally paid only up to the age of 13 years, but may be continued until 16 years for children who have entered apprenticeship or are continuing their education.

As regards the welfare of the staff itself, the health file opened for each worker on engagement serves as the basis for subsequent medical supervision over newcomers to the works for whom it has been recommended as desirable. There are two doctors attached to the works, one for full-time duty, including medical examinations on engagement and in case of accident, and the other chiefly for periodical visits and special treatment for members of the staff who may consult him individually. As a result of this medical supervision, changes of occupation may be recommended for certain workers; in some cases, too, regular special treatment or special rest periods may be granted. An analysis of the health files shows that this system of supervision has helped very materially to raise the standard of health among the staff, a matter of special importance in an undertaking producing foodstuffs.

Workers who are found to be suffering from some ailment are not sent to institutions managed directly by the works. A social welfare service attached to the works provides certain elementary treatment with a view to helping the workers' families to follow the doctor's instructions. For the rest, as the staff is covered by the statutory social insurance scheme, every worker is free to obtain treatment outside the works from a doctor of his own choice. As the staff has set up its own pri-

mary fund [1], however, it is possible that a special dispensary may be set up later.

In addition to the measures for maintaining a good standard of health among the staff, kindred schemes have also been introduced to increase the social security of the workers' families. There is, in particular, a Mutual Welfare and Pension Fund, which was set up in 1910 and has continued to function since the Social Insurance Act came into force.

As its name implies, the object of this fund is to promote saving and provide old-age pensions and relief to orphans. It also operates as a credit society to assist members who wish to endow their family with a little property by building a house. The fund is assisted by voluntary grants from the firm. Regular weekly contributions are made on each pay-day by the members, and an employer's contribution varying with, and generally in proportion to, the amount of the worker's contribution is also paid into the fund. In this way 3 per cent. Government annuities are gradually purchased in the name of the individual members of the fund; these remain their own property and are not subject to deduction in the event of resignation or dismissal. The annual rate of the pension after 20 years' service in the firm is 4,000 francs; for any additional period of service the rate varies with the length of membership. This pension is quite independent of the amount of the contributions, which are returned to the members in full, including the employer's contributions and the accrued interest, in the form of bonds, the beneficiaries being free to sell them or to draw the annual interest they bear in addition to the pension awarded. The pension fund is financed by annual grants from the firm. Similar provision has been made on behalf of widowed women workers.

According to information supplied by the firm, the fund had 705 members at 22 April 1934. At the same date the workers' contributions amounted to 1,045,020 francs and the employer's contributions to 1,794,778 francs, while the sums repaid to members who had left the firm for one reason or another amounted to 922,556 francs, of which 237,194 francs were paid to pensioners and 77,261 francs to widows and orphans.

[1] The primary funds are societies freely formed by the insured persons to provide for the application of the Act, i.e., the payment of benefits, in a given occupation or locality with the aid of contributions passed on to them by the Departmental Social Insurance Service.

The fund had assets of 2,935,586 francs in the form of 124,894 francs' worth of French *rentes*.

It should be added that the fund is an independent body, being managed by members elected by the general meeting and without the intervention of any representative of the management.

Like many other undertakings, the Géo Factory has been induced by the various advantages attaching to such schemes to set up a works canteen. Catering is of course facilitated by the nature of the firm's business, but the canteen has full freedom to purchase any supplies it may need from outside. It is, in fact, an autonomous institution, and the management of the firm has confined its intervention to providing the necessary premises and equipment and supplying water, heat and light. These facilities enable the canteen to provide mid-day meals at an exceptionally small charge.

Running costs are reduced to a minimum by dispensing with a waiting staff. Everyone fetches the utensils he needs himself, and washes them before leaving the room. Use of the canteen tables is allowed to those who bring their own food and they may have it re-heated if they wish.

In addition to these facilities, the staff can obtain any of the firm's food products at wholesale prices. Precautions are taken to prevent this privilege from being abused, and in particular to prevent the resale of articles bought at these special prices, each worker being entitled to buy only as much as he needs for his own household. The goods are not sold at the works, but at the warehouse from which they are distributed to the local retailers.

There is also a rest room attached to the canteen, which provides recreation for workers after their meal without their having to leave the works. Tables and chairs are provided, and various games and illustrated periodicals, together with a library which can be used for a monthly subscription of only 2 francs.

The rest room, like the canteen, is an independent institution. The staff use it at their own convenience for any meetings or social evenings they may organise, and pay any maintenance expenses out of contributions levied at a rate fixed by themselves.

The rest room is the headquarters of a sports club, founded with financial assistance from the undertaking, to which most

of the staff belong. A considerable sum had to be spent on the purchase of a sports ground, of an area of 3,000 square metres, for drill and games. The ground is large enough to accommodate two tennis courts, basket and volley ball and a running track. Part of it can even be flooded to make a skating rink. As this accommodation proved insufficient, however, the firm also purchased another field of 25,000 metres, not far from the works, to provide a hockey and netball ground and a private garden for the use of the families of persons employed in the works.

Although these large initial expenses were borne by the works, the various sports clubs which are formed freely by the workers are self-supporting, each club fixing the rate of subscription necessary to cover its own expenses.

The Géo Factory has also had to concern itself with the problem of housing its staff. It was originally led to make provision in this field by the particular characteristics of some of its labour, much of which comes from local pork-butchers' shops which still keep up the practice, traditional in handicrafts, of employing resident journeymen and apprentices. Although the works itself is an industrial organisation which no longer has anything in common with the artisan system, it has nevertheless been obliged to conform to this custom and to provide living accommodation for this class of its workers.

Starting from this group of workers, the firm subsequently proceeded to help the rest of its staff to overcome the housing shortage, which at one time was acute. Several buildings were bought and reconditioned for this purpose, the rents being calculated to yield interest at the very low rate of 1 or 1.5 per cent.

Every precaution is also taken in the Géo Factory to prevent industrial accidents, and in particular infection, which is a constant source of danger. All cuts are dressed at once in the surgery by the social welfare service, the workroom and office staff not being allowed to render first aid.

The special attitude adopted by the firm on the question of workmen's compensation is also worthy of notice, although its particular method of meeting this liability is not unique. Under the 1898 Act, most employers are required to provide compensation for injured workers, and they usually cover their liability by taking out special insurance policies with private companies. In common with a few other undertakings, the Géo Factory has made provision to meet this risk out of its own resources, and only safeguards itself against the heavy risks

attaching to serious accidents by means of a special contract with the Deposit and Trust Fund.

In the case of other minor accidents the firm takes full responsibility for the necessary treatment, while respecting the statutory right of the injured worker to obtain treatment where he pleases. It has organised its own surgery, with the necessary staff and equipment, and has thus been able to comply with the statutory requirements more cheaply than is possible under the policies of most insurance companies. Thanks to this saving in expense, the firm has sometimes been able to pay the injured worker half his wages from the first day of incapacity instead of from the fifth, as provided under the Act, in the case of accidents leading to a short period of disablement.

The firm has extended the autonomous system adopted for accident compensation to the application of the Social Insurance Act as well. Taking advantage of the faculty allowed to insured persons to set up primary funds for the purpose of levying contributions and meeting the expenditure entailed by the application of the scheme, the staff of the Géo Factory transformed the existing mutual aid fund into a fund conforming to the statutory provisions. This fund, which has its headquarters in premises provided by the firm, has various practical advantages, including that of economical management. As a result, its financial position is satisfactory enough to enable it to contemplate a considerable extension of the benefits at present provided for its members.

Conclusion

The foregoing brief account of the Géo Factory shows the undertaking as one which has managed to adjust itself to the new industrial conditions created by general economic development and by the social legislation introduced in France since the war.

Without carrying mechanisation to any considerable lengths, and purely by the application of logical management methods, the management has succeeded in obtaining a higher output from all its employees and in constantly improving the quality of its products. The results of this policy, consistently pursued for 15 years, are of special interest from the social standpoint because they have been accompanied by a steady and parallel improvement in the material and moral conditions of both

men and women workers. Their interest is increased by the fact that the staff has been associated throughout with the progressive policy of the management through the medium of a remarkable kind of machinery for collaboration.

Scientific management in the Géo Factory has also had a very marked influence on the harmonious development of industrial relations, that is, the human contacts of all kinds which occur within the undertaking. Its effects in this domain may be classified under four heads as follows:

(*a*) a sense of security, which the staff derives from its confidence in the commercial soundness of the concern and from the various social welfare schemes introduced;

(*b*) a team spirit and an interest in the firm's general prosperity, due to the satisfactory working of the collaboration committees;

(*c*) an absence of friction in the performance of work, all duties having been carefully defined and measured for workers and employees of all grades; and the satisfaction derived from the confidence that individual merit will be recognised, thanks to the rigorous control of each worker's performance;

(*d*) cordial and regular relations between all those who take part in running the business, due to the fact that these relations have been precisely defined and their mutual reactions and interplay carefully studied.