and want it at the same cost if not less than what they spend on their traditional *bhakri*. This question of cost can be solved if the employers subsidize the cost to the extent of at least half. The alternative solution would be to raise the wages of the workers to a 'living wage' standard according to local conditions provided that every worker shall take a balanced meal in the canteen.

It is doubtful if these measures will be voluntarily adopted either by the employers or the employees unless the government make those measures obligatory through legislation.

(*b*) *Education of the employees and employers.*—It has to be brought home to the workers that a balanced diet is a necessity for health and happiness and ultimately for increasing their earning capacity to their own benefit. The employers have yet to understand that spending money to feed the workers is no bad investment, it will ultimately pay in return of increased output and more profit. Most workers have no money left, after feeding and clothing themselves and their families, to improve the diet. Prohibition may cause some reduction in spending on luxury but the labouring man must have some mental and physical relaxation. If he can't drink he will gamble or try illicit drink. Planned recreation facilities are as essential as canteens or nearly so.

(*c*) *Co-operation.*—There is a sense of distrust prevailing between the employers and the employees. Any new action undertaken by the employer for the benefit of the employees is looked upon with suspicion and thought to be meant for the benefit of the employers only. Unless the workers give their full co-operation and take advantage of the factory canteens they will always be running at a loss. Almost all the canteens which are run by the employers in Central Provinces have been running at a loss. In fact two factories introduced balanced meals in their canteens and had to discontinue them for want of sufficient support from the workers.

To win the confidence of the workers they must be represented by at least 50 per cent in the managing body of the canteen. And the running of the canteen on a co-operative basis will go a long way to get the largest response from the workers.

(*d*) *Religious susceptibilities.*—No worker would object to drinking tea and snacks with fellow workers of other religions or castes but the ghost of caste prejudice at once haunts him as soon as he has to take cooked meals with them.

At the start arrangements will have to be made in conformity with the religious susceptibilities, but they may lapse after a time.

The fact that he spent his cash on frivolous amusement, etc., is due to his lack of appreciation of the need for better food for himself and his family and his ingrained conservatism and contentment with a very low standard of living. The uneducated definitely need education on this matter.

Absenteeism is mainly due to (*i*) fatigue and (*ii*) unusual cash receipts, a man used to very low wages feels rich and does not feel the need to work regularly.

Unless and until better housing is provided for the industrial worker I feel it will be impossible to make him appreciate the value of a better standard. This has been the experience in Europe both during the industrial revolution in the middle of the nineteenth century and in more recent years following slum clearance activity. Give a man the possibility of a decent home life and he will quickly develop personal pride and joy in his house and family and will make effort to improve his position still further.

Till such time as the workers do not attain that mental state of voluntary co-operation they will have to be persuaded by some sort of compulsion to spend a reasonable proportion of their 'living wages' for a balanced meal in the factory canteen.

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RICE GRUEL IN FOOD PREPARATIONS

SCHOOL-FEEDING EXPERIMENTS WITH KANJI (GRUEL) PUDDING AT BANGALORE

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DURING the cooking of rice in water a certain portion passes into solution and that is usually rejected because it interferes with the appearance, taste, flavour, keeping quality and digestibility of cooked rice. In some parts of the country, extra quantity of water is added and the liquid drained again to remove the last traces of the gruel. This practice is still being continued in spite of the increasing amount of knowledge regarding the attendant loss of vitamins, proteins, minerals and other essential food substances in the gruel.

Rice Gruel is best separated and used with other foods

The general practice is not altogether faulty : in fact, it is now established that the rice with the gruel adhering to it becomes a pasty mass that is not easily penetrated by digestive juices. Rice is best digested when the cooked grains

remain separated and that would be possible only by removing the gruel. A practical approach to the problem would therefore be to separate the gruel from rice and use it as a food in some other form.

The gruel may contain 4 to 10 per cent solids, depending on the variety and condition of rice, degree of boiling, amount of water added and so forth. The gruel from previously washed raw rice is a fairly clean product containing 6 to 8 per cent starch : that from parboiled rice is usually thinner (containing 2 to 4 per cent starch) and somewhat strong in smell. The vitamin, protein and mineral contents are variable, depending on the extent of washing prior to cooking. If the washing is not extensive, the major part of the water soluble vitamins would pass into the gruel.

The Gruel can be mixed with milk for souring

Rice gruel develops acidity on standing, lactic acid being the chief product. The fermentation proceeds quite smoothly on admixture with cow or buffalo milk. We have found that the gruel could be added to the extent of 25 to 30 per cent of the volume of milk and that the mixture develops acidity and sets to a thick curd as in the case of pure cow or buffalo milk. This would definitely be an advantage to homes which prepare their own curd and butter-milk and which could do with some extra supply. The acidity developed during the lactic fermentation helps to preserve the vitamins and this procedure would therefore be a simple and elegant method of using the gruel produced in most homes. The attendant chemical and biological changes have been studied and will form the subject of another communication.

Another and an equally elegant method would be to set the gruel to a solid and to use it as a sweet pudding. This type of preparation is quite popular besides being fairly cheap.

Preparation of Kanji (Gruel) pudding

At the invitation of the Bangalore Civil and Military Station authorities, we took up the standardization of conditions for this preparation and to produce it on a sufficiently big scale to provide mid-day meal for about 1,100 children per day. The procedure followed by us may be outlined as follows : The gruel (about 600 lb.) is obtained through the courtesy of the 6 M.T.T.C. and delivered each day between 12 noon and 2 p.m. It is not required till the next morning, so we bring it to a quick boil and store it in previously steamed vessels. On the day of use, it is again raised to boil and roasted, white wheat flour (35 lb.) in the form of a paste is added in rapid instalments with stirring. Sugar (35 lb.), salt (3 lb.) and edible colour (yellow, orange or any other pleasing shade) are added in quick succession. After about 15 minutes of cooking, a flavouring material (cardamom powder or vanilla essence) is added and the pudding, which is already fairly thick, rapidly transferred to the storage vessels and allowed to set. It is then sent out to the schools for distribution to the children at half a pound per child.

It may be added that if previously boiled, the gruel keeps well for even 24 hours. Wheat flour roasted to a crisp brown (by heating in cast iron pans) cooks more easily, sets better and imparts a more agreeable flavour than the raw flour. Rice or corn starch can be used in place of wheat, but they are more expensive at the present time. Whole jowar or maize imparts a bitter taste besides feeling rather coarse on the tongue. With some processing, these millets can be used in place of wheat. Sugar is the most expensive item in the preparation, but we have found it difficult to reduce it to less than 7 per cent on the weight of the gruel. We have tried to replace sugar partly with saccharine, but the resulting preparation has not the same good taste or food value as that of the preparation with sugar. Gur (jaggery) affects the flavour : moreover, it is now more costly than white sugar. Cane juice can be used in place of white sugar, and where it is available, it will be advantageous to use it after neutralization and clarification. Increasing amounts of salt up to 0.5 per cent improve the taste. Edible colours are available and we have found that the yellow and orange impart pleasing shades. We were first using vanilla essence (made up with vanillin, coumarin, glycerine and alcohol) but found later that powdered cardamom (20 tolas to 500 lb. of gruel) imparts a more pleasing flavour.

The pudding thus prepared is best consumed within 8 to 10 hours after preparation. It can be kept longer in cold storage, but this facility may not be generally available. On prolonged standing the jelly breaks up, accompanied by development of acidity and other secondary changes which should be avoided.

Incorporation of Soya paste improves taste and flavour

For some time we were incorporating 2 per cent skimmed milk powder but had to subsequently give it up because of the cost. More recently we have been incorporating the paste* obtained after pressing out soya milk at the rate of 125 lb. to 500 lb. of rice gruel. This addition improves the taste and flavour. Our total production now works out to about 675 lb. of pudding per day.

Cost of the preparation

The preparation of the pudding occupies only 3 to 4 working hours, so we employ the same

*The paste should be first added to the gruel and the wheat flour added right at the end. Otherwise, the preparation may not set properly.

staff for both this preparation and that of soya-bean milk and curd. After making due allowance for the proportionate expenses, materials used, depreciation on value of equipment, supervision, provision for unforeseen expenditure at 15 per cent and margin of 6 per cent as profit, the cost would work out to about one anna per pound. This would not include the cost of transporting the gruel (which is collected and delivered free by the kind courtesy of the army authorities) or distribution of the pudding to the different schools. Even after providing for these at one pice per pound, the cost is still attractive. The cost per child would work out to about 7½ pies which is quite modest.

In the beginning we had to contend against a good deal of prejudice, but the product soon became steadily popular. Although we are using gruel from parboiled rice, the final product has nevertheless an attractive flavour and taste corresponding to that of more expensive preparations served in restaurants.

Possible improvements

The preparation is deficient in fat, the main source of this constituent being only the added soya paste (after extraction of milk) which contains 2.5 to 3 per cent oil. Extra fat in the form of deodorized oil, vanaspati or ghee would be rather expensive. About 1.5 pies per child would be about the minimum required to increase the fat content by about 1 per cent. Addition of a savoury would provide a good supplementary dish, but this, again, would add to the cost.

The children receiving the pudding are under the observation of the health authorities. Systematic records will soon be available. The pudding has also been fed to experimental animals and has been found to have a useful supplementary value when added to poor rice diet.

Gruel is still wasted. Other cities can produce similar preparations

The conditions of the preparation have now been standardized and the operations reduced to a routine. It should now be possible to start similar production at other centres as well. The gruel can be collected from any of the big feeding centres where rice is eaten. With proper organization, many big towns can produce substantial quantities of a clean, wholesome food material which can be fed either to the poor or to young school children who will eat it with much relish and benefit.

The above investigation would not have been possible but for the keen interest and enthusiasm of Mr. P. M. Jayarajan, Collector and Controller of Civil Supplies, Civil and Military Station, Bangalore, to whom our warm thanks are due. Our thanks are also due to Messrs. M. N. Srinivasa Iyengar and E. S. Krishna Iyer, who helped actively in the preparatory work and supervised the production.

UNDERGRADUATE TEACHING OF ANATOMY

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A. Introduction

SINCE publication of my (Khan, 1945) previous paper on 'The Organization of Anatomy Department' I have discussed this and allied topics with eminent anatomists in Britain, France, Switzerland, Canada and U.S.A. during my one-year tour in the West. Those who have completely endorsed the views expressed in this paper constitute a remarkable majority. The dissenting minority differed not on principles but in details. These principles have received unqualified recognition in the Bhore and Goodenough Committee Reports also.

The subject of the present paper, the standard and methods of teaching of anatomy to undergraduates, is a vital problem in medical education and has been dealt with extensively at special conferences and in the correspondence columns of the *British Medical Journal*, Society Addresses and Association Meetings since 1935. It was my privilege to discuss certain details in this connection with no less than twenty teachers in the West. What follows is a constructive analysis of all I could assimilate during this tour.

The trend of our conversation varied from country to country as the system of teaching anatomy and the time devoted to it differs in many respects in each country. To mention the time factor only, two academic years are spent in U.K. and Canada, and only one academic year in many schools in U.S.A. and U.S.S.R. Variation in time factor alone implies difference in the standard of knowledge of anatomy considered necessary for proceeding to clinical studies in different parts of the world. Such difference is attributable to the different methods of teaching as well as the influence of the tradition of the mother countries, France and England, over the system of medical education in the daughter countries. French school was the model for medical education in U.S.A. and English schools influenced the design of Canadian and Indian institutions. In Canada, the Toronto University gave in 1944 a lead in remodelling its system of medical education on American lines. At the Toronto school, teaching of anatomy is completed by the end of the first term of the second year. Dissection of head and neck is carried out in the second year