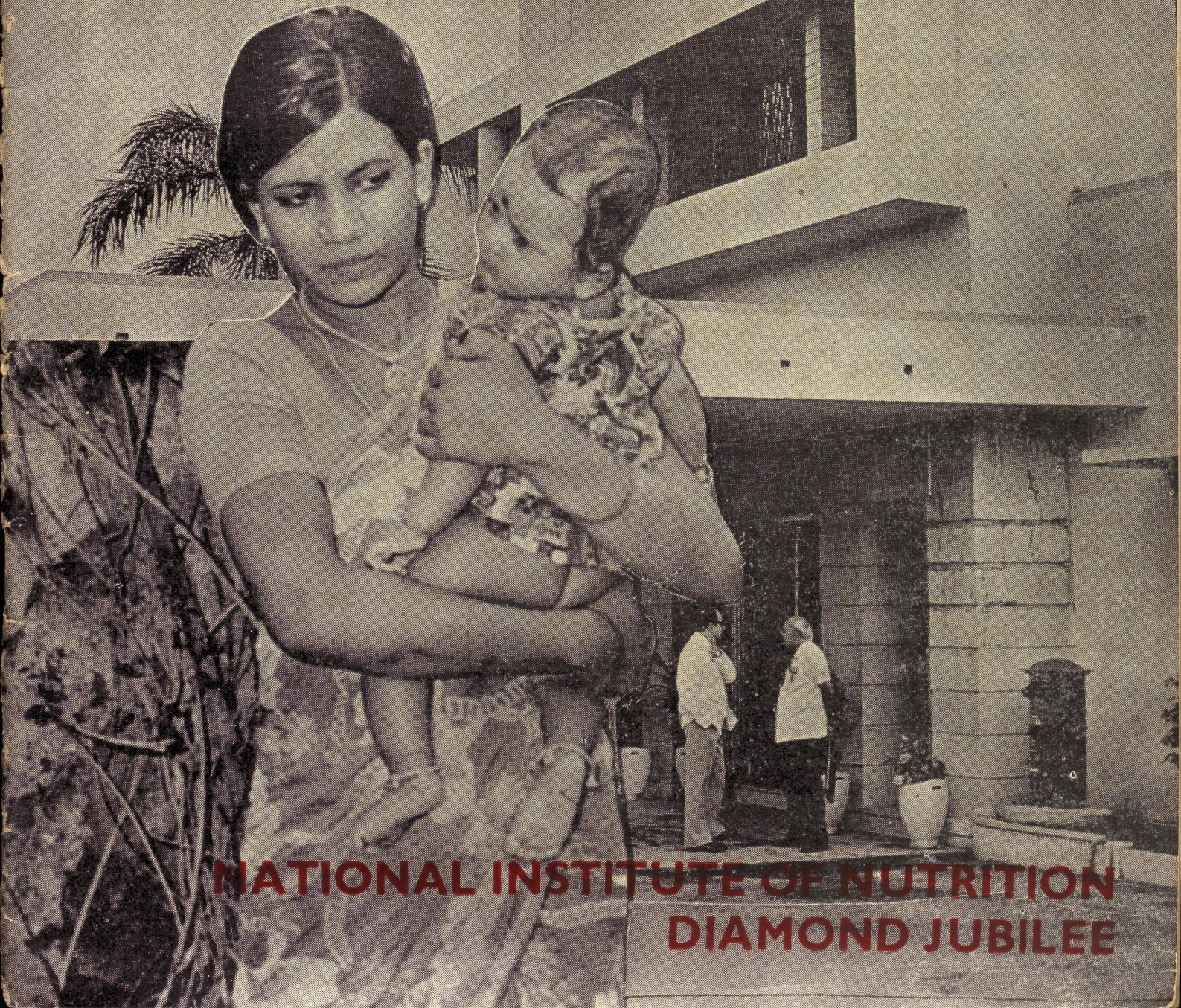


492

Swasth hind

OCTOBER 1978



**NATIONAL INSTITUTE OF NUTRITION
DIAMOND JUBILEE**

A demonstration of ACCI's deep involvement with your health is its massive Rs. 62.6 million pharmaceutical plant at Ennore, Madras.

ACCI's pharmaceutical plant is designed to manufacture a number of speciality drugs—right from the bulk chemicals to the finished products. Some of these drugs are internationally acclaimed for their efficacy in combating serious diseases. For example, "Atromid-S" and "Inderal" for the control and treatment of heart

disease; "Mysoline", a broad-spectrum anticonvulsant, outstandingly effective in the treatment of epilepsy; "Fluothane", a break-through in inhalational anaesthesia; "Savlon", "Hibitane" and "Cetavlon"—broad-spectrum, non-toxic antiseptics, superior in formulation and efficacy. "Tetmosol" for the prophylaxis and treatment of scabies and "Nilverm", a highly successful drug for the treatment and control of worm infestation in animals.

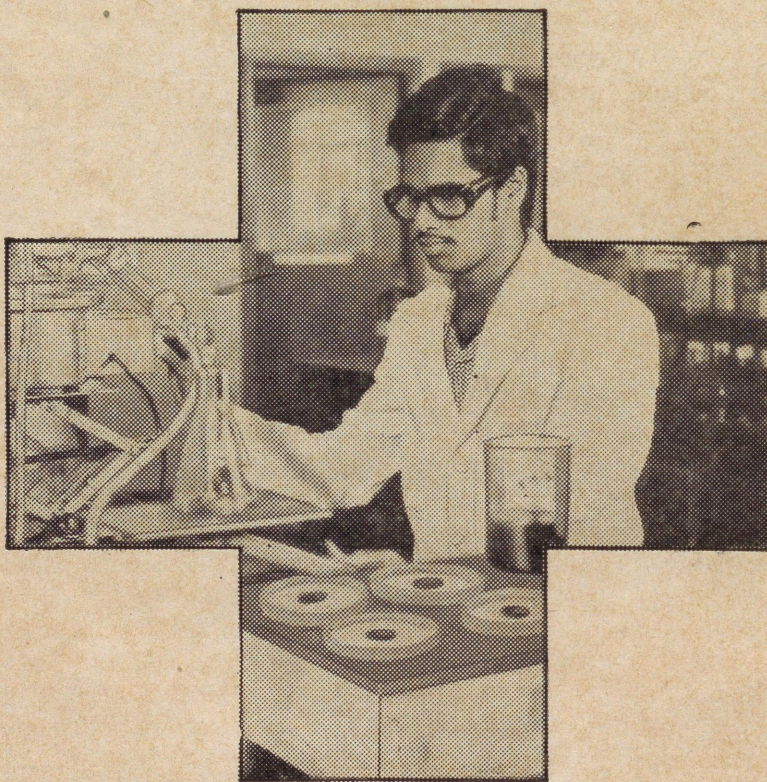


The Alkali and Chemical Corporation of India Limited

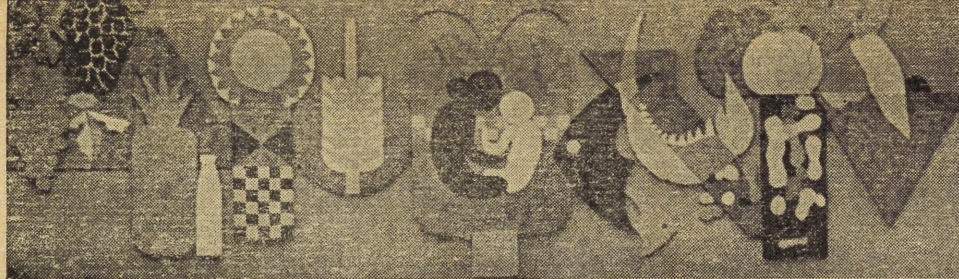
Pharmaceuticals Department
Ennore Express Highway
Ernavoor Ennore
Madras 600 057.

Regd. Office:
34 Chowringhee Road
Calcutta 700 071.

Growing proof of ACCI's commitment to your better health.



SAA/ACCI/2997



In this issue

- 242 **Improving nutritional status of people**
Dr S. G. Srikantia
- 248 **Three-dimensional approach to combat malnutrition—an interview**
M. L. Mehta
- 253 **Nutrition education : scope and research**
Smt. Parvathi Rau
- 255 **National Institute of Nutrition—an overview**
- 261 **Nutrition for different sections of community**
Dr Pralhad Rao
- 265 **Training programmes in nutrition**
Dr S. C. Balasubramanian
- 268 **Health in Parliament**

III cover Community health workers' page—Help Control Malaria

Editor : **T. K. Parthasarathy**

Asstt. Editor : **D. N. Issar**

Sr. Sub-Editor : **M. L. Mehta**

Layout artist : **S. L. Chaudhary**

Photos : **M. Y. Khan**

Editorial and Business Offices
Central Health Education Bureau
Kotla Marg, New Delhi-110002.

Articles on health topics are invited for publication in this Journal.

State Health Directorates are requested to send reports of their activities for publication.

The contents of this Journal are freely reproducible.

The opinions expressed by the contributors are not necessarily those of the Government of India.

SWASTH HIND reserves the right to edit the articles sent for publication.

Asvina-Kartika

October 1978

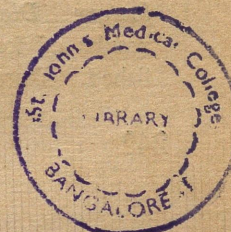
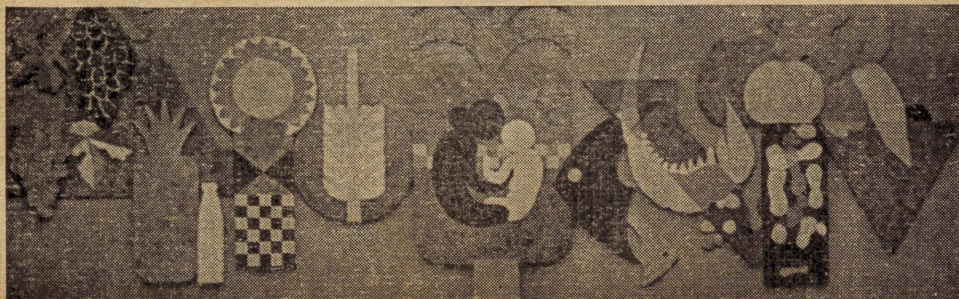
1900 Saka

Vol. XXII No. 10

Subscription Rates (Postage Free)

Annual .. Rs. 3.00 (\$2.50 or 9 sh)

Single Copy .. Rs. 0.25 (\$0.25 or 9 d)



IMPROVING

NUTRITIONAL STATUS OF PEOPLE

DR S. G. SRIKANTIA

The National Institute of Nutrition, set up in 1918, has made significant contributions in providing practical answers to the food and nutrition problems facing the country, especially relating to protein-energy malnutrition, blindness prevention due to vitamin A deficiency, prevention and control of pregnancy anaemias, dietary allowance to the Indian population, recipes for supplementary feeding programmes.

THE foundations for the National Institute of Nutrition were laid in 1918 when a sole scientist started what was then known as the 'Beri-Beri enquiry unit' in a single room in Coonoor, a hill station in South India. The scientist was Col. Sir Robert McCarrison, who can be said to have done pioneering work at a time when the subject of nutrition had not yet emerged as a science.

Col. McCarrison initiated experimental studies on the problems of beri-beri, goitre and urinary lithiasis. He also extensively studied the nutritive value of Indian diets in various regions of the country.

Col. McCarrison was succeeded in 1935 by Dr W. R. Aykroyd. During his term, the scope of research was enlarged and the laboratory was physically expanded. Studies on nutritive value of Indian foods were continued. The *'Health Bulletin No. 23—Nutritive Value of Indian Foods and Planning of Satisfactory Diets'*—incorporating the results of food analysis was published. During this period, 1935-

46, under Dr Aykroyd's stewardship, a public health orientation was given to the research programmes of the Nutrition Research Laboratories. As early as 1937, a training programme in nutrition was initiated for medical officers, health visitors, social workers, etc.

For a short period, 1945-46, Dr R. Passmore was the Director, when studies on nutritive value of foods, effects of supplementation of poor rice diets and biochemistry of the B-complex vitamins received attention.

Dr V. N. Patwardhan took over the Directorship of the Laboratories in 1946. The activities of the Laboratories were further diversified. It was due to Dr Patwardhan's efforts that the Laboratories were shifted to Hyderabad and the NRL found a permanent home on its own campus near the Osmania University. Spacious buildings on a 33.25-acre estate housed the Laboratories and new equipment were added. With the new hospital and field facilities which became available at Hyderabad, the scientific pro-

gramme of the Laboratories was further expanded.

In the beginning of 1961, Dr C. Gopalan took over as the Director of the Laboratories. The period that followed saw many changes in the Laboratories. Recognizing the need and benefits of the multidisciplinary, integrated approach for the solution of nutritional problems, Dr Gopalan introduced several new disciplines to enlarge the scope of research. His vision, dynamism and efficient administration have largely been responsible for not only the expansion of the Laboratories, but also for shaping the policies and philosophy of the Institute's research work.

Research on pellagra, protein calorie malnutrition, lathyrism and fluorosis was extensively carried out. Public health aspects of nutrition were given emphasis which resulted in the formulation and implementation of national nutrition programmes for the prevention of blindness caused by vitamin A deficiency and iron deficiency anaemia in pregnant women.

In view of the enlarged scope of the work, the Laboratories were re-designated as the National Institute of Nutrition at the time of its Golden Jubilee in 1969.

The immense facilities such as easily approachable urban as well as rural community centres, hospital clinics, sophisticated laboratories and an excellent library are available to the Institute. This enabled the NIN to emerge as one of the first organizations in India to offer regular training programmes in nutrition. Collaboration with international organizations such as the World Health Organization and UNICEF adds an international flavour to many of the training programmes.

Specific objectives

The Institute has several specific aims and objectives. Some of them are: (1) to develop practical answers to the food and nutrition problems facing the country, the solutions as far as possible to be within the existing socio-economic framework, (2) to carry out operational research connected with implementation of public health nutrition programmes, (3) to understand the interaction of food and nutrition with other life activities, (4) to train public health and ancillary personnel for adequate participation in nutrition action programmes, (5) to provide training to key personnel engaged in teaching of nutrition in the fields of medical, agricultural and veterinary sciences, (6) to train young scientists in nutrition research, (7) to disseminate nutrition knowledge to the community, and (8) to advise Government and other organizations on matters of food and nutrition.

Nutrition is a subject which interacts with many activities in life. In order to be able to fulfil the aims and objectives, a multidisciplinary

approach becomes a pre-requisite. The staff pattern of the Institute reflects this—biochemists, biophysicists, clinicians, dietitians, geneticists, pathologists, social scientists and statisticians work as a close-knit team. Although the Institute has several divisions, there is free interaction between them in the actual conduct of research, which itself is predominantly problem-oriented. The scientific staff is well supported

by trained technical staff and an efficient administrative staff.

Although the Institute's activities are broad-based and encompass the whole area of food and nutrition, it is possible perhaps to identify periods in its life in which different facets of nutrition had received particular emphasis. Diet surveys and nutrition surveys constituted important activities in the earlier years as



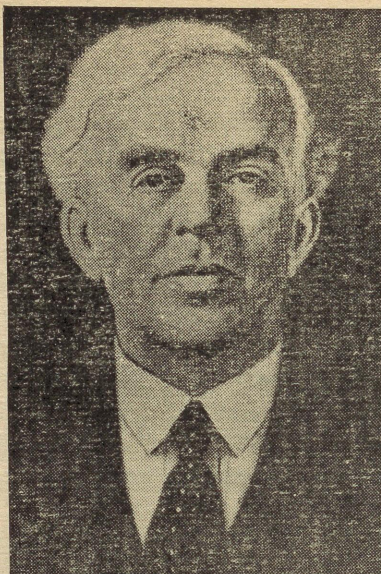
A child suffering from protein-calorie-malnutrition admitted into the Niloufer Hospital, Hyderabad is being fed on a balanced diet as part of the treatment.

was the analysis of a large number of foods commonly used in our country for their chemical composition and nutrient content. These studies have, in fact, provided a good base on which further data have now been built. Also, during this period, much of the research was done in the laboratory using experimental animals and it was only during the early fifties that studies on clinical nutrition were initiated in the Institute. Since then facilities to carry out this type of work have been considerably expanded, and clinical research now constitutes a major component of the overall research output of the Institute.

Also, in earlier years, many of the studies undertaken were, what might be termed as "straight-forward nutrition studies", but during the last decade or so, emphasis has been on looking at food and nutrition problems not in isolation but in relation to other factors which are known to modify health and well-being. This is clearly a change in the right direction and research activities of the Institute now deal with a host of such interactions. To name a few—the role of nutrition in metabolic diseases, nutrition and infection, nutrition, work output and productivity, nutrition and mental function, nutrition and genetic effects, nutrition and drug metabolism and nutrition-agriculture interphase.

Collaborative studies

Nutrition-agriculture interphase received considerable attention in the mid-sixties coinciding with the agricultural thrust made in the country regarding high-yielding pest-resistant and drought-resistant varieties of foodgrains. A nutritional dimension was built into this aspect of agricultural breakthrough in collaboration with the Indian Council of Agricultural Research. Analy-



Col Sir Robert McCarrison
first Director of NIN (1918-1935)



Dr W. R. Aykroyd
second Director (1935-1948)



Dr V. N. Patwardhan
fourth Director (1946-1960)

sis of foods acquired an additional purpose. This was not only to ensure that the newer varieties of foodgrains grown in the country were satisfactory from the nutrition standpoint, but also to identify varieties of germplasm with better than average nutrient composition. It was hoped that these studies would provide the basis for breeding better strains of foodgrains. This collaborative effort has, in fact, been very useful and, as a result of these studies, improving nutritional status of population groups and, hopefully, of even controlling some specific deficiency diseases through the identification, breeding and selective propagation of suitable varieties of foodgrains are within the realms of possibility.

Toxins in foods

Another aspect of nutrition and agriculture is the increasing evidence that toxins in foods may pose serious health hazards, particularly in rural areas. There are some foods which are known to contain toxins as an integral part, while there are other foods which become contaminated with toxins either in the field itself or during storage. Inadequate post-harvest technology relating particularly to storage can predispose proliferation of fungi and elaboration of toxins. Aflatoxin contamination of various foods, fusarium contamination of sorghum and ergot contamination of bajra are cases in point. The relevance of these to human health has formed an important facet of the Institute's activities in recent years. Research has now made it possible to understand the relationship between levels of toxin contamination in foods and outbreaks of disease in man. It has also been possible to determine permissible or safe levels of toxins and other contaminants in foodgrains.

Although in developing countries malnutrition is widespread, the

quantitation of the extent of malnutrition has always posed problems. The incidence of clinical deficiency signs has been and continues to be used for this purpose. It is, however, recognized that the use of this method may under-estimate the quantum of malnutrition to an unknown extent since clinical defi-

available. Some of them are simple and some others quite complex and sophisticated. In the estimation of the extent of malnutrition it is now customary to use these criteria in conjunction with clinical evaluation. Even this is not without limitations.

One of the concepts developed at this Institute in recent years relates to malnutrition in terms of function which perhaps is the most rational way of viewing the problem. To design studies to enable the development of criteria which define functional impairment is not easy, and should the Institute succeed in this effort, a truly realistic picture of the nutritional status of our population would become possible. A base which is essential for the planning and implementation of nutrition programmes would then have available.

Problem-oriented studies

Much of the work done in the Institute to-day is problem-oriented. There are two main ways in which studies are initiated. When a problem is identified in a community, clinical, laboratory and experimental studies are undertaken to understand the aetiopathogenesis of the conditions and an effort is made to develop suitable control measures. Possible measures are actually tested out in a community for their acceptability, practical applicability and logistics. It also happens sometimes that data generated in the laboratory suggest that they may have relevance to the community. Studies are then extended to the field which help in understanding the meaning and relevance of biochemical findings obtained under controlled ex-

perimental conditions, to real life situations.

Achievements

Among the contributions of the Institute, mention may be made of those relating to protein-energy malnutrition, particularly the observation that the primary bottleneck in the diets of pre-school children be-



Before

A Child suffering from protein-energy malnutrition showing swelling over the body and changes on the skin.

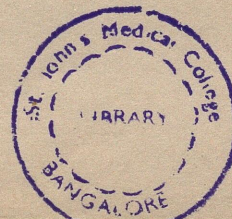
ency cases represent no more than the tip of the iceberg of malnutrition. In the more recent past, efforts to identify sub-clinical malnutrition have been made and biochemical assessment of nutritional status became a subject of considerable interest. As a result, a whole host of biochemical tests have now become

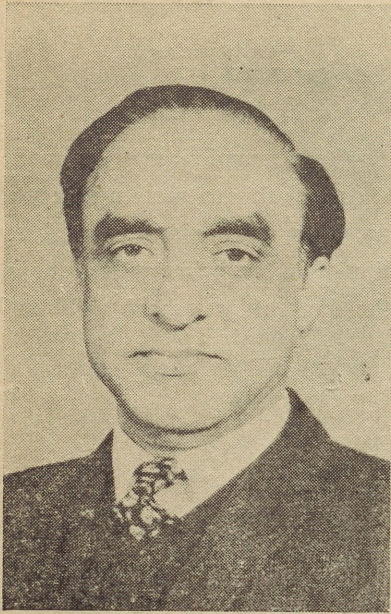


After

The same child recovered completely after treatment for a few weeks with a supplement containing vegetable proteins.

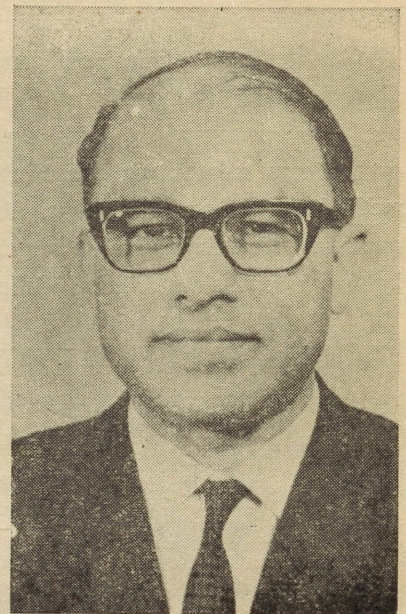
longing to poor communities is energy and not protein as was believed until recently—an observation that has enormous implications in the control and prevention of the disease; the recommendation of a national programme for the prevention of blindness due to vitamin A deficiency through the massive dose





Dr. C. Gopalan
Fifth Director
(1961-1973)

approach, wherein children between the ages of one and five years are given 200,000 units of vitamin A concentrate twice a year; the prevention and control of pregnancy anaemias through the distribution of iron and folic acid tablets during the last 100 days of pregnancy; fortification of common salt with iron as a public health approach to improve the nutritional status of the community; attempts to control the problem of neurolethyrism through the development of procedures



Dr. S. G. Srikantia
Present Director
(1973-)

Nutritional care of the school-going children is important as they need adequate food containing good nutrition for proper growth and enough energy for active life. Photo shows school children being examined.

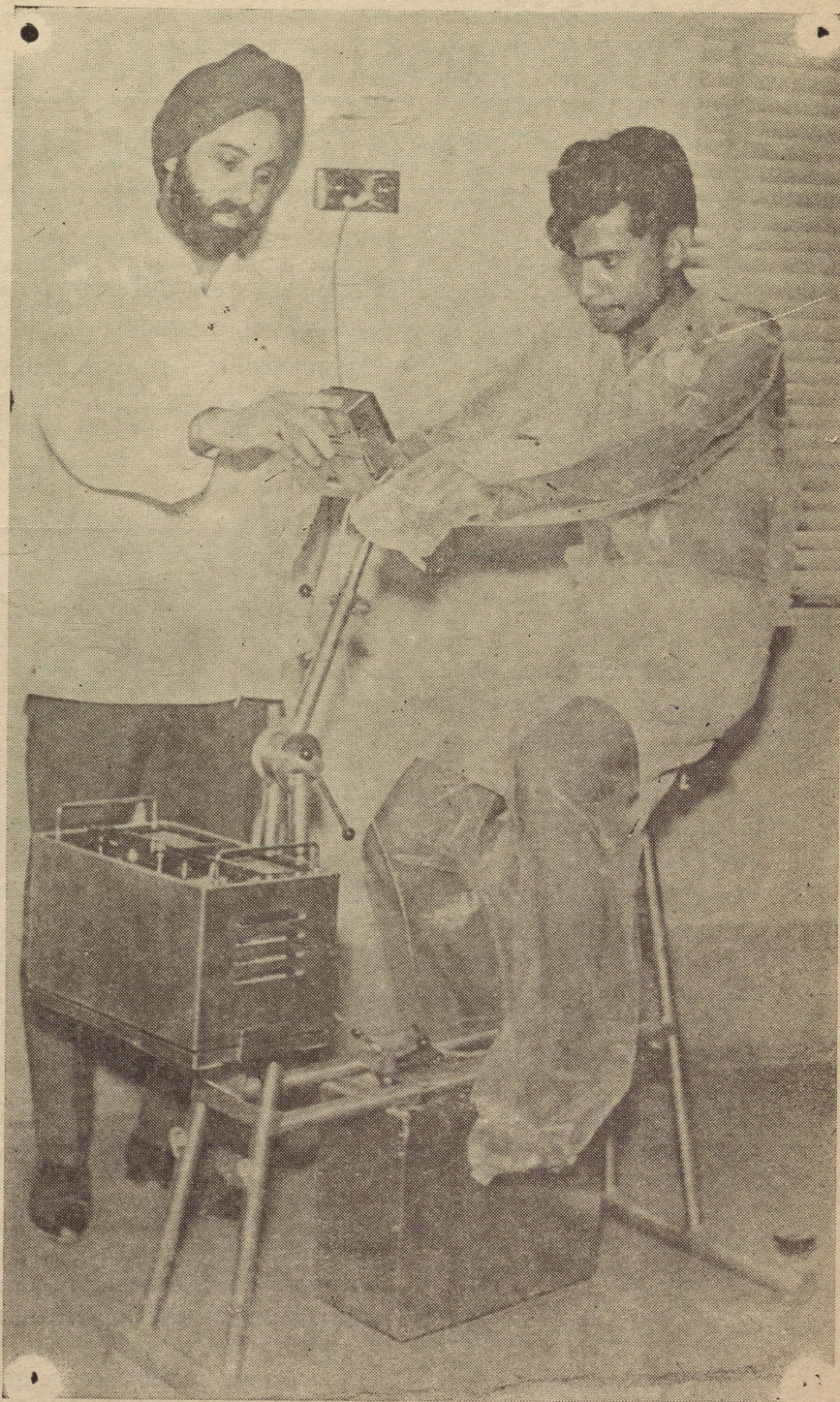


which can render *kesari dal* safe for consumption; the recommendation of dietary allowances to the Indian population; the setting up of standards for growth and development for Indian children; the development of a large number of recipes for supplementary feeding programmes and the evaluation of the national nutrition programmes.

Ongoing studies

While newer aspects related to these problems are being further explored, important ongoing studies include those related to pellagra, endemic fluorosis, the effects of oral contraceptives on vitamin-nutritional status, the effect of nutrition status on work output and productivity, identification of varieties of foodgrains which resist mycotoxin contamination, wholesomeness of processed foods including irradiated wheat, the importance of trace elements in human health and disease and monitoring of population groups for their food intake and nutritional status throughout the country.

The Institute can take legitimate pride on the fact that it has made several useful contributions, it is fully alive to the widespread problems of food and nutrition in the country and will continue to strive hard to help improve the nutritional status of the people at large. ○



A sweat sample being collected to assess loss of iron through sweat.

THREE-DIMENSIONAL APPROACH TO COMBAT MALNUTRITION

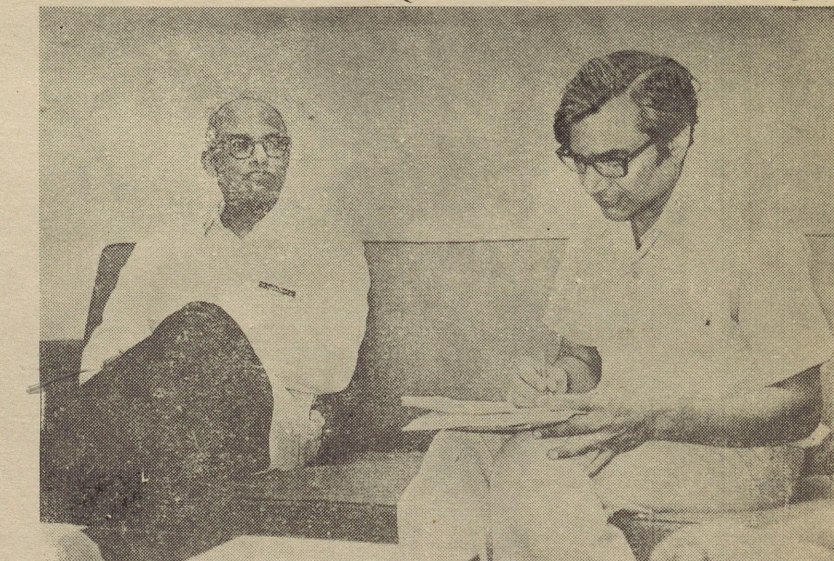
M. L. MEHTA

“Studies conducted on 7,000 children from different parts of India who belonged to higher income groups and were well-nourished reveal that the growth-rate of the Indian babies up to the age of four months is comparable to that of well-nourished American babies. The deterioration sets in later”, says Dr Srikantia in an interview to Swasth Hind

“WHAT is the magnitude of the problem of malnutrition in India and what measures are taken by the National Institute of Nutrition (NIN) to combat it?” I asked Dr S. G. Srikantia, Director of this Institute in Hyderabad, in an interview.

“Indians”, said Dr Srikantia, “suffer from a variety of nutritional deficiency diseases, namely, protein-calorie malnutrition (kwashiorkor and marasmus), vitamin A deficiency, nutritional anaemia, B. complex deficiency, pellagra, etc.” Of these, three are very widespread, namely, protein-calorie malnutrition, vitamin A deficiency and nutritional anaemia. Children below five years of age are the worst affected by the ravages of malnutrition. Two to three per cent of children below five years of age in rural areas are severely malnourished while almost 60 to 70 per cent show varying degrees of growth retardation.

Other diseases like diarrhoea and measles also claim many victims. For every 1,000 infants born alive, about 100 die before they see their



Dr S. G. Srikantia, Director, National Institute of Nutrition, Hyderabad (left) being interviewed by the author.

first birthday; a further 180 die before they reach the age of five, due to various diseases, many of them with a background of malnutrition.

Dr Srikantia avered that the health and longevity of the mothers are far from satisfactory. The mortality among child-bearing women is eight to ten times higher in India than in developed countries.

Every third child living in rural India is anaemic and every alternate pregnant woman suffers from anaemia during the last three months of pregnancy. The meaning of this problem becomes clear when we realize that 20 per cent of all maternal deaths in the country are due to nutritional anaemia; severe anaemia is one of the important reasons for abortions, premature

deliveries and low birth weight of infants.

Vitamin A deficiency, another type of malnutrition, poses a serious threat as it causes blindness. About 15,000 to 20,000 children below the age of five years become blind every year due to keratomalacia—a condition wherein the cornea—the portion of the eye through which light enters the eye, becomes softened into a cloudy, opaque mass.

However, vitamin A deficiency can be controlled. In a study involving over 2,000 children below the age of five in 26 villages near Hyderabad, the institute showed that a massive dose of vitamin A concentrate, that is, 200,000 I.U., given to the children between one and five years of age, once in six months, could prevent vitamin A deficiency.

Based on the success of this experiment, the Government of India launched a massive prophylaxis programme in 1970 in several States where vitamin A deficiency was very high. Later, the programme was extended throughout the country. About 24 million children are proposed to be covered under the programme. "The NIN has evaluated the programme in Kerala and Karnataka and has found a marked decrease in the incidence of vitamin A deficiency. Evaluation of the progress in nine other States is now under way."

Dietary toxins, too, contribute to disease conditions. Sometimes, due to improper pre and post-harvest conditions, toxic (poisonous) substances may accumulate in the food articles which could damage health. Consumption of such foods may lead to acute disease manifestation quickly. The disease caused by dietary toxins could be classified

as due to (i) naturally occurring toxicants in the foodgrains, oilseeds or weed seeds, (ii) fungal toxins, and (iii) adventitious toxic materials.

New tools

What role can NIN play in fighting malnutrition and disease prevention? Dr Srikantia says that the NIN has three specific roles to play in combating malnutrition. Firstly, to develop new tools to quantitate extension of food production—a pre-requisite to attain proper nutritional values. The NIN has been evaluating the nutrient composition of newer varieties of different crops being evolved. Also, as more knowledge is gained about the role of hitherto unknown nutrients, new foods will have to be assessed for their potential.

Changing concepts

The concepts of malnutrition are changing. In the earlier years, nutrition scientists thought that malnutrition was due to protein deficiency and their focus was on children below five years of age, and pregnant and nursing mothers.

"We used to advocate the use of protein concentrates for children to fight malnutrition. But when we looked at the results of such a strategy, we discovered that these concentrates made no impact whatsoever. We have now found that what was limiting the child's growth was not protein, but inadequate food intake", says Dr Srikantia.

Scientists then suggested that "if a child gets more of whatever he is eating, it will make a considerable impact on the extent of malnutrition". A controlled study in selected villages around Hyderabad where children were given about 25 per cent more food, showed that they grew almost as well as well-nourished children in the country.

What is the income-food intake-disease relationship? I asked Dr Srikantia. "The second role of NIN", he says, "is to understand the precise relationship between income food intake-disease. Infections and malnutrition act as a vicious cycle and this cycle should be broken. In addition to food, immunization, control of diarrhoea and minimum medical care will be needed to improve the nutritional status".

A study conducted by the National Nutrition Monitoring Bureau of the NIN on 10,000 households in nine States revealed that the amount spent on a child's meal per day was about 60 paise. Thirty-seven per cent of the families had an income of one rupee per head per day, and another 33 per cent between one and two rupees per day.

"More than 85 per cent of the family income is being spent on food in these groups and they are left with hardly anything for meeting other needs. So asking these families to spend a little more on food is really asking them too much", says Dr Srikantia with authority based on experience, having published a hundred papers on the problem of malnutrition.

Most of these people are agricultural labourers and "if we can do something to improve agricultural technology or start agro-industries which generate more employment or if we can improve on the multi-cropping system which could provide them with employment for some days more than the 100 days in a year they work at present, it would go a long way in solving the problem of malnutrition", Dr Srikantia says.

More water for better health

Lack of water in villages is responsible for a number of diseases.

Dr Srikantia pleads for more water in villages, if not drinking water, to improve health situation. Diarrhoeal diseases, which are water-borne, claim the lives of many children. An underfed child getting diarrhoea due to unsafe water is starved for four or five days because of the wrong belief that the child should not be given any food. If you can give immediate treatment and control the infection, the quantum of malnutrition will come down. **"I would put water supply fairly high in the list of priorities. Protected water is important, but let us give water at least in large quantities so that people can wash their hands and become more hygienic and the rate of gastroenteritis will come down", he says.**

Amenable to treatment

The two major problems—vitamin A deficiency and nutritional anaemia—are now amenable to treatment. The only source of vitamin A for the poor people is green leafy vegetables. There are some wrong beliefs about the use of green leafy vegetables. Consequently, people do not take to these. There should be nutrition education on the utility for the intake of green leafy vegetables. Until this can be achieved, a large dose of vitamin A in a concentrated form can be given once in six months. "This is being done in several parts of the country. The cost of preventing blindness works out to less than 50 paise per child per year", says Dr Srikantia.

The NIN's efforts to fortify common salt with iron are proving successful in laboratory tests, and community tests are being done in some villages in several parts of the country. "If the expected improvement in haemoglobin level could be achieved, we could have placed in the Government's hands a relatively simple method by which we

can control nutritional anaemia", says Dr Srikantia.

Nutrients in high-yielding crops

What role does NIN play in the high-yielding varieties of different crops? The third role of the NIN is to see that the nutrient value is not lost sight of in the efforts of scientists taking up the challenge of introducing high-yielding varieties of different crops, says Dr Srikantia. With this aim, the NIN has taken up collaborative studies with the Indian Council of Agricultural Research (ICAR) during the past decade. The aim is to see (i) how far high-yielding varieties fare nutritionally, and (ii) whether any type of cereals, millets and pulses can be identified with better than average nutritional quality. Another aim is to see how environmental factors influenced the nutritional quality of cereals and pulses.

Under this study, new varieties which are agronomically satisfactory are screened at the Institute for their nutritive value, says Dr Srikantia.

Prevention of lathyrism and Pellagra

"Studies have revealed that people who consume *kesari dal* develop lathyrism, and those who consume *jowar* develop pellagra". But the NIN has found a way out to make the pulse free of toxin that causes lathyrism. The method is simple. All one has to do is to soak the pulse for an hour in boiling water; through this, most of the toxic material in the *Kesari dal* is leached out in the water. The water is then thrown away, the seeds dried and used for human consumption. Alternatively, the seeds can be parboiled with the same beneficial effect.

The NIN found out that the people whose staple diet is *jowar* suffered from pellagra. This disease

can be prevented by diversifying the diet containing vitamins, nicotine acid, and the aminoacid tryptophan. Foods like milk, meat, eggs and pulses are rich sources of these substances, says Dr Srikantia. This is not always possible, and the NIN scientists are now trying to find varieties of *jowar* which will not cause the disease.

Why are some men unable to do as much work as is expected of them? The NIN is studying about 2,500 pre-school children from a number of villages around Hyderabad since 1965. Of these, 100 boys were made to undergo a standard physical work capacity test when they were 14 to 17 years old in 1976. The study revealed that boys who had normal body weight for their age could do more work compared to the boys who were lighter and less nourished. Difference in height amongst the boys by itself did not make any impact on their capacity to do work, unless the height was accompanied with higher body weight and muscularity. Since malnutrition in early childhood influences adult body weight, the importance of this finding becomes obvious.

Studies conducted on 7,000 children from different parts of India who belonged to higher income groups and were well-nourished also reveal that the growth-rate of the Indian babies up to the age of four months is comparable to that of the well-nourished American babies. The deterioration sets in later because their growth is affected due to lack of proper supplementary foods. In many Indian families, the child is abruptly introduced to adult food around the age of one year because the mother is pregnant again and she cannot breast-feed her baby.

Frequent pregnancies affect the health of the mother and child.

The youngest child is often deprived of proper nutrition and attention in poor families and this leads to poor growth.

Breast-feeding

Breast-feeding is best for infants, it is said. But, the modern urban-oriented woman is discarding this practice. What has Dr Srikantia to say? Surveys undertaken to determine the breast-feeding practices showed that more than 50 per cent of women belonging to the urban elite stop nursing babies when they are five to seven months old; 3.7 percent of them never breast-feed their children. This practice seems to be spreading to urban middle

class, but luckily only slowly. This trend needs to be reversed.

Research studies also show that even mothers from poor and rural families can wean their children with nutritious and inexpensive foods prepared from rice, *rawa* and ragi mixed with milk, *dal* and vegetables. Mothers should be encouraged to breast-feed babies for as long as possible to ensure proper growth and provide proper mother-child interaction, which is important for the mental development of the child.

A related field of study is the health and nutrition of pregnant and nursing mothers. It has been found

that in many poor rural families, girls of barely 16 are married and become pregnant. Such a girl is physiologically unprepared for her first pregnancy. With lack of good food and proper pre-natal care, the baby is likely to be under-weight, that is, if the mother does not have a miscarriage.

Mental development—a revelation

Severe malnutrition among children, says Dr Srikantia, can also affect mental development. It was believed in the past that these changes were not reversible, even if good nutrition is provided in later life. Fortunately, "we know now that this is not true. Long-term

Nutritive value of foodstuffs being investigated. The National Institute of Nutrition also gives special attention to the nutritive value of less common foods and of the new hybrid and high-yielding varieties of foodgrains.



studies done at NIN have provided evidence that malnutrition and poor psychological stimulation are both involved and if these are corrected, the changes can to a large extent be reversed."

NIN has recently started investigating the metabolism of the most commonly employed drugs in undernourished adults to fix dosage

schedule for them to maximize beneficial effects of drugs and minimizing side-effects.

Among newer studies started at the Institute, Dr Srikantia mentioned those related to nutrition and cancer. Several environmental factors are related to cancer and if the causes of natural disorders are understood, they will, in turn, open

the gates to the control of degenerative diseases.

A proper understanding of basic issues, and an intelligent anticipation of the effects of the changing environment, Dr Srikantia says, can be effectively used not only to promote good health through good nutrition, but also prevent man from becoming a victim of disease. This is what the NIN aims to achieve. ○



BIGGEST ADULT EDUCATION DRIVE FROM 2 OCTOBER, 1978

Reaffirming its determination to wage a relentless struggle against illiteracy, the nation will launch the biggest-ever adult education crusade on Gandhi Jayanti Day—2 October, 1978.

An elaborate programme—known as national adult education programme (NAEP)—has been drawn up for the inauguration of the nation-wide campaign which seeks to impart adult education to 100 million people in the next five years.

In New Delhi, the movement against illiteracy will be inaugurated by the Prime Minister, Shri Morarji Desai at a function to be attended by Ministers, MPs, diplomats and people representing cross-section of the society.

Radio and television programmes relating to adult education are being organized. A film on NAEP, especially prepared by the Films Division and dubbed into various regional languages, will also be shown.

An exhibition on adult education is being organized by the Directorate of Advertising and Visual Publicity.

Other programmes include holding of literacy festivals, seminars, exhibitions and launching of adult education projects at block level.

The Planning Commission has earmarked Rs. 200 crores for the implementation of NAEP.

Though the literacy rate in the country went up from 28.30 per cent in 1961 to 34.45 per cent in 1971, the actual number of illiterates increased from 267.3 million to 307.2 million during the period.

Similarly, the number of adult illiterates jumped from 187 million to 209.5 million during the same period. The lowest rate of literacy exists among the rural females as against 11.37 per cent in 1961, it moved to 18.80 per cent in 1971. ○

THE PEOPLE'S WAR—AGAINST DISEASE AND FOR HEALTH

The people's health ... is the concern of the people themselves. They must want health. They must struggle for it and plan for it. Physicians are merely experts whose advice is sought in drawing up plans and whose cooperation is needed in carrying them out. No plan, however well designed and well intentioned, will succeed if it is imposed on the people. The war against disease and for health cannot be fought by physicians alone. It is a people's war in which the entire population must be mobilized permanently.

From : Sigerist, H. E. *Medicine and human welfare*, New Haven, Yale University Press, 1941, p. 96.

NUTRITION EDUCATION SCOPE AND RESEARCH

A well-planned and well-organized effort in nutrition education can motivate people to improve their feeding habits. Only concerted efforts to teach improved methods will result in better use of the foods available.

SMT PARVATHI RAU

THE nutritional status of our population is in a precarious situation despite bumper harvests. The prospects for the next decade are gloomy, indeed.

Increasing food production with the use of modern agricultural methods and practices is one solution. But, in India, this increase is not uniform as the modern agricultural techniques have not diffused widely among the rural population. A syste-

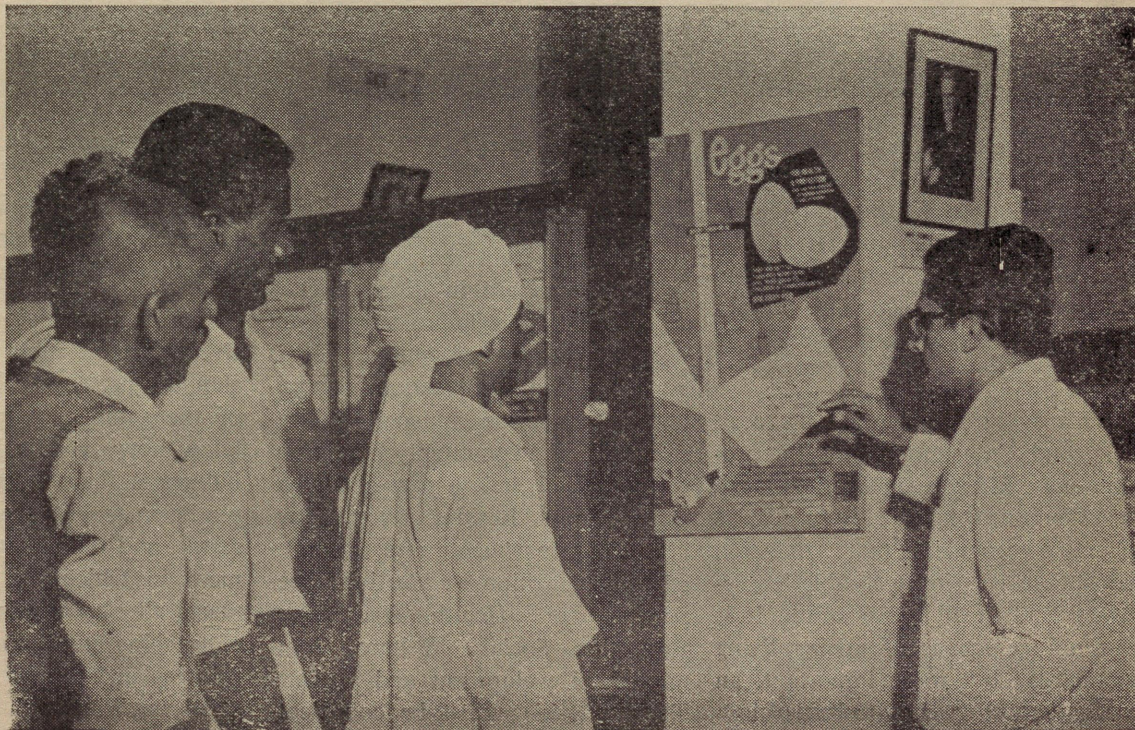
matic effort in the field of agricultural extension is imperative; but it must run concurrently with increased demand which is dependent on an accelerated economic development. Without the latter, the former is of little value.

Analyzing the causes of malnutrition, one finds that these are not always economic or food production based. For example, an enormous part of the food produced is lost due

to improper storage. In addition, the available food is not properly utilized due to poor selection and feeding practices stemming from customs, habits, religion and prejudices.

A well-planned, and well organized effort in nutrition education can induce people to improve their feeding habits. Only a concentrated and realistic effort to teach improved methods of food conservation, preparation and consumption will

Village leaders being acquainted with the activities of the National Institute of Nutrition. With a view to enlisting community participation, the Institute discusses a rural project with them before implementation.



result in better use of the food available.

What is nutrition education?

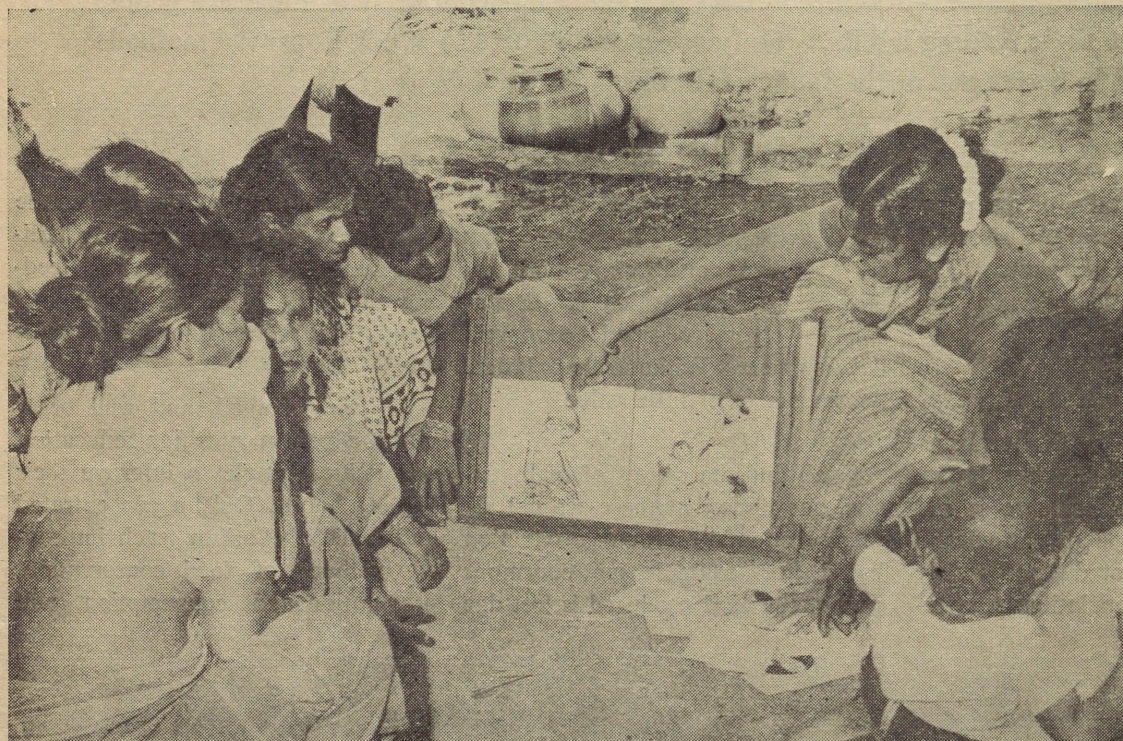
People passing from a subsistence economy to a market economy are changing their food habits, leading to an improvement,

but frequently resulting in a deterioration of the family diet.

One of the objectives of nutrition education is to help people change their food habits in the best possible way. Such people do not always know how to get the best value for their money. Hence, people have to be shown not only what

to eat but also what to grow and why. They do not understand that the price of food on the market may have little to do with the nutritional value of food. All this must be taught through a permanent educational programme.

In this technologically oriented world, new attractive food products



The author expounding on a "large family causing malnutrition" theme to a rural group.

appear on the market every day, to which well-conceived publicity gives enormous, even if transitory prestige. It is quite understandable, therefore, that people want to spend money on the prestigious foods, often, at the expense of the family diet.

This again emphasizes the need for good nutrition education programmes. Many such examples can be mentioned here. However, it is widely recognized that nutrition education is indispensable everywhere and in all social strata. It is not only a means of raising living standards but more important, an activity, most urgently to be developed to avoid malnutrition.

Who should teach?

Nutrition education is not the prerogative of one single discipline but comes within the scope of all workers who are in direct contact with families or who are carrying out programmes in communities. It is a part of health education, of agricultural extension, of social education and of community development. Indeed, it is a part of all basic education. Besides, several Government departments are concerned with nutrition education: Department of Health, Agriculture, Education, Social Welfare, Community Development and others. Their activities must be coordinated; the content of the educational

programme must be made homogeneous. The nutrition education programme must therefore be an integral part of the overall national development plan for its success.

In order to educate people effectively, the nutrition educator should preferably be a member of the same community. He must know how people learn and what influences their learning. The people being taught, the teachers themselves, and the situation or environment in which the teaching takes place, all play a role in the process of teaching and learning. A successful teacher requires particular personal qualities such as sincerity of

(Contd. on page 259)

NATIONAL INSTITUTE OF NUTRITION

—AN OVERVIEW

THE National Institute of Nutrition, Hyderabad, which observes its diamond jubilee in October 1978 has risen from a modest beginning to its present pre-eminent position. Started as a 'beri-beri' enquiry unit in a single room at Coonoor in 1918, the NIN is now housed in a campus of about 13.45 hectares (33.25 acres) near the Osmania University complex at Hyderabad. It has a two-storey spacious main building with a few 'auxiliary buildings'. It celebrated its Golden Jubilee in 1969 and to commemorate the occasion, the Golden Jubilee block which houses the Extension & Training and Field Divisions was constructed. An additional three-storey block, called the 'Gopalan Block' was recently added.

The work of the NIN is carried out by the following major divisions:

1. Division of Analytical Chemistry: This division is mainly concerned with the analysis of foods and development of methods for the analysis of constituents of nutritional importance. Investigation of nutritive value of newly evolved high yielding varieties of foodgrains is also pursued in this division.

2. Division of Biochemistry: Development of biochemical methods for the early detection of malnutrition and for studying the biochemical changes that occur in various types of malnutrition constitute the main activities of this Division.

3. Division of Biophysics: This Division is concerned with the use of modern tools and equipment in nutritional investigations. An Isotope Unit is a part of this Division. Maintenance of various sophisticated instruments is one of the activities of this Division.

4. Division of Clinical Studies: It conducts clinical investigations. At present, 16 beds in Osmania General Hospital and 18 beds in the Niloufer Hospital for Women and Children are at the disposal of the Institute. The beds in Osmania General Hospital are

meant for admission of adult male cases, while 12 beds in the paediatrics ward and six beds in the antenatal wards of the Niloufer Hospital for Women and Children enable admission of women and children. In addition, out-patient facilities are available at both the hospitals. The admission and management of the cases in these hospitals are under the Institute.

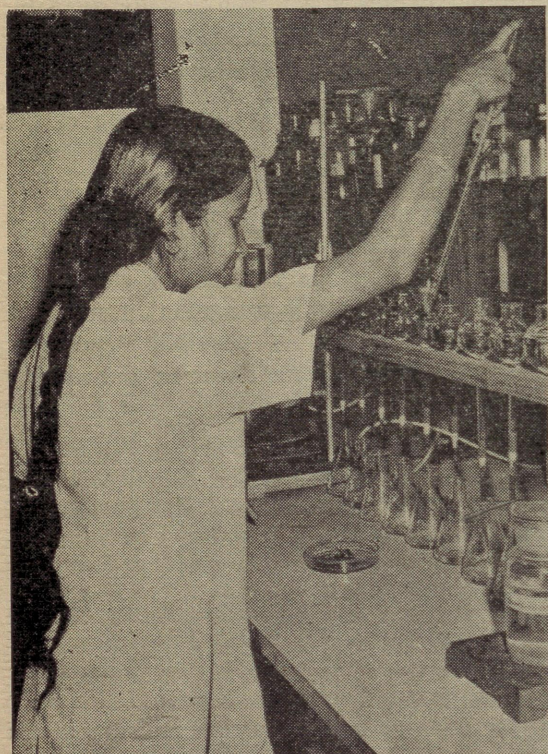
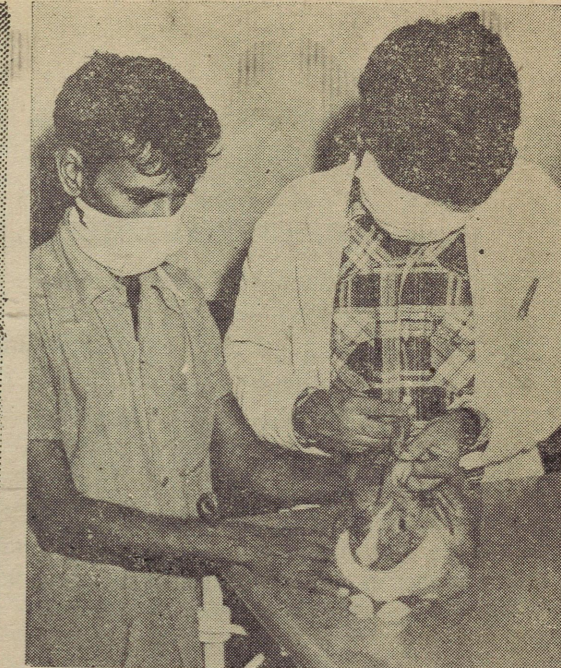
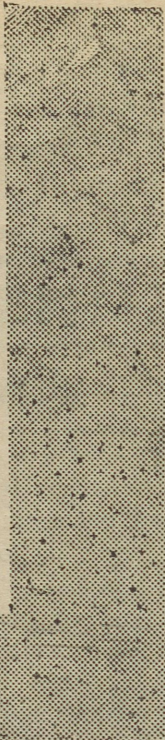
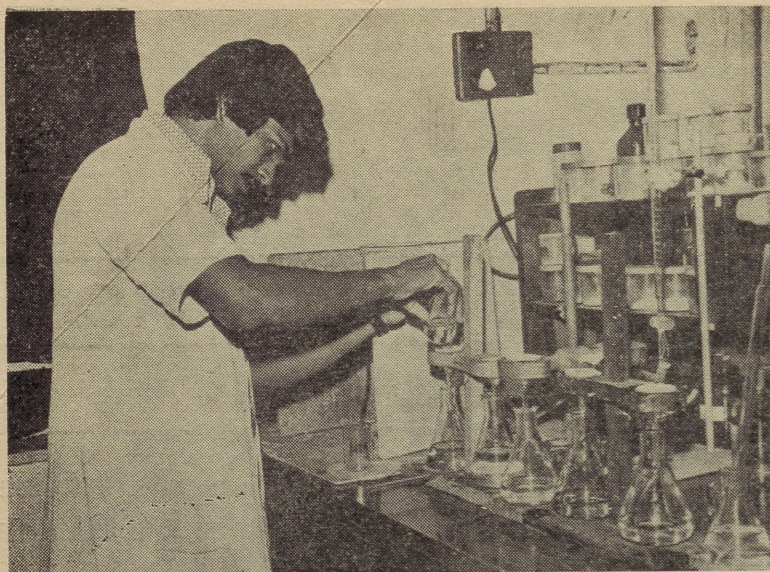
5. Division of Field Studies: The Division carries out diet and nutrition surveys not only in and around Hyderabad but also in other States. In addition, nutritional problems are among the most important to be tackled by this Unit whenever there is any emergency as, for instance, in times of famine, etc. It also carries out pilot projects for promotion of nutrition among vulnerable segments of population, such as, pre-school children and expectant women and nursing mothers. A Demonstration-cum-Training Centre of the Division helps in the development of suitable models for provision of nutrition services through the existing health services. A National Nutrition Monitoring Bureau aimed at maintaining a continuous surveillance of the food and nutrition situation in various parts of the country and helping in the evaluation of national nutrition programmes has been recently started by the Indian Council of Medical Research. This has a Central Reference Laboratory located at the Institute and ten peripheral units in ten different States.

6. Division of Endocrinology: The development of assay methods for various hormones, especially those with special relevance to nutrition, is a major activity of this Division.

7. Division of Extension and Training: This Division is mainly responsible for bringing out popular and other publications on nutrition and for organizing regular training programmes in nutrition at various levels.

Food and Drugs Toxicology Research Centre

This Centre established by the ICMR is part of the NIN Complex. This unit carries on various



National Institute of Nutrition—Pictures Speak

Top (left to right)

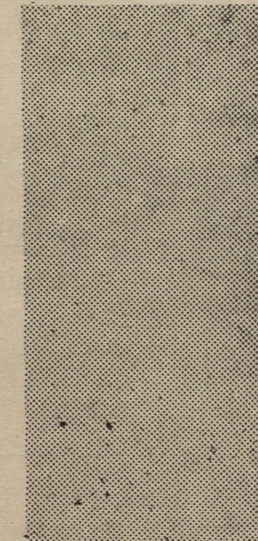
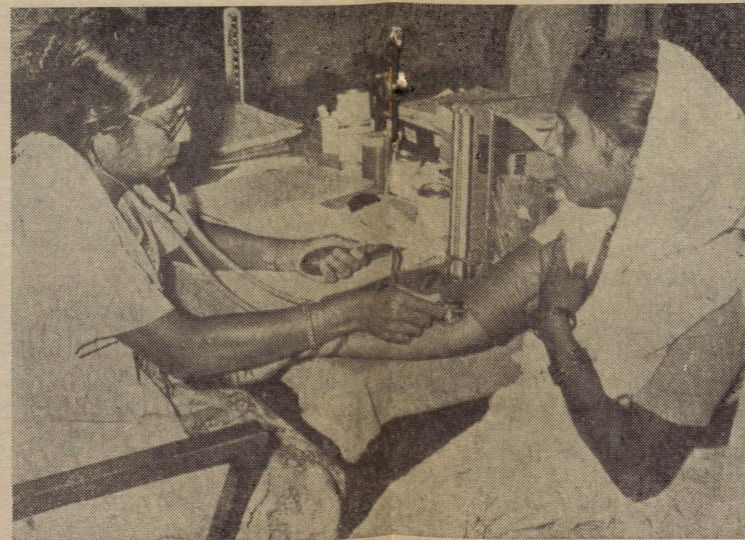
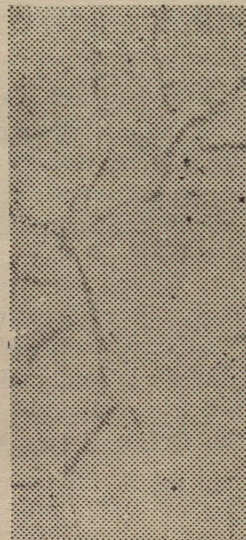
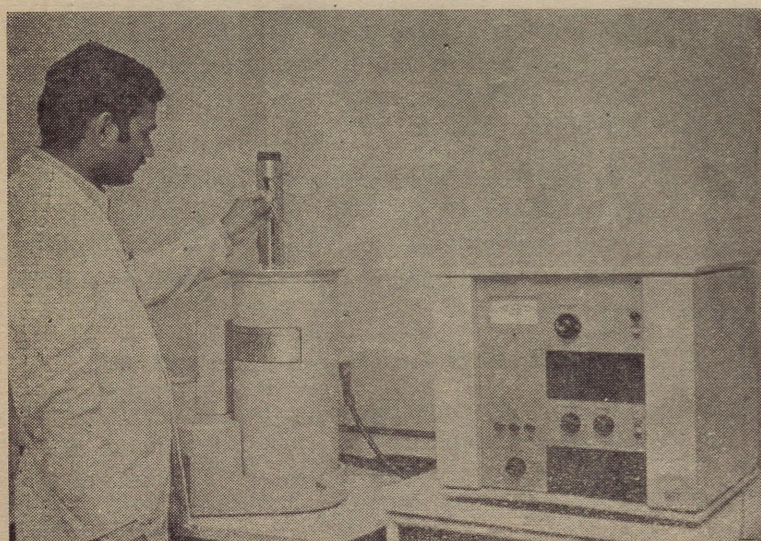
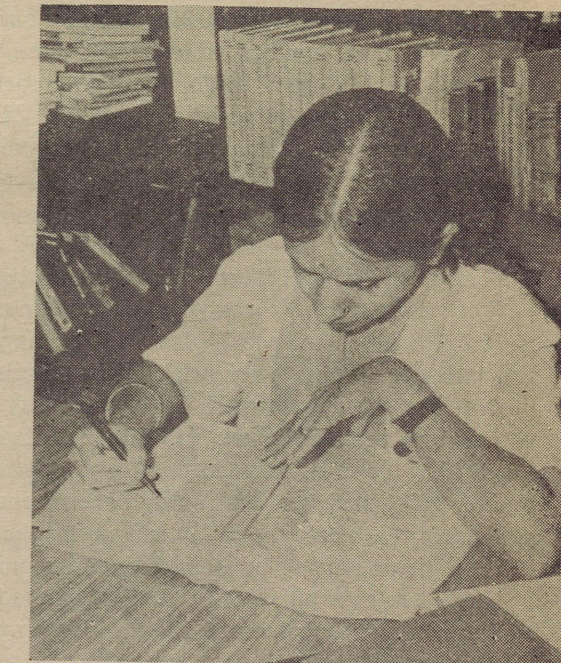
1. The Analytical Chemistry Division is mainly concerned with analysis of nutrients in different foods. Photo shows a view of the Analytical Chemistry Laboratory.
2. Popular Publications brought out by the Institute.
3. The NIN has a well-equipped animal house with different species of animals used for various experiments.

Alongside (left and right)

1. The Biochemistry Division is engaged in studying Vitamins in relation to different states of nutrition—estimation of Xanthurenic Acid.
2. The Institute has a well-equipped library with about 17,000 volumes and current periodicals that number about 250 titles. Photo shows a view of the Library.

Bottom (left to right)

1. Gamma Scintillation Counter used for isotope counting for isotope studies and hormone assays.
2. A Woman being examined for high blood pressure at a nutrition clinic.
3. One of the field studies being carried out by the Institute is an investigation on the effect of early nutrition status of a mother on her child.



studies relating to investigation of toxins in foods, safe levels of drugs in relation to nutrition status etc.

FUNCTIONAL UNITS

Though for administrative convenience, the Institute has several Divisions, in the actual implementation of research programmes, functional units which cut across these Divisions are constituted depending upon the investigation.

Staff—The scientific staff of the Institute who number more than a 100 include biochemists, clinicians, geneticists, pathologists, social workers, statisticians, anthropologists and dietitians and psychologists all working as a close-knit team.

Library—The Institute has a well-equipped library. There are about 17,000 volumes and current periodicals that number about 250 titles. Reprint collection and a good slide pool are other unique features of this library which is open for 24 hours a day. It caters to research workers not only of the Institute but also others coming from different parts of the country.

Equipment—The Institute is one of the best equipped in the country for carrying out researches in nutrition and allied sciences. A complete range of instruments for isotope work which is an indispensable part of present day research in biochemistry and nutrition has been installed. Besides, modern equipment like the atomic absorption spectrophotometer, amino acid analyzer, infra-red spectrophotometer, gas liquid chromatography units, electrophoretic apparatus, tissue processing apparatus, microanalysis set up and sensitive balances, freeze drying equipment, equipment for work in molecular biology and whole body counter have recently been added.

Four cold rooms, well-equipped to carry out laboratory work at low temperature and with adequate storage space to preserve biological specimens are also available.

Workshop—Forming part of the instrumental unit, the workshop looks after the maintenance of optical, electrical and electronic instruments and attends to minor repairs.

Other service units such as a photography section, an offset printing unit and an artist's pool are also available.

Animal House—An animal house with several species of animals, mice, albino rats, monkeys, guinea-pigs, rabbits and chicks is maintained for experiments.

The Laboratory Animals Information Service Center of the ICMR is also part of this set up.

Nutrition Museum—A unique feature of the Institute is the nutrition museum. Information on different aspects of food and nutrition with special reference to India, and the work of the Institute is presented in the Museum.

Various popular publications in the form of booklets, journals and folders are brought out by NIN in English as well as other Indian languages. The two quarterly journals brought out are: '*Nutrition*' (English) and '*Poshan*' (Hindi).

Indeed, research, training and extension have been the keynotes of the activities of the Institute for the past six decades. It is hoped that the coming years will witness a balanced development of these activities to help improve the nutritional status of the people.

—M. L. Mehta

71 Years of Health Care

Alembic Chemical Works Co., Ltd.
Baroda—390 003.

Leading Manufacturers of

**Antibiotics,
Ethical Pharmaceuticals
and Home Products**

purpose, a sense of humour and pleasant manner; he must also understand the people he is teaching, their culture, needs and ambitions and what it is that gives them the incentive to learn.

Trying to persuade people to adopt good food habits is rather like "throwing a bridge across a river", on one side is the educator. He has a lot of knowledge about nutrition which he believes is invaluable and is ready to give. On the other side are the educated people who may not necessarily want the knowledge he has to give. So he must cross the bridge to communicate effectively with these people in a way they can understand. *Without communication, there can be no education.*

How should it be taught?

Generally, the more senses people can use, the more likely they are to understand and to remember. It is for this reason that the teacher always does his best to find ways of teaching which will enable the people to use as many of their senses as possible. He will talk to them, use recordings, show objects and make them do something.

There are two main types of aids used by teachers to assist them in the teaching and to help the people in understanding; *audio-aids* which use the sense of hearing and include the teacher's voice, radio, recorders; and *visual aids*, such as pictures and posters, books and pamphlets, actual foods or models which employ the sense of sight. Audio-visual aids are usually used in combination like in drama, dance, role-playing, *burra katha*, *villu-pattu*, *poikkal kudurai*, *kummi*, films, etc. But whether used singly or together they must meet two requirements: they must be easily understood by the people for whom

they are used and the ideas they help to teach must be acceptable or made acceptable to the group. However, the most important thing one must remember is that the aids are intended to *aid* or *help* in teaching people and to help them to learn and remember. If the aids do not do this, they cannot be called aids, and their use may even hinder learning. Secondly, it is important to remember that an aid cannot normally teach by itself: In India, where there is no much illiteracy, a discussion-cum-demonstration alongwith aids can make a better impact than just plain posters with messages on them.

Who should be educated?

The principal target of nutrition education is the family. In rural societies, the family produces its own food. In urban communities, food is usually a family affair with the head of the family and other wage earners providing the funds and the women and older daughters doing the marketing and preparing the meals. There is interaction between various members at meal times and this has a profound influence on the development of food habits and attitudes towards food. Educational programmes, thus, should be planned with the whole family in mind and not certain groups, notably women and children. The father should not object to his wife receiving instruction in nutrition although this may mean a request from his wife for more money to spend on food or keeping back home produced food from the market for family use.

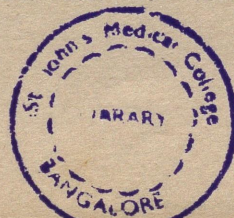
Programme of nutrition education are most effective when a coordinated approach is used. For example, different members of a family should be approached through different channels according to their interests: *mahila mandals*, youth

clubs, farmers' club, school, etc., simultaneously. But the basic messages about the relationship of food to health, selection of the right foods to purchase, of production at home, will be the same.

Teaching school children the facts about good nutrition is important because at this period, children's food habits are still in the formative stage and can be readily influenced; particularly through mid-day school lunch programmes where the products from the school garden can be used. Those incharge of planning and preparing meals for groups and those who determine the food budgets of institutions are important targets for education in nutrition, because they influence the health of children and adults in institutions, day-care centres, schools and hospitals. Industrial canteens and group feeding programmes are excellent venues for teaching nutrition to the recipients, by serving good quality meals, well-prepared and attractively served, using locally available low-cost foods, accompanied by well-thought-out pamphlets and talks given by trained personnel in charge. Doctors and nurses, planners and administrators, peripheral health workers and voluntary agencies also need to be educated in nutrition so that they are convinced about the need for change in their food habits before they attempt to convince others.

When should it be taught?

Education time should coincide with what is called "teachable moments", when the subject is most receptive and he participates actively in the learning process. The young mothers expecting her first child and the mother who has several severely malnourished children, are ready subjects. Many of our rural women do not realize that their children are undernour-



rished till they are made to realize this fact by virtue of comparison with another healthy well-grown child in the same village. Also, messages learnt during a crisis may be remembered long afterwards.

Where should it be taught?

Education is probably most effective if given in a place similar to that where it will be applied. Doing a cooking demonstration in a typical home or a community centre is most practical and convincing. A well kept kitchen in any one house may serve as a model for improvement in other kitchens.

Health centres are natural settings for nutrition education. The use of any supplement distributed through the centres can be demonstrated through its preparation, simple explanation and tasting sessions. Otherwise, it will not serve its purpose.

Scope of nutrition education

Research in nutrition education indicates that problem-solving is an effective way to influence what people do about their dietary intakes and their food supply. Nutritionists and nutrition educators need to solve their own problems first before they can solve others' problems.

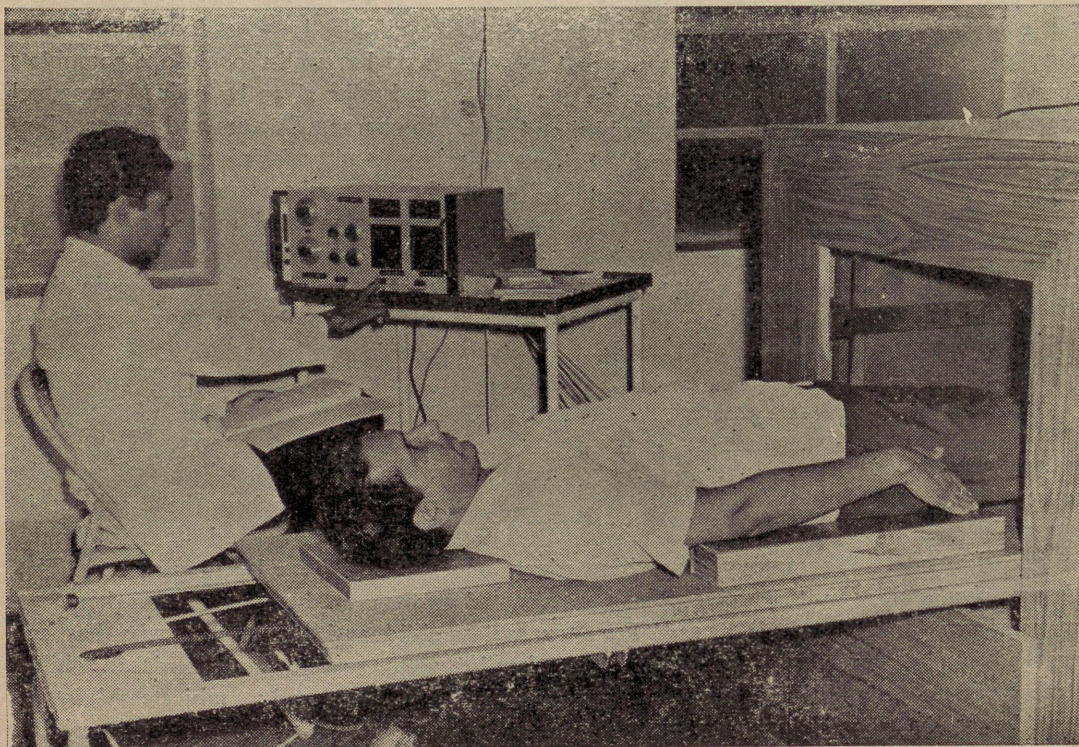
Because nutrition educators are concerned with what the learner does, they must be concerned also with what he thinks and how he thinks. If problem-solving is used as a method of nutrition education, then the educator must be thorough with the current nutrition knowledge, otherwise it will be a farce. Without problem-solving, nutrition knowledge *per se* may be meaningless to the learner.

Discussion—decision is more effective than a lecture as a method of influencing what people do about their food habits and nutrition problem. This method helps people to

try out better ways of preparing food, try out new foods and to make better food choices at home and in feeding programmes.

Effective nutrition education based on recognized needs is cooperatively planned, conducted and evaluated by individual concerned, in homes, in schools and in communities, provided such education is supervised by properly trained nutrition educators.

As Alan Holmes says, education is something quite different from simple teaching. It is not just a question of giving information to be memorized; it demands active and direct participation; it demands effort and "learning by doing". This is true, because the objective of nutrition education is not only to pass on information but to provide a background from which ideas can be formed, a base from which to modify beliefs and attitudes and create new habits and behaviour. ○



The instrument called the "Whole body counter" is used for studies on level absorption of some nutrients by the body.

NUTRITION FOR DIFFERENT SECTIONS OF COMMUNITY

In India, pre-school children, expectant and nursing women followed by tribal population form nutritionally the most vulnerable segments of general population. Thus the nutritional problems of these special groups are of vital importance for developing nutritional programmes.

DR N. PRALHAD RAO

IN any discussion on nutrition for different sections of the community, no doubt, a consideration of diet and nutritional status of children, adolescents, adult men and women, and the elderly should receive attention. But extensive studies carried out by the National Institute of Nutrition, however, have suggested that in India, pre-school children and women particularly during pregnancy and lactation form nutritionally the most susceptible segments of general population. In addition, tribal population which often form socially and culturally a closed community and differ from the general population is also vulnerable from the nutrition view point. Thus, the nutritional problems and the needs of these special groups of population are of vital importance for developing nutritional programmes for the different sections of the community.

NUTRITIONAL STATUS

Pre-school children

A comprehensive survey covering 18,000 pre-school children in various parts of the country has provided valuable information on

the prevalence of some of the important forms of malnutrition. Clinical evaluation of these children showed that more than 40 per cent of children examined had evidence of one or more of the signs of nutritional deficiency. The major problems observed were protein-calorie malnutrition, hypovitaminosis A, anaemia and deficiency of B-Complex vitamins. The percentage prevalence figures for some of the nutritional deficiency signs are indicated in the diagram.

The heights and weights of our rural pre-school children are found to be 15 to 20 per cent and 40 to 50 per cent below the American standards respectively. Similarly, both the arm and muscle circumferences are 20 to 30 per cent below the standard. Judged by the degree of deficit in body-weight, nearly 80 per cent of the pre-school children suffer from either mild or moderate protein-calorie malnutrition.

Haemoglobin surveys carried out in pre-school children indicated that 52 per cent of the toddlers among the poor socio-economic groups have haemoglobin levels below 10.8 per cent—a level considered as anaemia.

A detailed analysis of the diet survey data revealed that the pre-school children of our country on the average received 1.7 g. protein per kilogram of body-weight per day from their home diets. This level of intake is considered adequate according to the latest recommendations of the FAO/WHO Expert group. The 'protein quality' of the diet was also found to be satisfactory. On the other hand, the average calorie intake was around 80 KCal per kilogram body-weight. The expert group recommendations are 100 KCal/Kg. for children of this age group. On further analysis, the data showed that 92 per cent of the children surveyed were deficient in calories, while only 35 per cent were deficient in protein on the basis of accepted recommendations. This latter group of 35 per cent of the children were deficient in protein and calories, while the remaining 57 per cent were deficient only in calories. The meaning of all these exercises is that on an average there is a deficit of about 300 calories in the diet that is consumed by pre-school children in the rural community.

Pregnant and nursing women

Diet surveys carried out among expectant and nursing women of

low income groups indicated that their diets were grossly deficient in protective foods as well as in staple cereals. In fact, their diets showed no improvement over those of the non-pregnant, non-lactating adult women. On an average, a pregnant or nursing woman in India subsists on diets which supply about 1,800 calories, 40 g. of protein, 18-20 mg. of iron and 200-300 mg. of calcium per day. As a result, during pregnancy, women of poor socio-economic group gained only about 6.5 Kg. of weight between 16th and 40th weeks of gestation as against 10 Kg. or more in well-to-do groups.

Evidence of poor nutritional status during pregnancy is further indicated by the low birth weight of babies born to these mothers. Average birth weight of babies born to mothers of low income group is around 2.8 Kg. as against 3.1 Kg. born to well-nourished mothers.

When these women were provided with a diet giving 2,300 calories and 50 g. of protein, not only significant increase in body-weight between the 36th and 40th week occurred but also the birth-weights of the infants born to them were also higher.

Clinical signs of nutritional deficiencies were more frequent in pregnant women than in nursing mothers. Nearly 30 to 50 per cent of women in their later part of pregnancy have haemoglobin levels below 10 g. The above condition is known to aggravate not only the complications associated with pregnancy and childbirth but also lead to higher maternal and infant deaths.

The nutritional status of nursing women was also generally poor though severe anaemia and other nutritional deficiencies were less commonly seen.

Tribal population

Though majority of our population live in rural areas, tribal groups form a considerable proportion of our total population. Nutrition and diet surveys carried out among some of them revealed the following.

Mompas, a tribal group of NEFA, were, in general, heavier than the population groups belonging to low income groups in South India. The

rural adult population. The heights and weights of the children were, however, comparable to those of the rural population. Though protein-calorie malnutrition was not a problem among the Nicobarese, anaemia was widely prevalent. More than 50 per cent of the population suffered from anaemia. The general health and medical facilities available to most of these tribes were unsatisfactory. However, the prevalence of common nutritional defi-



Several low-cost locally available foodstuffs can be used to prepare nutritious recipes which can supplement the child's diet.

major nutritional disorder observed in them was goitre. Among Onges in little Andamans, no evidence of protein-calorie malnutrition was seen in children. Children up to 15 years were heavier than their counterparts from rural Hyderabad. Though the average height of an adult Onge was less than that of an adult in rural Hyderabad, other anthropometric (body) measurements were similar. Nicobarese adults living in Car Nicobar Islands were shorter but heavier than the

ciencies was less than seen in rural areas.

The situation among tribes resident in Andhra Pradesh, however, appeared to be different. Data on seven tribes living in the tribal areas indicated that Jatapus, Savaras inhabiting Srikakulam and Visakhapatnam areas; Chenchus of Mahaboobnagar and Gonds living in Adilabad area were nutritionally worse off than their rural counterparts from Hyderabad. The prevalence

of severe protein-calorie malnutrition as judged by body-weight deficit appeared to be more among these tribes. Konda Reddy and Koya Dora tribes were similar to populations living in Hyderabad.

PREVENTIVE PROGRAMMES

Considering the extent and magnitude of the problems of protein-calorie malnutrition, Vitamin A deficiency, anaemia and goitre, a num-

ber of programmes have been undertaken to control them. A rule, is based on locally available inexpensive food. With the result, the overhead charges of the programme are minimum. Roughly two-thirds of the money allocated is spent for the foodstuffs and only one-third towards operational overheads like transportation, preparation, etc. However, programme based on Corn, Soya, Milk (CSM)/ or Bulgar Wheat blends (supplied by CARE) and commercially processed products like *Balahar*, Ready

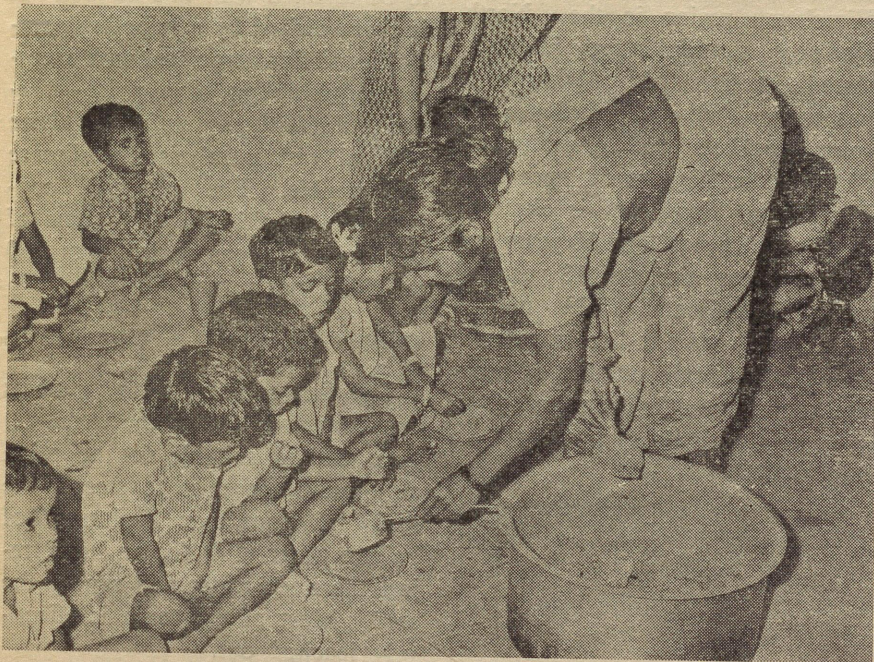
cases of malnutrition from worsening into irreversible forms.

Vitamin A prophylaxis

Severe forms of vitamin A deficiency as manifested by ocular signs have been found in Eastern and Southern parts of the country. The peak incidence is in pre-school children. Although this condition is prevalent in school children, adolescents and pregnant women, it does not lead to blindness in these older age groups. Hence, a prophylactic programme directed towards pre-school children has been started in many States of the country. Under the programme, each pre-school child from one to five years of age receives orally a massive dose of 200,000 I.U. of vitamin A in oil once in every six months. The programme is operated through the existing health infrastructure by the Auxiliary Nurse Midwives (ANMs) in rural areas.

Anaemia prophylaxis

Prophylactic trials indicated that supplements of 60 mg. of iron given daily over the last 100 days of pregnancy were sufficient not only to maintain the haemoglobin levels above 10 g. per cent in all the subjects, but also to raise this level in many pregnant women. Studies have also shown that supplementation of folic acid has a beneficial effect on the birth-weight of infants. At the end of six months, however, the incidence of anaemia in infants born to iron-supplemented mothers was significantly lower than that of in infants of the unsupplemented mothers indicating that in the iron-supplemented groups, infants were born with better iron stores. Considering these observations, a programme of distribution of iron and folic acid tablets (folifer) on public health basis for pregnant women during the last trimester and pre-school children through MCH, primary health centre and sub-centre



It is time for lunch. Children receiving nutritious food to supplement their diet at home.

ber of programmes have been undertaken to control them.

Supplementary feeding

The programme is operated by the Ministries of Social Welfare and Rural Development. Under this programme, the population of urban slums, tribal areas and certain drought prone rural regions are covered on a priority basis. Pre-school children, pregnant women and nursing mothers are the main beneficiaries. The programme, as

to Eat (RTE) extruded products, etc., are also in operation in different parts of the country.

It has been recommended that the supplement should provide about 300 calories and 9-10 g. protein per pre-school child per day, and 500-600 calories and 20 g. protein per day per mother beneficiary. The main purpose of the supplementary feeding programme is to ameliorate the existing conditions in the most vulnerable segments of our population and to prevent the marginal

complexes has been started to make a significant impact on the anaemia situation. In recent years, the feasibility of using iron fortified common salt is being investigated in four different centres of the country.

Applied Nutrition Programme (ANP)

Conceptually, the ANP is a nutrition education programme. The prime objective of the programme is to educate people about good nutrition through demonstration. Under the programme, model vegetable gardens, poultry units and pisciculture ponds at community level are developed with the assistance of international agencies like UNICEF and WHO. The food, thus, produced in community/school gardens, poultry units, etc., is made use of in feeding young children and women. The idea behind the feeding component of the ANP is to create awareness among village people about the nutritional pro-

blems of young children and women and to motivate them to consume locally grown nutritionally rich foods, which otherwise under false food beliefs of the community, are likely to be prevented from consumption by pregnant and nursing mothers and toddlers.

Goitre control

Goitre, a deficiency condition, arises from iodine deficiency. It has hitherto been assumed that goitre is endemic only in the sub-Himalayan region in the North. However, a recent survey in Marathwada region of Maharashtra has shown that its prevalence in some pockets of Aurangabad district is as high as 50 per cent. The highest prevalence is observed in girls between 12 and 18 years and boys between nine and 13 years of age. An estimated 100 million people are known to live in endemic zones and a large number of them are known to suffer from goitre.

In all endemic areas for preventing goitre, iodized common salt is supplied in place of ordinary salt under the Goitre Control Programme (Salt Iodization Programme).

Lathyrism—a special problem

Lathyrism is confined to certain areas of Central India and nearly four per cent of the population (predominantly males between 11 and 35 years of age) are reported to be afflicted with this disease. It is characterized by a crippling paralytic condition associated with excessive consumption of a pulse—*khesari dal* (*Lathyrus sativus*). Once afflicted with paralysis, the disease is incurable. The average consumption of this pulse in some of the endemic areas varies from 250 to 450 g. per person per day.

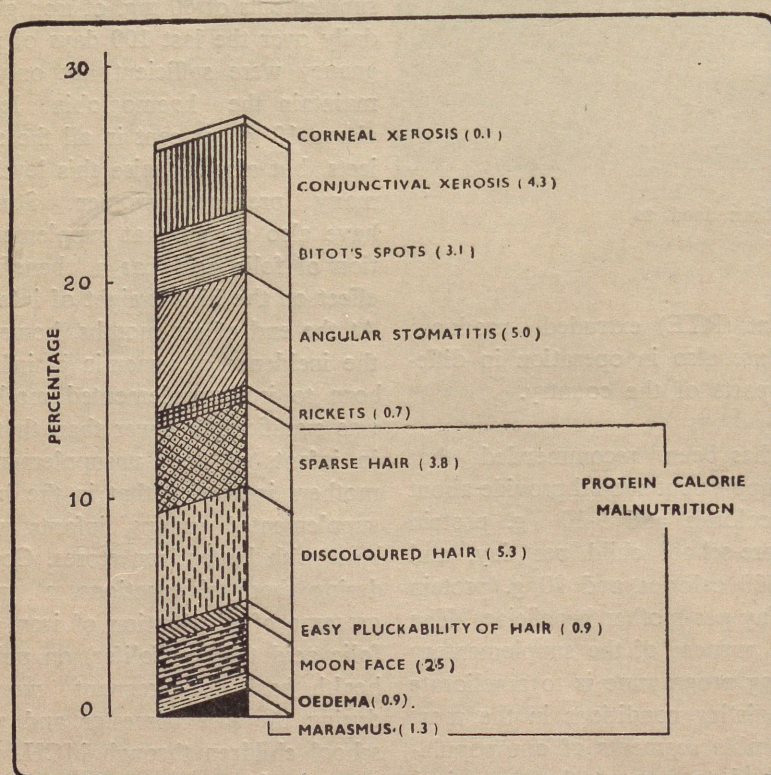
Combat measures

The first solution is to process the seeds and remove the toxin. (1) One method suitable for adoption at domestic level is to steep the seeds in about four volumes of boiling water (1:4) for an hour, reject the steep water and sundry the seed. Most of the toxin is effectively leached out.

(2) By using parboiling technique, large quantities of pulse can be made safe. In this process, the seeds are soaked in warm water for short periods, then steamed for 15 to 20 minutes and then dried in sun. About 80 to 90 per cent of the toxin could be removed by this method.

(3) Programmes of selective breedings and propagation of low toxin strains of seed now under way hold promise for the eradication of the crippling problem without eliminating the pulse, which accounts for nearly seven per cent of the total pulse production in this country. ○

NUTRITIONAL DEFICIENCY SIGNS IN PRE-SCHOOL CHILDREN (PERCENTAGE PREVALENCE)



TRAINING PROGRAMMES

IN NUTRITION

DR. S. C. BALASUBRAMANIAN

The training programmes of the National Institute of Nutrition provide orientation in nutrition for teachers in specialities like paediatrics, maternal and child health and social and preventive medicine. This results in positive upgrading of 'nutrition' in the under-graduate medical curriculum. This, in turn, would create medical men trained in nutrition to assume leadership in the implementation of nutrition programmes.

ONE of the important means by which the results of research in nutrition can be made useful to the community is by training key personnel, such as, teachers, doctors and nurses, who, in turn, will communicate the information to the public with whom they come in to contact. It is, therefore, essential to create the necessary awareness and motivation for a proper appreciation of the role of nutrition in health and disease among medical and public health personnel. Besides, teachers in agricultural universities in the departments of home science, veterinary science and agricultural science will also gain by appropriate training and equipment in human nutrition.

The vast experience gathered by the National Institute of Nutrition (NIN) in understanding the nutrition problems especially in India and other developing countries has provided the necessary background and confidence for organizing training programmes in human nutrition for various categories of personnel from India and abroad.

Among the several training programmes offered by the Institute,

the following programmes are of special importance.

Annual Certificate Course in Nutrition

This course is of an advanced nature and covers the theory and practice of nutrition. It is conducted for three months every year from 1 December through 28 February. The course is open to medical graduates and is so geared that it gives the appropriate nutritional orientation to teachers in medical colleges in the Departments of Paediatrics, Obstetrics and Gynaecology, Social and Preventive Medicine, Biochemistry, Physiology and General Medicine—disciplines in which an up-to-date knowledge of the latest concepts in nutrition will be particularly valuable. By this training, nutrition concepts can be expected to be integrated in the teaching of these specialities in the medical curriculum and thus an appreciation of the place of nutrition in the under-graduate medical curriculum ensured. Many of the State Governments are implementing several nutrition programmes. To provide necessary leadership for organizing

these nutrition programmes, it is essential to train persons with public health background and engaged in nutrition programmes. Such personnel are also accommodated in this course. More than 250 medical personnel have been trained in the 15 courses held since 1963. These include 150 participants drawn from almost all the States of India and 110 from various countries extending from the Netherlands to Fiji.

The Indian participants are supported by stipends provided by UNICEF while foreign participants receive fellowships provided by WHO towards per diem and travel expenses. These participants who will be occupying strategic teaching positions in schools of medicine in the next few years or be connected with public health set-up in administrative capacities are expected to give the appropriate nutrition bias in their assignments. The N.I.N. Alumni Association keeps in contact with participants trained in earlier years. A survey carried out recently indicated that participants trained at NIN are posted in 55 medical colleges out of 110 in the

country. Almost all the State Nutrition Officers in the whole country including the Nutrition Adviser to the Government of India are former alumni of NIN.

Master of Science (A.N.) Course

A study group of the WHO which visited the Institute in the sixties and surveyed the facilities available in clinic, field and laboratory, suggested the institution of a fullfledged diploma course. An inspection commission of the Osmania University which visited the Institute to consider affiliation of the course under the faculty of Medicine suggested the institution of a master's degree programme instead of diploma. The first course was offered in 1968. This course was designed to provide a sound training in the theory and practice of nutrition to selected candidates who may be engaged in the implementation of public health nutrition programmes in their respective coun-

tries or States or who may be engaged in teaching subjects allied to nutrition like paediatrics, maternal and child health or social and preventive medicine to undergraduates in schools of medicine.

The duration of the course is one academic year. A maximum of 12 participants are admitted every year. In all the 11 courses that have been held so far, more than 70 participants have been trained. A number of participants have been sponsored by WHO for this course also, from many developing countries like Nepal, Sri Lanka, Burma and Indonesia. The other participants were drawn from various States of India.

Both these courses have been supported by WHO and UNICEF right from their inception. The WHO also supports the participants of two guest lecturers. Eminent nutritionists from the USA, the UK, Guatemala and Indonesia have participated as guest lecturers. The

UNICEF provides stipend to the Indian nationals participating in the course and has also provided grants for acquisition of equipment for the training. The UNICEF also supports the travel costs for leading nutrition scientists from the country to participate as guest lecturers.

Other training programmes

Certificate Course in Endocrinological Techniques

The Institute is one of the best equipped for carrying out investigations in Endocrinological Techniques. Endocrinological techniques are now being increasingly used for diagnostic purposes. Research in various branches of medical science also requires the use of these techniques which are often highly sophisticated. The Endocrinology Division of the Institute has standardized many of these methods including *radioimmunoassay* procedures.



Participants carrying out diet survey in a rural as a part of training programme.

The National Institute of Nutrition is an internationally recognized centre for training. Participants in the different courses include several South-East Asian countries. They receive training in the laboratory, hospital and field situations.



A two-month intensive course for the training of senior teachers and scientists from selected medical colleges and biomedical research centres in the country, in the latest endocrinological techniques and their application was started in 1972. The courses are being offered usually in October—November every year.

The participants in this course are provided with stipends by the Indian Council of Medical Research (ICMR).

Certificate Course in Human Nutrition for Teachers

Human nutrition forms an important part in the equipment of teachers in agricultural universities and this can be expected to have in the area of home science, veterinary science and agricultural science. To enable such teachers to improve their teaching programmes, a three-month Certificate Course was organized with the help of the Indian Council of Agricultural Research (ICAR) and UNICEF. Sixteen teachers from various agricultural universities have participated in this programme.

The ICMR has been offering an advanced course in Biostatistics to personnel engaged in statistical work in medical institutions. The National Institute of Nutrition has been the venue for these training programmes and the staff of the Institute take a leading part in the teaching programme.

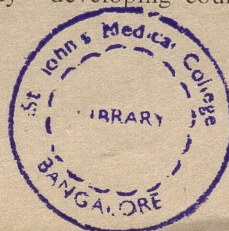
In addition to these regular training programmes, the Institute offers a number of *ad hoc* training courses. These are organized periodically for a period of a few days to a few weeks. These courses are usually designed to suit the needs of the groups that are to be trained. State nutrition officers, co-ordinators in charge of the Applied Nutrition Programme, Food Department officials and similar categories of personnel have benefited by such *ad hoc* training programmes. These courses are usually organized at the request of UNICEF or of the departments concerned.

Liaison with the Osmania University

The Institute maintains close contact with the Osmania University

in their teaching programmes. Some of the medical staff of the Institute participate in the undergraduate training of medical students in the local medical colleges. Postgraduate lectures in nutrition are delivered by senior members of the staff to students working for M.D., D.P.H. and D.C.H. degrees of Osmania University.

The training programmes offered by this Institute have been responsible for creating a nucleus of teachers in specialities like paediatrics, maternal and child health and social and preventive medicine who are well oriented towards nutrition and this can be expected to have a positive result in the upgrading of the place of nutrition in the undergraduate medical curriculum. This, in turn, can be expected to result in the creation of a corps of medical men well-trained and well-equipped to occupy positions of responsibility and assume leadership in the implementation of nutrition programmes, such as, ANP or other public health nutrition programmes in India and other neighbouring developing countries. ○



Health In Parliament

Health in Parliament is published in **Swasth Hind** as a regular feature with a view to post our readers with the answers given in both the Houses of Parliament—Lok Sabha and Rajya Sabha—to important questions of public interest.

LOK SABHA

KALA-AZAR

SHRI J. P. Yadav, Union Minister of State for Health and family Welfare, informed the Lok Sabha on 27 July, 1978 that in the districts affected by Kala-azar during 1977 where DDT spray was undertaken, the incidence has been checked, but increased number of cases have been reported from the districts where DDT spray was not undertaken last year. Such spray has now been undertaken in all the affected districts.

During 1977, 229 deaths were reported. During 1978, up to 8 July, 1978 thirty-one deaths have been reported. Steps taken to control the disease include:

1. Spraying of DDT in the houses and roof structures;
2. Early detection and complete treatment of cases.
3. Spreading health education amongst the public; and
4. Training of block medical officers in controlling kala-azar.

INFANT MORTALITY

SHRI Yadav informed the Lok Sabha on 10 August, 1978: (a) The infant mortality rate in India for 1972 as per Sample Registration Scheme of Registrar General of India is 139. (b) The causes of infant mortality can be broadly grouped into those related to the health of the mother; to the injuries received during the process of birth; and to the environment. The various steps taken by the Government in this direction are:

(i) The infrastructure for the delivery of maternal and child health services had been expanded both in the rural and urban areas. In the rural areas, the primary health centre has been strengthened by pro-

viding additional doctors. Sub-centres have been set up at the rate of one for 10,000 population. The ratio of population to be served by a sub-centre is proposed to be reduced to 8,000 in the first instance and to 5,000 during the course of this plan period. A team of two Multi-purpose Workers will serve this population of 5,000.

The community health workers scheme has been introduced and it is proposed to have one worker for every one thousand population.

The training of traditional birth attendants (Dais) who assist at the time of childbirth in villages has been intensified so that there would be a trained *dai* also for a village of 1,000 population.

The delivery rooms in the primary health centres are being renovated and additional bed facilities provided. Selected primary health centres are being up-graded to hospitals and maternity units provided in the Taluka sub-divisional hospitals. Maternity and children's units at district headquarter hospitals are also being strengthened.

(ii) Special clinics to attend to pregnant mothers and small children are organized in all types of medical and health institutions. Besides keeping pregnant mothers and small children under regular health supervision, these clinics provide the preventive services as well as undertake health and nutrition education.

(iii) Preventive immunization against tetanus is given to pregnant mothers in order that puerperal tetanus and neonatal tetanus which is a cause of infant deaths in many parts of the country is prevented. Facilities are provided for the protection of infants from small-pox, tuberculosis, diphtheria, whooping cough and tetanus. Possibilities of taking up immunization against other diseases like measles and poliomyelites is also under consideration.

(iv) Nutritional anaemia is widely prevalent among pregnant and nursing mothers. A scheme is in operation to prevent nutritional anaemia among mothers and children.

(v) A special Integrated Child Development Services Project has been introduced in 100 blocks in collaboration with the Department of Social Welfare. These projects implemented in the tribal and backward rural areas and urban slums aim at providing intensive health care for pregnant mothers and children below six years of age.

PREVENTION OF BLINDNESS

Shri Jagdambi Prasad Yadav, Union Minister of State for Health and Family Welfare, gave the following statement in the Lok Sabha on 24 August, 1978.

The Government of India have launched a National Programme for Prevention of Visual Impairment and Control of Blindness with the following features:

(i) Health education to community in eye care measures so as to preserve sight and prevent visual impairment.

(ii) Provide immediate eye relief through mobile units which will undertake comprehensive eye care services in the remote areas and also undertake survey of the community including preschool and school-going children for early detection of visual impairment.

(iii) Develop permanent infrastructure for comprehensive eye health care services at the primary health centres, Taluka and District hospitals, medical colleges and the Regional Institute of Ophthalmology. The Government of India have also identified Dr. R. P. Centre for Ophthalmic Sciences, All-India Institute of Medical Sciences, New Delhi, for development as an apex organization under the National Programme. The development of such permanent infrastructure would provide eye care services from the peripheral level to the highly specialized apex centre.

Since blindness is not a notifiable disease as such it is not possible to give State-wise number of blind in the country. A few studies conducted by the Indian Council of Medical Research have indicated that cataract, trachoma and infections, glaucoma, nutrition deficiencies, injuries, smallpox, some systematic diseases like diabetes, tuberculosis, leprosy, STD, etc., and certain congenital conditions like optic atrophy

are responsible for the visual impairment and blindness.

The Government have decided to set up a National Institute for Visually Handicapped at Dehra Dun. The Institute will be composed of the following divisions: (1) Research Division; (2) Training Division, (3) Book Division; (4) Aids and Appliances Division, (5) School Division, and (6) Industrial Psychology Division.

The Government give assistance to voluntary organizations for the handicapped including blind. Separate figures for assistance to the blind are not available. The following amounts were sanctioned to the voluntary organizations for the handicapped during the last three years:

1975—76	Rs. 65 lakhs
1976—77	Rs. 90.82 lakhs
1977—78	Rs. 80.33 lakhs

The current year's total plan provision for the handicapped is Rs. 275 lakhs which includes the provision for the blind.

AYURVEDIC SYSTEM OF MEDICINE

Shri Yadav informed the Lok Sabha that the Ayurvedic System of Medicine was already gaining popularity in the country. The Central Council for Research in Indian Medicine and Homoeopathy had established as many as 100 Research Institutes/Units and Enquiries in about 20 States/Union Territories. In order to accelerate the research programmes it had been decided to reorganize the Central Council for Research in Indian Medicine and Homoeopathy into four Central Councils for Research, one each in (i) Ayurveda and Siddha, (2) Unani Medicine; (3) Homoeopathy and (4) Yoga and Naturopathy. These new Councils had already been registered as Registered Societies. The Scientific Advisory Committee of the Central Council for Research in Ayurveda and Siddha had recently reviewed the various programmes and recommended setting up of new Research Institute/Centres in Delhi, Bihar, Madhya Pradesh, Gujarat, Arunachal Pradesh, Sikkim and Jammu.

A Regional Research Institute in Madhya Pradesh was proposed to be set up by the Central Council for Research in Ayurveda and Siddha during the current financial year by amalgamating the existing Research Units in the State. This Institute would be located

in a place where rent free Accommodation and other basic facilities will be made available by the State Government. The Institute will cover important areas in the State including Chittrakoot and Amarkantak.

RAJYA SABHA

FAMILY WELFARE IN VILLAGES

Shri Jagdambi Prasad Yadav, Union Minister of State for Health and Family Welfare, informed the Rajya Sabha on 16 August, 1978 that the Government of India had taken various steps to intensify Family Welfare Programme, especially in rural areas, as an integral part of comprehensive policy covering education, health, maternity and child care, family welfare, women's rights and nutrition. Particular attention was being given to improve maternity and child health services. A massive scheme for the training of indigenous *dais* had been taken up. A Community Health Welfare Scheme had been initiated in selected areas.

Intensive educational and motivational drives had been launched to popularize the Family Welfare Programme and a special fortnight was planned for September, 1978. A number of orientation training camps had been launched for public opinion leaders in rural areas. Efforts were being made to involve people's representatives and public opinion leaders at various levels including village level. The Prime Minister had made appeals through radio and television as also through letters addressed to the Chief Ministers of States and his Cabinet colleagues emphasizing the need for population control.

POPULATION OF INDIA

According to the population projection made by an Expert Committee set up by the Planning Commission, the population of India is now over 63 crores. This was stated by the Union Minister of State for Health and Family Welfare, Shri Jagdambi Prasad Yadav, in the Rajya Sabha on 19 July, 1978. He added: As a result of the family welfare programme, the birth rate which was over 41 per thousand of population, according to estimates based on the 1971 census, has come down to 34.4 in 1976 according to the estimate of the Registrar General based on the Sample Registration System, and is expected to have further declined to about 33 since then. The annual growth rate of the population which was of the order of 2.2 per cent during the period 1961-71 was,

according to the Sample Registration System 1.94 per cent in 1976.

The demographic objectives of the current plan is to bring down the birth rate from the present estimate of 33 to 30 per thousand of population by 1982-83. The Plan envisages an operational programme of 25 million voluntary sterilizations, five million IUD insertions and an annual average of five million other contraceptive users.

The other features of the Plan include:

- (i) Greater integration of health, family welfare and MCH services at all levels and conversion of the programme workers sanctioned for various activities into multipurpose workers.
- (ii) Provision of rural family welfare services at all primary health centres and provision of working and living accommodation at all family welfare centres.
- (iii) Establishment of 1,500 additional urban family welfare centres and 500 post-partum centres including 100 in the organized sector hospitals.
- (iv) Expansion of media infrastructure, step up of person-to-person approach and strengthening of health education machinery in the States.
- (v) Upgradation of primary health centres located at Taluq level or Taluq Level Hospitals under the Scheme of Referral Services.
- (vi) Expansion of the immunization programme for expectant mothers and children and schemes of prophylaxis against nutritional anaemia and control of blindness among children due to Vitamin 'A' deficiency and taking up measles and polio immunization under the family welfare programme.
- (vii) Introduction of population education in the educational system and involvement of school teachers.
- (viii) Greater involvement of the organized sector and voluntary organizations.
- (ix) More effective utilization of the field machinery and the infrastructure already available for the purpose of ensuring wider voluntary acceptance of the small family ideal. ○

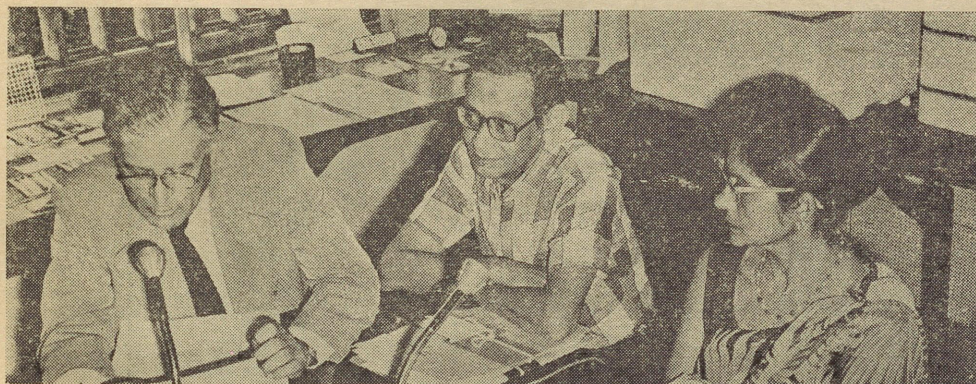


Photo shows from left to right: Dr A. D. W. Nugent, WHO Programme Coordinator in India, Dr Ranjit Sen, Deputy Director-General of Health Services (Planning) and Smt Serla Grewal, Additional Secretary and Commissioner (Family Welfare) attending the Workshop.

A workshop on the cold storage facilities for vaccines was held from 4 to 5 August, 1978 in New Delhi. The Extended Programme on Immunization (EPI) and MCW Officers of the States and Union Territories, WHO and UNICEF representatives and the concerned officers of the Ministry of Health and Family Welfare and the Directorate General of Health Services participated. The workshop reviewed the EPI Programme and formulated recommendations for future implementation. Also discussed was the plan of operation for diphtheria, tetanus and typhoid immunization to primary school children.

International Conference on Primary Health Care

The International Conference on Primary Health Care co-sponsored and organized by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) was held in Alma-Ata, capital of Soviet Kazakhstan from 6-12 September, 1978.

The Conference was the first convened on a world scale to address the issues of how better health care can be provided for all the world's peoples.

The Conference gave an opportunity to exchange experience and information on the development of primary health care, within the framework of comprehensive national health systems and services, and overall national development.

Some 700 participants, either as delegates from Member States or as representatives of international agencies and non-governmental organizations attended the Conference.

The Conference working paper was a joint report by Dr. Halfdan Mahler, Director-General of WHO and Mr. Henry R. Labouisse, Executive Director of UNICEF.

The report defined primary health care as essential health care made universally accessible to individuals and families in the community by means acceptable to them, through their full participation, and at a cost that the community and the country can afford. It stated that primary health care formed an integral part both of the country's health care system, of which it is the nucleus, and of the overall social and economic development of the community.

Participants considered the issues of primary health care in three committees, *viz.*, (1) Primary health care and development, (2) Technical and operational aspects of primary health care; and (3) National strategies and international support.

OUR CONTRIBUTORS

Dr S. G. Srikantia

Director
National Institute of Nutrition
Jamai-Osmania P.O.
Hyderabad-500007
Andhra Pradesh.

Dr S. C. Balasubramanian

Deputy Director
National Institute of Nutrition
Jamai-Osmania P.O.
Hyderabad-500007.

Dr N. Pralhad Rao

Assistant Director
National Institute of Nutrition
Jamai-Osmania P.O.
Hyderabad-500007.

Smt Parvathi Rau

Research Officer
National Institute of Nutrition
Jamai-Osmania P.O.
Hyderabad-500007.

M. L. Mehta

Senior Sub-Editor
Central Health Education Bureau
Kotla Road,
New Delhi-110002.



PRIME MINISTER

MESSAGE

Although every child has a right to expect proper care and attention from his parents by way of food, clothing, education and health, millions of our children are left to grow on their own without the benefit of parental care and attention.

No parents would want to neglect their children. But when there are many children to look after, parents just find themselves unable to provide them with even the bare necessities of life. The children suffer. The parents suffer. The nation suffers.

Therefore the growth of population has to be controlled in order that a perceptible share of the fruits of development becomes available to the people.

Family Planning thus acquires the most urgent priority. We have to approach every family particularly those in our villages and persuade it to adopt measures of birth control which we devised for their welfare. It is for us in Government, and in voluntary agencies to launch a movement to convince people about the continuous need for family planning.

I hope the National Family Welfare Fortnight which is being observed in the second half of October will help in carrying the message of family planning to the remotest villages to accelerate the pace of progress of the National Welfare Programme. I send my best wishes on this occasion and appeal to all sections of our society to help in this national endeavour.

New Delhi
August 24, 1978

Morarji Deasai

HELP CONTROL MALARIA

This is sixth in the series of the feature. The Community Health Workers, among others, are to educate the community on preventive, curative, promotive and rehabilitative aspects of health. Malaria is posing a great threat to the health of the people. Every effort should be made to control this disease. Given below are a few tips for CHWs to educate the community.

MALARIA has become once again a major problem confronting the health authorities. All-out efforts are being made by the Government of India to arrest the spread of disease. These efforts can yield good results only with full participation of workers at different levels in the programme and acceptance of services by the people.

People have to be given information on measures they could take in warding off the disease.

How does malaria spread? Malaria, a communicable disease, is transmitted from a patient to a healthy person by the female anopheles mosquito. The mosquito sucks the malaria parasite (Plasmodium) when it bites a man who is already suffering from the disease. This malaria parasite develops in the body of the mosquito for a period of 10 days to become infective (capable of spreading the disease). When this mosquito bites a healthy person (after 10 days), it injects the malaria parasite into him. Thus the disease spreads from a sick person to a healthy one.

Break this chain

The chain of this transmission from a patient to a healthy person has to be broken. This is possible if the mosquitoes carrying malaria

parasite are not allowed to breed. It is far more easy to prevent mosquito breeding than to kill adult mosquitoes. People could be advised to avoid water collections in and around their houses. Where water collection becomes unavoidable, they should pour a few drops of kerosene oil in it. This will kill the mosquito larvae and help keep surroundings mosquito-free.

If there are no malaria parasites in human beings, it will not be possible for the mosquito to pick up the parasites from anybody. This is the principle behind the detection and treatment of cases. Hence, every fever case should be reported to health authorities and one or two drops of blood given for examination. The blood examination will indicate whether the fever is malaria or not. If it is malaria, the patient will be given complete treatment.

One of the methods employed to kill the mosquitoes carrying the parasites is to get the houses sprayed with DDT. When the DDT is sprayed in the house, it leaves small traces of the insecticide on the walls, roof, etc. It is the habit of the anopheles mosquito, which takes a blood meal, to rest inside on the walls of the house. The trace of DDT that is left on the

wall sticks to its legs and the mosquito dies within seven to ten days. This is one way of breaking the chain of transmission. So it is necessary that the entire house is got sprayed when a spray team comes for this purpose.

People should be advised to get all the rooms of the house/premises sprayed. These should include cattle-sheds. During the spray, all eatables and fodder should be properly covered. After a spray, the walls should not be whitewashed or mud-plastered for at least two-and-a-half months. The effect of spray will be lost, if this is done.

During the transmission season—usually May to July and July to September—two rounds of spray (DDT) are required. In case of alternative insecticides like malathion or BHC three rounds of spray become necessary and are given.

The insecticides—DDT, BHC or malathion—kill malaria-carrying mosquitoes. Therefore, when the spray teams visit next time, people should accept their services and lend them a helping hand for spray purposes. By this they would be helping themselves, their family and the neighbourhood in keeping malaria away. ○

Regd. No. D (C)-359
Regd. No. R. N. 4504/57

