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We thank our readers for the many kind comments received on our last Index, and present our second, which has been compiled according to a similar format.

Fillers, Cajanaquotes and Letters to the Editor, however, have not been included, and Editorials and News Briefs have been listed under their particular subjects rather than under "Editorial" and "News Briefs" as formerly.

We would appreciate your comments on these changes as well as on the efficiency and value of these Indexes in helping to locate information.

THE EDITOR

SUBJECT INDEX - CAJANUS, VOLUME 9, 1976

	<i>Pages</i>
<u>A</u>	
AMC <i>see</i> Agricultural Marketing Corporation	
Advertising	263
Agricultural Marketing Corporation - <i>Jamaica</i>	121
Agriculture	3, 341
Agriculture - <i>Antigua</i>	51
Agriculture - <i>Guyana</i>	52, 247, 344
Agriculture - <i>Jamaica</i>	39, 47, 53, 203
Audio-visual materials	235, 306
<u>B</u>	
Baby foods <i>see</i> Infants, nutrition	
Barefoot doctors <i>see also</i> Health - <i>Guyana</i>	346
Book reviews	188
Brain damage	8
Breast-feeding	214
<u>C</u>	
CARDI <i>see</i> Caribbean Agricultural Research and Development Institute	
Caribbean Agricultural Research and Development Institute	344
Caribbean Food Plan	117, 193, 195
CARICOM Food Plan <i>see</i> Caribbean Food Plan	

	<i>Pages</i>
<u>C (cont'd)</u>	
Cassava, research	199
Cereals	11, 125
Cheese, composition and analysis	21
Cheese, nutritive value see Cheese, composition and analysis	
Climate	139
Community nutrition programmes - <i>Jamaica</i>	297, 306
Community nutrition programmes - <i>Philippines</i>	315
Conservation, food see Food conservation	
Consumer education	120
Corn see Cereals	
 <u>D</u>	
Dairy industry	223
Dietetics	206
Doctors see Barefoot doctors	
 <u>F</u>	
Farm produce, marketing - <i>Jamaica</i>	121, 135
Fish	164, 180
Fish culture	180
Food	57, 59, 75, 241, 273
Food, analysis	13
Food, canned	120

	<i>Pages</i>
<u>F (cont'd)</u>	
Food conservation	183
Food consumption - <i>U.S.A.</i>	49
Food habits	6, 64
Food habits, Oriental	113
Food habits, Rastafarian	228
Food labelling	120
Food and Nutrition Policy	288
Food and Nutrition Policy - <i>Trinidad</i>	158
Food processing	90
Food production	248
Food production - <i>Caribbean</i>	117
Food production - <i>Guyana</i>	52
Food production - <i>Trinidad and Tobago</i>	177
Food promotion	315
Food supply	75, 241

G

Groundnuts *see* Peanuts

Ground provisions *see* Root crops
see also Cassava

	<i>Pages</i>
<u>H</u>	
Health - Guyana	3, 346
Health education	172
Hydroponics <i>see</i> Soil-less culture	
<u>I</u>	
Infants, nutrition	32, 260, 266
Insects, nutritive value	64
Legumes <i>see also</i> Peanuts and Soyabean	61, 130, 141, 201
Longevity	6
<u>M</u>	
Malnutrition	8, 32, 99, 244
Marketing	135
Mass Media <i>see also</i> Advertising; Audio-visual materials; and Nutrition and Mass Media	341
Maternal and child health	214
<u>N</u>	
Natural resources	132, 180
New foods	57, 75
Nutrition	152, 260, 273
Nutrition - Caribbean	243

N (cont'd)

Nutrition - <i>Jamaica</i>	297, 306, 342
Nutrition education	1, 14, 82, 297, 306, 315
Nutrition and Mass Media	258, 260, 263, 271, 273 288, 297, 306, 315, 342
Nutritional status	152

P

Peanuts	201
Peas and Beans <i>see</i> Legumes	
Pigeon Pea <i>see</i> Legumes	
Plants, soil-less culture	66
Processing, food <i>see</i> Food processing	
Protein	64, 68
Protein, vegetable <i>see also</i> Soyabean; Textured Vegetable Protein; and Legumes	98

R

Research, cassava	199
Retail trade	121, 135
Rice production - <i>Jamaica</i>	53
Root crops <i>see also</i> Cassava	199

	<i>Pages</i>
<u>S</u>	
Schoolfeeding - <i>Jamaica</i>	266
Solar drying	183
Soyabean	61, 186
Sugar industry	132
Sugar production - <i>St. Kitts</i>	50
 <u>T</u>	
TVP <i>see</i> Textured Vegetable Protein	
Textured Vegetable Protein	98
Triticale <i>see</i> Cereals	
 <u>V</u>	
Vegetables	113
 <u>W</u>	
Weather <i>see</i> Climate	

AUTHOR/TITLE INDEX - CAJANUS, VOLUME 9, 1976

KEY

Article	(AR)	Newspaper Clipping	(NC)
Book Review	(BR)	Press Release	(PR)
Editorial	(ED)	Report	(RR)

Page

A

<i>Advertising Standards for Food Products Recommended.</i> Ffrench, Jennifer. (NC)	263
<i>Agricultural Boom in Antigua.</i> (NC)	51
Alfin-Slater, Roslyn B. and Jelliffe, Derrick B. <i>Corn: The Food of Millions.</i> (AR)	11
Alfin-Slater, Roslyn B. and Jelliffe, Derrick B. <i>Peanuts - An Unappreciated Food.</i> (AR)	201
<i>AMC Special Shops Meeting Vital Needs.</i> (NC)	121
Andrews, R. <i>Food and Nutrition Activities in Trinidad and Tobago.</i> (AR)	158
Antrobus, A.C.K. <i>Caribbean Food Plan: Add NUTRITION Now!</i> (ED)	193
Antrobus, A.C.K. <i>New Foods: A Perspective.</i> (ED)	57
Antrobus, A.C.K. <i>NUTRITION EDUCATION - "more honoured in the breach..."</i> (ED)	1
Antrobus, A.C.K. <i>Nutrition and Mass Media: A Glimmer of Hope?</i> (ED)	258
Antrobus, A.C.K. <i>Two Important Foods.</i> (ED)	130
Archer, Hutton G. <i>Food and Nutrition Content and Approaches in CARICOM Media.</i> (AR)	273

	Page
<u>B</u>	
'Barefoot Doctors' for Guyana. (NC)	346
Bernez, E.G.A. <i>Wanted - A New Deal in Health Education.</i> (AR)	172
<i>Bigger Plug to Agriculture on Electronic Media.</i> (NC)	341
<i>Breast-Feeding and Maternal and Child Health.</i> Gray, Ron H. (AR)	214
Brodber, Erna. <i>A Study of Yards in the City of Kingston.</i> [Reviewed by Christine Craig]. (BR)	188
Byam, N.T.A. <i>Nutritional Status: Historical and Geographical Perspectives.</i> (AR)	152
<u>C</u>	
<i>Cajanus Cajan - The Nutritious, Historic, Versatile Pigeon Pea.</i> Morton, Julia F. (AR)	141
<i>CARDI, Guyana Agriculture Ministry to Merge Work.</i> (NC)	344
<i>Carib Food Plan.</i> (NC)	117
<i>Caribbean Dietetics in Transition.</i> Zephirin, Manuelita. (AR)	206
<i>Caribbean Food Plan: Add NUTRITION Now!</i> Antrobus, A.C.K. (ED)	193
<i>Cassava Research Brings Results.</i> (AR)	199
<i>Changes in Production Policy Essential.</i> (NC)	248
Constantine, Henry. <i>From Barren Wasteland to Food Farm.</i> (NC)	203
<i>Corn: The Food of Millions.</i> Jelliffe, Derrick B. and Alfin-Slater, Roslyn B. (AR)	11
Cox, Eileen. <i>Solar Drying: A Low Cost Way of Conserving Foods.</i> (NC)	183

C (cont'd)

Craig, Christine. <i>A Study of Yards in the City of Kingston.</i> (BR)	188
Cremer, Hans D. <i>Nutrition Education and Training (Part I).</i> (AR)	14
Cremer, Hans D. <i>Nutrition Education and Training (Part II).</i> (AR)	82
Cremins, William J. <i>World Weather Watch.</i> (AR)	139

D

<i>The Dairy Cow - An Efficient "Recycling Machine"?</i> National Dairy Council. (AR)	223
--	-----

E

<i>The Effects of Food Processing on Nutritional Values.</i> Food Technology. (AR)	90
---	----

F

Ffrench, Jennifer. <i>Advertising Standards for Food Products Recommended.</i> (NC)	263
<i>Fish: A Depleted Food Source.</i> Stein, Jane. (NC)	164
Flannery, Robert. <i>Non-Agricultural Sources of Food.</i> (AR)	75
<i>Food and Nutrition Activities in Trinidad and Tobago.</i> Andrews, R. (AR)	158
<i>Food and Nutrition Content and Approaches in CARICOM Media.</i> Archer, Hutton G. (AR)	273
<i>Food Sources.</i> (NC)	241

	<i>Page</i>
<u>F (cont'd)</u>	
Food Technology. <i>The Effects of Food Processing on Nutritional Values.</i> (AR)	90
Fox, Helen. <i>The Ministry of Health/Catholic Relief Services: (A - In Hanover).</i> (AR)	297
<i>From Barren Wasteland to Food Farm.</i> Constantine, Henry. (NC)	203
<i>The Future of Textured Vegetable Protein (TVP) Production in Guyana: Agricultural and Nutritional Considerations.</i> Omawale. (AR)	98
<u>G</u>	
<i>General Criteria and Methods in the Evaluation of Audio-Visual Communication Materials.</i> Okwesa, B. Andrea. (AR)	235
Goodwin, Peter. <i>Jamaica's Crop of Good Ideas.</i> (AR)	39
Gray, Ron H. <i>Breast-Feeding and Maternal and Child Health.</i> (AR)	214
<i>Guyana Holds Agriculture Month.</i> (NC)	247
<u>H</u>	
Haddon, Celia. <i>Insects à La Carte.</i> (NC)	64
Harper, Malcolm. <i>The Little Big World of the Shopkeeper.</i> (AR)	135
Hodge, Walter H. <i>Very Interesting - Those Oriental Vegetables.</i> (NC)	113
<i>Hybrid Soya Being Developed.</i> (NC)	186

	<i>Page</i>
<u>I</u>	
<i>Innovative Use of Mass Media for Food and Nutrition Promotion.</i> Mannoff, Richard K. (AR)	315
<i>Insects à La Carte.</i> Haddon, Celia. (NC)	64
<u>J</u>	
<i>Jamaica's Crop of Good Ideas.</i> Goodwin, Peter. (AR)	39
<i>Jamaica's School Feeding Programme: Helping to Fight Malnutrition.</i> (NC)	266
<i>James, Canute. Positive Side of CARICOM Food Plan.</i> (NC)	195
<i>Jelliffe, Derrick B. and Alfin-Slater, Roslyn B. Corn: The Food of Millions.</i> (AR)	11
<i>Jelliffe, Derrick B. and Alfin-Slater, Roslyn B. Peanuts - An Unappreciated Food.</i> (AR)	201
<u>L</u>	
<i>Landman-Bogues, Jacqueline. Rastafarian Food Habits.</i> (AR)	228
<i>The Little Big World of the Shopkeeper.</i> Harper, Malcolm. (AR)	135
<u>M</u>	
<i>Malnutrition and Brain Damage in the U.S.A. - Report Finds Many Children Hurt by Malnutrition.</i> Schmeck, Harold M., Jr. (NC)	8
<i>Mannoff, Richard K. Innovative Use of Mass Media for Food and Nutrition Promotion.</i> (AR)	315
<i>Marriott, Louis. The Mass Media Component of a National Food and Nutrition Policy.</i> (AR)	288

	Page
<u>M (cont'd)</u>	
<i>The Mass Media Component of a National Food and Nutrition Policy.</i> Marriott, Louis. (AR)	288
<i>Meeting the Nutrient Needs of the Caribbean.</i> (NC)	243
<i>The Ministry of Health/Catholic Relief Services: (A - In Hanover).</i> Fox, Helen. (AR)	297
<i>The Ministry of Health/Catholic Relief Services: (B - In Portland and St. Thomas).</i> Peat, Gabrielle. (AR)	306
<i>Morton, Julia F. Cajanus Cajan - The Nutritious, Historic, Versatile Pigeon Pea.</i> (AR)	141
 <u>N</u>	
<i>National Dairy Council. The Dairy Cow - An Efficient "Recycling Machine"?</i> (AR)	223
<i>National Dairy Council. Say Cheese - The Nutritive Value and Composition of Cheese.</i> (AR)	21
<i>Need for Powerful Drive.</i> (NC)	177
<i>The Neglect of Agriculture.</i> (NC)	3
<i>Nestel, Barry. Waste Not, Want Not.</i> (AR)	132
<i>New Cereal Crop.</i> (NC)	125
<i>New Foods: A Perspective.</i> Antrobus, A.C.K. (ED)	57
<i>New Sources of Food.</i> (NC)	59
<i>Non-Agricultural Sources of Food.</i> Flannery, Robert J. (AR)	75
<i>NUTRITION EDUCATION - "more honoured in the breach..."</i> Antrobus, A.C.K. (ED)	1
<i>Nutrition Education and Training (Part I).</i> Cremer, Hans D. (AR)	14

	Page
<u>N (cont'd)</u>	
<i>Nutrition Education and Training (Part II).</i> Cremer, Hans D. (AR)	82
<i>Nutrition Makes News.</i> (NC)	260
<i>Nutrition and Mass Media: A Glimmer of Hope?</i> Antrobus, A.C.K. (ED)	258
<i>...Nutritional Self-Sufficiency in Guyana?</i> (NC)	52
<i>Nutritional Status: Historical and Geographical Perspectives.</i> Byam, N.T.A. (AR)	152
<u>O</u>	
Okwesa, B. Andrea. <i>General Criteria and Methods in the Evaluation of Audio-Visual Communication Materials.</i> (AR)	235
Omawale. <i>The Future of Textured Vegetable Protein (TVP) Production in Guyana: Agricultural and Nutritional Considerations.</i> (AR)	98
<u>P</u>	
<i>Peanuts - An Unappreciated Food.</i> Alfin-Slater, Roslyn B. and Jelliffe, Derrick B. (AR)	201
Peat, Gabrielle. <i>The Ministry of Health/Catholic Relief Services: (B - In Portland and St. Thomas).</i> (AR)	306
Pines, James M. <i>Supplementary Feeding and Cost-Effectiveness Analysis.</i> (AR)	32
<i>Positive Side of CARICOM Food Plan.</i> James, Canute. (NC)	195
<i>Private Sector and Nutrition.</i> (NC)	342
<i>Proper Eating Habits, the Key to Longevity.</i> (NC)	6

	<i>Page</i>
<u>R</u>	
<i>Rastafarian Food Habits.</i> Landman-Bogues, Jacqueline. (AR)	228
<i>Reassessment on the Farm.</i> (NC)	47
<i>Report on Technical Group Meeting on "Nutrition and the Mass Media".</i> (RR)	271
<i>Rice Self-Sufficiency Targets in Jamaica set for 1985.</i> (NC)	53
<i>Rose, Graham. US Promises a Bean-Feast.</i> (NC)	61
<u>S</u>	
<i>St. Kitts' Sugar.</i> (NC)	50
<i>Say Cheese - The Nutritive Value and Composition of Cheese.</i> National Dairy Council. (AR)	21
<i>Schmeck, Harold M., Jr. Malnutrition and Brain Damage in the U.S.A. - Report Finds Many Children Hurt by Malnutrition.</i> (NC)	8
<i>Silcock, Brian. UK Water-Farmers Boost World Food.</i> (NC)	66
<i>Solar Drying: A Low Cost Way of Conserving Foods.</i> Cox, Eileen. (NC)	183
<i>Stein, Jane. Fish: A Depleted Food Source.</i> (NC)	164
<i>A Study of Yards in the City of Kingston.</i> Brodber, Erna. [Reviewed by Christine Craig]. (BR)	188
<i>Sugared Baby Food Called Unhealthy.</i> (NC)	13
<i>Supplementary Feeding and Cost-Effectiveness Analysis.</i> Pines, James M. (AR)	32

	Page
<u>T</u>	
Thomas, A.J. <i>'Unusable' Land Could Produce Millions of Lbs. of Fish.</i> (NC)	180
Tudge, Colin. <i>Why Turn Waste Into Protein.</i> (AR)	68
<i>Two Important Foods.</i> Antrobus, A.C.K. (ED)	130
<u>U</u>	
<i>UK Water-Farmers Boost World Food.</i> Silcock, Brian. (NC)	66
<i>'Unusable' Land Could Produce Millions of Lbs. of Fish.</i> Thomas, A.J. (NC)	180
<i>US Promises a Bean-Feast.</i> Rose, Graham. (NC)	61
<u>V</u>	
<i>Very Interesting - Those Oriental Vegetables.</i> Hodge, Walter H. (NC)	113
<u>W</u>	
<i>Wanted - A New Deal in Health Education.</i> Bernez, E.G.A. (AR)	172
<i>Waste Not, Want Not.</i> Nestel, Barry. (AR)	132
<i>Weights on Cans Often Confusing.</i> (NC)	120
<i>Why Turn Waste Into Protein.</i> Tudge, Colin. (AR)	68
<i>World Weather Watch.</i> Cremins, William J. (AR)	139
<u>Z</u>	
<i>Zephirin, Manuelita. Caribbean Dietetics in Transition.</i> (AR)	206

Opinions expressed by the contributing authors should not necessarily be construed as representing the views of the Caribbean Food and Nutrition Institute, nor of the bodies represented on the Policy Committee of the Institute.

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FROM THE EDITOR

NUTRITION EDUCATION - "more honoured in the breach..."

Several years have gone by since nutrition education has been identified as a badly neglected discipline at levels ranging from primary school to medical undergraduate training. One cannot deny that the recognition of this defect in our educational systems has stimulated a variety of innovative approaches to the teaching of nutrition. It is, however, very evident that the spread of such ideas and approaches has been sadly circumscribed.

Professor Cremer, a guest contributor to *Cajanus*, tells it as it is: nutrition education may be said to be still more "honoured in the breach than in the observance." Its importance still depends too much on the special interest of professors in medical schools and teachers in both primary and secondary schools, and the manner in which much of the teaching takes place might well be helping to sustain the notion that nutrition is of no more than secondary importance.

The fact that many of these observations apply as much to the developed as to the developing countries provides the latter with nothing more than cold comfort. The magnitude and wide distribution of the nutritional problems of the poorer countries of the world demand that sound but simple and appropriate initiatives be taken in nutrition education. We must accelerate such effort as already exists, focussing on the needs of the young and the indigent. Nutrition must become a prime component of family life education in schools and, indeed, must be taught and made an examinable subject in teachers' colleges and in medical and nursing schools.

However, the ultimate goal of changing eating habits for the better cannot be achieved by nutrition education alone, but, as Professor Cremer says, "If nutrition education will remain a part of our nutrition strategy, substantial changes are necessary.

Nutritionists cannot do this job alone... Nutrition education can be effective only by an interdisciplinary approach."

THE EDITOR

CAJANAQUOTE

"The great need is not nutrition, in the sense of an esoteric, biochemical discipline; what we urgently need is a science that teaches people how to use the foods that are there, cook them to preserve the nutrients, and feed them to the children attractively enough so that they'll eat them."

Margaret Mead

*"Agriculture: men's work,
women's work?"*

RF Illustrated (August 1975)

TOPICS AND COMMENTS

*THE NEGLECT OF AGRICULTURE**

The call for poor, developing countries all over the world to place greater emphasis on agricultural development to improve the quality of life of their people has never been stronger.

Here in the Caribbean we are being bombarded on all sides by experts of various disciplines to make greater use of our two greatest resources, people and land, for two very good reasons.

The first is that with increased and improved farming we can grow a lot of the food we are now importing and thus save on our foreign exchange spending. The other is that agriculture is a labour intensive undertaking and can provide the opportunity for substantially increasing gainful employment in a region plagued since slavery with a high percentage of idle manpower.

Now there is nothing novel about this idea. It has been bandied about the region for as long as I can remember. Yet nothing significant has been achieved along these lines, although the major territories have been independent politically long enough, and thus able to make their own decisions on such vital economic matters.

In fact, it appears that in spite of the accepted importance of agriculture in the development of the English-speaking Caribbean, the trend seems to be away from farming pursuits.

President of the Caribbean Development Bank, William Demas, at the fifth annual meeting of the Board of Governors of the Bank in May this year, pointed out that the Caribbean Common Market

**Reproduced from The Jamaica Daily News, 16 November 1975.*

countries had a food import bill of \$E.C. 1,000 million for 1974. What was even worse, was that between 1960 and 1970, in these same countries, 500,000 acres of land had gone out of agriculture, Mr. Demas said.

He also mentioned that there were signs of some reawakening of interest and action in increasing food production in the region, "but this interest and this action need to be given considerably greater impetus."

The question that has to be answered now is: Why has there only been lip service to an idea which seems to hold such great potential for improving the quality of life of the poor people in this region?

One of the major reasons seems to be psychological. Too many Caribbean people have come to consider agriculture dirty work. Others equate it with slavery because it entails long hours in the sun and rain, unpredictable working hours, and after all that the returns in terms of dollars and cents are not usually encouraging.

The two inhibiting factors here are hard work under difficult conditions, and poor returns in terms of money. In addition to these two, there is the equally vital issue of cost of production. In simple terms, we must be able to sell what we produce for more than it costs us to produce. If not, we will very soon not have the means to continue the wasting operation.

So we have to think in terms of introducing new technology and where possible, machines, to help increase productivity - that is, to produce more goods at the same cost, or the same amount of goods at reduced costs. The more we can increase production without having to increase costs, the more profitable will our operation be. This in turn can mean either greater profits, or a drop in the price to consumers, and consequently, a lowering of the cost of living.

But if it means that more and more machines have to be used to increase production while holding costs down, then one of the major objectives of embarking on an expanded agricultural programme - providing employment for the thousands out of work - will be defeated, as machines usually displace more human beings than are needed to run them.

The use of modern technology also presents a problem for us. At present, the bulk of the food farming done in the region - with the exception of crops like sugar, and to a lesser extent, bananas, coffee and cocoa - is in the hands of peasant farmers who in most cases are really subsistence farmers, barely earning enough to keep them going from year to year.

What is more, their methods, and the lands they cultivate are far from adequate and they do not accept change easily. Not only have they become set in their ways, but they also have a healthy distrust for "new fangled" ideas from people with "only book learning."

What we need to correct this situation is a whole new breed of farmers better educated in their discipline, armed with the new technologies developed here and abroad and willing to put them into practice during a lifetime devoted to the land.

Since the old farmers will not be the best material for this job, the task must fall to the youths of today. But while these youths have shown great capacity for the political act of capturing "idle" land, they have not shown any interest in taking advantage of the incentives to farming offered by the Government.

The reluctance of our young people to get seriously involved in agriculture can be a continuing block to the effective exploitation of the region's resources in land and human beings, for the benefit of those who live here.

*PROPER EATING HABITS, THE KEY TO LONGEVITY**
By Eugene Sochor

Food of the right quality, but in reduced quantities may be the key to longer life.

The formula at least works for white rats, which according to a report by two Soviet scientists, have had their life prolonged by between 30% and 40%. The researchers, V. V. Frolkis and V. V. Bezrukov of the USSR Academy of Medical Sciences, say that so far these feeding methods have not been used to prolong the life of humans. They have not been put through all the stages of experimental analysis to see what effects they would have on the main organs, work capacity and mental activity of humans.

In their report on the problems of ageing and longevity in modern science and society, written for a UNESCO Conference on Biology and Ethics in Varna (Bulgaria), the scientists also dealt with geriatric drugs.

Their findings at the Institute of Gerontology in Kiev show convincingly that drugs, such as the poly-vitamin complexes, have a beneficial effect on fat metabolism, the functional condition of the nervous, endocrine and cardio-vascular systems and the work capacity of elderly people. Geriatric drugs to some extent also prevent premature ageing.

"Modern medicine has at its disposal a considerable range of treatments and drugs which are used in preventive medicine," the report notes. "However, these treatments are rarely studied from the strategic angle, that is to say, from the point of view of their effect on longevity. The same applies to geriatric drugs. In our view, study along these lines should become a standard feature of the testing of drugs."

*Reproduced from *The Daily Gleaner (Jamaica)*, 20 November 1975.

Exercise

An increasingly serious problem, according to the two Soviet scientists, is physical inactivity after retirement, together with a sharp rise in emotional and mental strain and psychological stress. Experimental data obtained by the Kiev Institute of Gerontology plainly show that protracted enforced hypodynamia, or diminished physical activity, shortens the life of animals.

Clinical and physiological research provides convincing evidence that inactivity affects the health of the elderly and contributes to their premature ageing. Among other effects, hypodynamia impairs the central nervous system, the circulation of the blood and causes a number of nervous and mental disorders and cardio-vascular conditions. These effects, the report states, must be counteracted by regular exercise and physical culture.

Equally important in modern life is the question of sensible eating habits. The researchers say that they now have conclusive evidence that overeating and obesity contribute to arteriosclerosis and diabetes, premature ageing and shorter life.

"Our Institute has obtained direct evidence that elderly people who habitually overeat, with a high calorie diet, are much more prone to age-related changes in the cardio-vascular system, coagulation of the blood, changes in the fat and carbohydrate metabolism and various other conditions than moderate eaters with a preference for milk and vegetables," the researcher noted.

"No tablets or injections will make up for the infractions of the simple rules for a long life - a sensible life style, proper organization of work, diet and exercise," they warn in conclusion.

*MALNUTRITION AND BRAIN DAMAGE IN THE U.S.A. - REPORT FINDS
MANY CHILDREN HURT BY MALNUTRITION**

By Harold M. Schmeck, Jr.

More than a million American infants and young children have either suffered stunting of their brains or are under risk of that kind of damage because of malnutrition, a team of scientists has estimated on the basis of national nutrition data.

The cause of the malnutrition is poverty. When malnourished pregnant women are considered in the estimates, one million babies yet to be born are added to the total in jeopardy.

"Finding evidence that a substantial proportion of the population of an affluent country like the United States is in jeopardy for brain growth and development comes as a shock to us," the scientists said, in a recent report.

"It implies," they said, "that a corresponding proportion of the difficulties children experience in school and later in their career development may be due to undernutrition affecting their brain growth in utero and during early life, thus interfering in the most serious way with the quality of their lives..."

The study results imply, as others have suggested in the past, that poverty is a vicious cycle trapping the children of the poor and dooming them to the same environment their parents endured.

Nutrition Surveys Used

The studies were done by scientists of the University of California using data from two national nutrition surveys completed several years ago. The original surveys were not done with brain research in mind.

**Reproduced from The New York Times, 2 November 1975.*

The scientists matched the nutrition and income data from the surveys with the items of physical data that give clues to nutrition and brain development. They estimated from this how many Americans were so severely malnourished as to put their brains in jeopardy.

Many individuals living near or below the poverty level showed serious chemical deficiencies. Furthermore, the malnourished infants and young children had head circumferences so far below the normal range for their ages as to suggest hampered brain development, the scientists said.

The team estimated the average deficit in brain weight among the severely malnourished children at 125 grams. This is a substantial fraction of the 1,400 grams weight of a normal 4-year old's brain.

In a normal population there is no clear correlation between head size and intelligence, one of the scientists noted in a recent conversation, but the degree of deficit of the malnourished children appeared to be so great that he estimated the odds as less than one in a million that they could represent normal variation.

As further evidence that malnutrition effects were involved, the scientists cited recent studies by scientists at St. Judes Hospital in Memphis. These studies by Dr. Paulus Zee indicated that malnourished infants and young children experienced spurts in general growth and in head circumferences when they were given special diets to supplement their previously deficient nutrition.

Reports of the Study

Dr. Robert B. Livingston, of the Department of Neurosciences, University of California, San Diego, presented details on the study at an opening symposium of the Society for Neuroscience Annual Meeting in New York City, November 1975.

A report of the work has also been written for a volume on growth and development of the brain which was published this year by Raven Press, New York, for the International Brain Research Organization. This organization is devoted primarily to the international dissemination of information on current brain research.

In addition to Dr. Livingston the research group in California consisted of John S. MacGregor, Gary J. Fisher and Dr. A. Baird Hastings, and Dr. Doris H. Calloway of the University of California Department of Nutritional Sciences, Berkeley.

They used extensive data from the 10-state nutrition study, done several years ago by the Department of Health, Education and Welfare and a study of nutritional status of pre-school children in the United States done collaboratively by Ohio State University and University of Georgia.

Using data from these and from the 1970 United States census, the scientists in California, estimated that the total number of pregnant women in the United States suffering malnutrition serious enough to endanger their babies was more than 945,000 then and is presumably greater now.

They estimated the number of infants and children in the jeopardized group already born at more than 1,100,000.

In the surveys used, data were compiled on eating habits, income and physical factors such as body size, weights and development as well as evidence of biochemical deficiencies.

*CORN: The Food of Millions**

By Roslyn B. Alfin-Slater and Derrick B. Jelliffe

The earliest record of corn as a plant food was made in the course of an early visit to Cuba by Columbus, when one of his followers reported that this food was "most tasty - boiled, roasted or ground into a flour."

Seed from corn was brought back to Spain in the late 15th century. Because of its high yield, little need for attention and resistance to both drought and pests, the cultivation of corn has spread more rapidly than has any other crop. In a single generation, corn was cultivated throughout warmer parts of Europe. In two generations, it was grown in many parts of Asia and as far afield as China. Similarly in later years, the cultivation of corn spread very rapidly throughout Africa.

In North America, as is well-known, the Pilgrim Fathers learned from the Indians the taste for corn, methods of interplanting it with beans, of harvesting and storage and of preparing such dishes as *hominny*, *pone* and *succotash* - whose Indian names are still used to this day.

Nutritionally, the value of corn depends on the type of product used, and as with other cereal grains, the more finely milled corn products are less nutritious.

Like other grains, corn is low in the essential amino acid, *lysine*, but in addition it has a second so-called "limiting" amino acid, *tryptophan*, which also is essential. The B vitamin, *niacin*, is present in corn only in small amounts and is not easily available. Flour made from corn lacks gluten of adequate quality, so that, unlike wheat flour, it cannot be used for making leavened bread.

*Reproduced from *Los Angeles Times Home magazine*, November 16, 1975.

The value of corn in the diet depends largely on the range of other foods consumed. For example, in the ancient Aztec diet, corn preparations were part of a mixed diet that included beans, tomatoes, squash and various dark green leafy vegetables. Under these circumstances, the nutrients lacking in corn were supplied by the rest of the diet.

However, in parts of the world where corn is eaten as the main source of food, the severe niacin deficiency disease, *pellagra*, occurs. This was the case in the southern United States in the first decades of this century, and *pellagra* is still prevalent in some parts of southern Africa and the eastern Mediterranean.

The methods of preparing foods from corn can be most important. In Mexico, the traditional use of lime in preparing tortillas adds calcium to the flour and also makes the niacin more available.

By contrast, *polenta*, a main corn preparation of Italy, does not have these advantages, so that in the past *pellagra* occurred in Italy but not to any extent in Mexico.

The United States is the principal producer in the world, with about one-third of all corn being grown here. Only two other cereal grains - wheat and rice - are more abundantly produced throughout the world. In the U.S., corn is used not only for human consumption but also for animal feed and for a wide range of other products, ranging from bourbon to starch to syrup.

Because of the importance of corn to many millions of people in the world, scientists recently have been working on improved varieties. Most important has been the *opaque-2* variety, which is very high in *lysine*, the amino acid usually low in ordinary corn. This improves the corn so much that high-lysine, *opaque-2* corn may almost be compared with meat, as far as its amino acid composition is concerned.

In fact, children with the severe protein deficiency disease, kwashiorkor, have been successfully treated solely with opaque-2 corn.

SUGARED BABY FOOD CALLED UNHEALTHY

Sugar added to processed baby foods adds only empty calories and contributes to problems like obesity and tooth decay, a group of health experts charge.

A petition circulated by the Centre for Science in the Public Interest and signed by 370 health professionals and students, asks that major baby food companies voluntarily lower the amounts of sugar in baby foods. It said the companies should stop adding sucrose to products and should discontinue production of baby desserts.

The petition was released this week and coincided with the centre's request for a recall of baby desserts by the Food and Drug Administration.

The group's codirector, Dr. Michael Jacobson, said manufacturers had refused to supply data on the amounts of sugar added to products because "the amounts of added sugar are embarrassingly high." There was no immediate comment from manufacturers.

Dr. Jacobson added: "The sole purpose of baby food desserts is to gain shelf space in the store and increase sales."

NUTRITION EDUCATION AND TRAINING

by

*Hans D. Cremer**Part I

Nutrition problems are of worldwide importance. They exist in those countries of the world which are currently in the development stage, where nutrition presents problems of primary importance. Nutrition problems occur also in countries of western civilization, but malnutrition in these countries is completely different from that in developing countries where it is associated rather with a low intake of calories and a deficiency in various nutrients like proteins, some vitamins or minerals. Diseases caused by a lack of such nutrients are termed "deficiency diseases". All these diseases have almost wholly disappeared from Europe and parts of the U.S.A. while other problems related to the development of the civilization and industrialization have appeared. These problems are part of the field of social medicine. They are the result of the rapid change in living conditions under the combined influence of various sociological factors, especially urban concentration, industrial development and increased lifespan.

The importance of nutrition problems brought an urgent sense of the need for scientific research in this field. In the so-called western countries the theoretical interest in nutrition

**This paper is based on a guest lecture given at the University of the West Indies, under the auspices of the Caribbean Food and Nutrition Institute. Dr. Cremer is Professor Emeritus of Human Nutrition, University of Giessen, Germany.*

problems and the need to find practicable solutions have led to the creation of centres for the study of nutrition problems, institutes for specialized research in this field, and scientific associations oriented in this direction. This orientation has also appeared in universities and other scientific institutions. With the increase in interest in the different aspects of food and nutrition the field was extended, becoming a subject of study in other disciplines. Not only have nutrition specialists been engaged in food and nutrition research in universities, the medical or health services, and agricultural services, but there have also been other categories of professional personnel contributing to the science of nutrition: biochemists, bacteriologists, microbiologists, agricultural specialists in plant and animal nutrition, food technologists, and social scientists who have continued to add new dimensions to existing knowledge.

Originally, specialists in this field were practically self-taught, and for a long time there was no need for further training. Since about a decade ago, however, research programmes have been extended, requiring increasingly numerous forms of collaboration, so the need has arisen for the formal professional training of experts, who could build a bridge between theoretical scientific knowledge in the science of nutrition and its practical application.

Nutrition in Medical Study Programmes

In the field of Medical Studies as in other disciplines it became apparent that:

- (1) Instruction in diet and nutrition had a place in the general training of medical students and physicians.
- (2) The subject should be included in medical specialization or postgraduate study programmes.

A basic knowledge of the composition of foods and of metabolic processes form part of some curricula within the general medical programme or graduate degree programmes and/or within the classical type of basic sciences, such as physiological chemistry or biochemistry and physiology, during the years of preclinical training. But, as we all know, the number of subjects to be taught within physiology and especially in biochemistry has become so immense, that it is completely impossible within lectures to deal with all its parts, even if they are very important. Therefore it depends very much on the interests of the professor in physiology or biochemistry whether he is teaching a great deal about physiology of the nerves or the biochemistry of enzymes, or whether he is teaching nutrition.

Later, in the clinical fields, the subject of nutrition is again taken up in the study of human pathology, in hygiene and in the clinical internship training in hospitals, when therapeutic diets and the feeding of patients are discussed.

In the field of paediatrics questions of nutrition have long been considered of primary importance. But except in special cases, the concepts of food and nutrition are scattered sporadically, and with no attempt at integration, within the classical study programme under the most varied names. Thus the basic elements of nutrition are gradually distributed throughout the study programmes where, in addition, the importance varies greatly according to the special interest of the professors, as is the case of preclinical fields.

Many medical faculties in the European countries considered this form of instruction perfectly adequate. In other countries, however, this situation was felt to be unsatisfactory, not only because such spreading out causes a lack of a whole view of the subject, but also because these subjects are all too often taught by professors who are not nutritionists themselves and who introduce this information (if at all) without having any personal

interest in it, since their own interest is centered in those branches of the subject they teach.

Those members of medical faculties who severely criticized the prevailing classical views deplored the fact that the student has to consider, rather inadequately, the changes in the diet necessary for the treatment of sick patients, when he has been taught practically nothing on the normal human diet, the various factors involved in determining what that diet should be, the reason why dietary regimes of peoples differ throughout the world, or why they change with the times.

Many of the professors believed that it would undoubtedly be advisable to deal also with these questions either in hygiene or social medicine courses. But it was also pointed out that this could not be done satisfactorily unless the professors of those departments, who are not usually nutritionists, would allow a number of lessons in their courses to be given by qualified specialists in the field of human nutrition. In almost all countries the future general practitioner does not usually learn anything or almost nothing about the practical problems of dietetics that arise in his professional work, either with respect to the normal or to the sick patient. It is through his own efforts at self-improvement, that he is left to fill in what, he feels, are the gaps in the medical education he has had.

In order to guarantee that the medical practitioner has some knowledge about the nutrition of normal and sick people, teaching in nutrition should become both an obligatory part of medical training and/or of medical examinations.

For example, in the Federal Republic of Germany a federal regulation for medical examinations was introduced in October 1970. A part of this examination was to answer multiple choice questions among which nutrition questions were compulsory.

This is the first example of a whole country forcing its medical students to have some knowledge in nutrition, and this new development will obviously increase the amount of attention given to nutrition teaching, both by the teaching staff and by the students.

The International Union of Nutritional Sciences

The International Union of Nutritional Sciences has created a Committee on Nutrition Education in Medical Faculties. This Committee intends to submit evidence concerning the urgent need to include the teaching of nutrition in the education of medical undergraduates and postgraduates in schools of medicine all over the world and wishes to make practical proposals deriving from its conclusions.

The Committee has examined available reports on schemes of nutrition teaching in medical faculties and has found certain interesting developments which promise well for the future. For example, the nutrition division of the department of community medicine at Mount Sinai School of Medicine, New York, has a comprehensive programme of nutrition teaching of medical students. In the U.K., Cambridge University is introducing a nutrition teaching programme in its clinical curriculum, a pregraduate clinical course lasting two years. At Cambridge there is also a postgraduate diploma course in nutrition run by a committee representing the Faculties of Medicine, Biology, Veterinary Medicine, Agriculture, Biochemistry, Physiology and a number of research institutes.

In spite of these first steps the IUNS Committee states that, on the whole, education in nutrition in most schools of medicine is not adequate. Therefore, the members of this Committee are recommending that medical students and medical graduates should be kept informed of the great advances in nutritional sciences which have occurred in the recent years, since it

considers it an essential duty of the doctor to be a contributor in preventive public health and nutritional measures, as well as to use up-to-date nutritional knowledge in the treatment of nutritionally dependent diseases. The importance of nutrition in conditions of physiological stress, e.g. in growth, pregnancy and lactation, or after injury, is of primary interest to the medical profession, as are those public health diseases with a dietary component, e.g. coronary heart diseases, and diabetes.

The Council in Foods and Nutrition of the American Medical Association has stated, that "in general medical education and medical practice have not kept abreast of the tremendous advances in nutritional knowledge". A recent survey on nutrition teaching in medical schools indicated that there is inadequate recognition, support and attention given to this subject in Medical Schools.

Nutrition Training of Paramedical Staff

Paramedical staff provide assistance to the medical staff in the fight against malnutrition and in ensuring that everybody is properly fed. Therefore a certain degree of nutrition training should be included in the curricula of the different categories of paramedical staff:

- (1) Personnel for whom nutrition is the main concern - dietitians and nutritionists. These include:-
 - (a) hospital dietitians;
 - (b) public health (community) dietitians;
 - (c) public health nutrition workers.
- (2) Personnel who are not *mainly* concerned with nutrition including nurses, midwives, pharmacists and, to some degree, medical technicians, etc.

Hospital dietitians have, besides their work in general catering and dietetic therapy, some teaching responsibilities such as when patients are admitted to hospital and when they come for consultation. In some respects the hospital dietitian is also responsible for the instruction of other hospital paramedical staff and, if need be, patients' families.

The duties of the *public health dietitians* and/or *public health nutrition workers* are broader and more varied, especially in their teaching obligations. The different activities should be listed briefly:

- (1) Advising governments and public health departments.
- (2) Organizing and supervising nutrition of different communities.
- (3) Therapeutic functions within public health institutions.
- (4) Organizing and supervising public health programmes.

All these activities may include some amount of instruction and therefore they have teaching responsibilities as well.

SAY CHEESE!*

- The Nutritive Value and Composition of Cheese -

The amount of cheese manufactured and consumed throughout the world has increased tremendously in recent years. In 1972, 32 countries produced 12.1 billion pounds of cheese compared to 8.3 billion pounds in 1966. A total of 2.9 billion pounds was produced in 1974 in the United States alone, where the per capita consumption increased to 14.5 pounds (excluding cottage cheese) from 7.7 pounds in 1950. Domestic production of cottage cheese was 8.6 million pounds in 1974 and per capita consumption has steadily decreased from 5.4 million pounds in 1972 to 4.7 million pounds in 1974.

The observed consumption patterns of cheese provide an indication of the kind and amount of nutrients that cheese contributes to our diet. Nutrition labelling offers the opportunity to relate to consumers the nutrient content of cheese.

CHEESE VARIETIES

Most cheese in the U.S.A. is made from cow's milk; however, many other species produce milk which has been and can be used. The Code of Principles from the Food and Agriculture and World Health Organizations of the United Nations defines cheese as the fresh or matured product obtained by the draining after coagulation of milk, cream, skimmed or partly skimmed milk, buttermilk, or a combination of some or all of these products. This definition

*Reproduced from the Dairy Council Digest, Vol. 46, No. 3, 1975, published by the National Dairy Council, U.S.A.

encompasses hundreds of varieties of cheese; a U.S. Department of Agriculture publication¹ described more than 400 varieties and indexed more than 800 names. As many as 2,000 names of cheese have also been mentioned in the National Dairy Council's publication "Newer Knowledge of Cheese"². These have been classified into 10 to 18 distinct types on the basis of methods of manufacturing. No two of these varieties are made by the exact same procedure; that is, the varied details of manufacturing produce characteristics and qualities peculiar to each type.

Classification systems have also been proposed on the basis of important composition variables (moisture, fat, calcium) age, texture or general appearance, type of milk used, type of ripening agent used, and country of origin.

Moisture content has been regarded as the most important single factor controlling other properties of cheese. At approximately equal fat concentrations, the lower the moisture content, the firmer the cheese, the slower the ripening, the milder the flavour, the more selective the microflora, and the longer the keeping quality. Thus, according to moisture content cheese may be classified into very hard, hard, semi-soft, and soft types. While soft cheese may be unripened, cheeses of the first three types could be further sub-grouped according to whether they are ripened by the action of bacteria, by surface microorganisms, or by blue molds in the interior. Typical of very hard or grating cheeses, containing less than 32% moisture and ripened by bacteria, are *Parmesan* and *Romano*. The best known varieties of hard cheeses ripened by bacteria are *Cheddar* and *Swiss*, which may have a moisture content of up to 39% and 41%, respectively.

¹U.S. Department of Agriculture. "Cheese Varieties and Description". USDA Agriculture Handbook No. 54, Washington, D.C. 1969.

²Chicago, National Dairy Council, 1967.

Limburger cheese, which can contain not more than 50% moisture, is a semi-soft variety ripened by bacteria in the cheese and on its surface. Other semi-soft cheeses include *Roquefort*, *Blue*, and *Gorgonzola*, all of which are ripened by a blue mould in the interior and may contain more than 39% but not more than 50% moisture. Soft cheeses have a moisture content of 50-55%; ripened soft cheeses include *Brie* and *Camembert*, and unripened types include cream cheese. Fresh types include cottage cheese, which contains about 80% moisture.

COMPOSITION AND NUTRITIVE VALUE

In cheese-making, changes in the composition of the original milk occur at two stages: at the separation of the curd from the whey, and during ripening. The removal of whey concentrates in the curd many of the nutrients of milk. The degree of concentration depends largely on the type of cheese being manufactured, on the type of milk (whole or skimmed) initially used, and on the manner of coagulation. Almost all of the water-insoluble and some water-soluble components are retained in the curd resulting in approximately an eight-to-ten-fold increase in protein, fat (when whole or partially skimmed milk is used), calcium, phosphorus, and vitamin A over those in milk. Most of the water-soluble components, on the other hand, are retained by the whey. As a result, lactose, soluble proteins, and water-soluble salts are not all concentrated and thus may be relatively lower in cheese than in the original milk.

Ripening involves intentional exposure to controlled temperatures for long or short periods of time - depending on the type of cheese - to allow bacteria and enzymes to transform the fresh curd into a cheese of a specific flavour, texture, and appearance. The extent of these changes, which inevitably affect nutrient content of the product, depends largely on the micro-organisms introduced as a starter culture prior to ripening and/or present initially.

It is rather difficult to quote any general analytical values because of differences in reported nutrient composition of cheese varieties. Various sources of information on the nutrient content of cheese may be found.

The protein, fatty acids (both saturated and unsaturated), cholesterol, and lactose contents of common domestic cheeses are shown in Table 1. The values are based on a one-ounce (28 g) serving size, the measure recommended by the National Cheese Institute as a reference standard for comparison with other cheeses and foods.

Protein

Protein in cheese depends largely on the method of coagulation of milk employed. Milk is coagulated by one or a combination of three ways: (1) addition of starter culture; (2) addition of milk-coagulating enzymes, rennet, for example; and (3) the aid of controlled cooking temperatures. Protein in cheese is also altered during ripening, a process which is almost exclusively restricted to cheese made from rennet-coagulated curds.

In the rennet-coagulated cheese, protein is in the form of calcium paracaseinate. A portion of the calcium is displaced from the paracasein when acid is produced during cheese manufacture. During ripening, the rigid, insoluble paracasein is hydrolyzed into small molecular and soluble nitrogenous forms giving a softer, more pliable body as well as a partially digested food. Since the cheese coagulated with the aid of starter culture alone (acid-coagulated) is not subjected to further ripening, the protein is not greatly hydrolyzed. Acid-coagulated cheese treated with high temperatures contains good quantities of all three milk proteins:

casein, lactoglobulin, and lactalbumin. Data on amino acid content of several cheeses are available in an earlier publication.¹

The protein content of common cheeses, as shown in Table 1, varies from 2.10 to 8.14 g/oz, although the majority of the cheeses contain 5.00 to 7.00 g. Generally, a one-ounce slice (28 g) of cheese contributes an amount of high quality protein approximately equal to 15% of the U.S. RDA for adults and children over four years.

Fat

Fat in cheese exists as an emulsion. The fat content of cheese varieties differs due largely to variations in the fat content of the milk from which the cheeses were made. During ripening, a small amount of neutral fat is hydrolyzed to butyric, caproic, caprylic, and higher carbon-chain fatty acids and these are known to contribute to the more aromatic flavour of cheese.

Individuals following a medically prescribed fat-modified diet desire information on the fat and cholesterol content of foods. Nutrition labelling regulations allow food manufacturers to list saturated and polyunsaturated fatty acids as well as cholesterol content of foods. Table 1 contains data on the total lipids, saturated and unsaturated fatty acids, and cholesterol content of cheese. These figures, except for cholesterol, are from a more detailed provisional table.

Cholesterol in the lipid fraction exists in three forms: free in the fat, bound to the lipoprotein of the fat globule, and as the cholesterol ester. At least 95% of the cholesterol in dairy products is in the first two forms.

¹Orr, M.L. and Watt, B.K. "Amino Acid Content of Foods". Home Economics Research Project No. 4, U.S. Government Printing Office, Washington, D.C. 1957.

Table 1: Protein, total lipids, fatty acids, cholesterol, and lactose content of selected cheeses. ^a [Amount of nutrient per one-ounce (28 g) edible portion].

Cheese	Protein ^{b,c} g	Total Lipids ^d g	Fatty Acids ^d		Cholesterol ^e mg	Lactose ^f g
			Saturated g	Unsaturated g		
Blue	6.03	8.29	5.35	2.55	21.06	N.D.
Brick	6.55	8.23	5.04	2.80	N.A.	N.D.
Camembert	5.47	7.31	4.59	2.38	20.17	N.D.
Cheddar	6.96	9.18	5.66	3.00	28.67	N.D.
Colby	6.67	8.62	5.43	2.74	26.57	N.D.
Cottage, creamed	3.49	1.12	0.73	0.34	3.89	0.17
Cottage, uncreamed	4.85 ^g	0.11	0.06	0.03	1.88	0.13 ^g
Cream	2.10	9.46	5.94	2.97	30.52	0.48
Edam	7.21	7.81	5.07	2.32	24.99	N.D.
Mozzarella, low moisture part skimmed	7.72	5.43	2.86	1.42	15.13	0.11
Neufchâtel	3.25	6.78	4.31	2.16	N.A.	0.29
Parmesan	10.82 ^h	7.42	4.70	2.32	20.49	N.A.
Provolone	7.27	7.28	4.62	2.27	19.28	N.D.
Ricotta	3.11	2.41	1.45	0.76	N.A.	0.40
part skimmed	3.27	4.09	2.60	1.26	N.A.	0.41
skimmed	8.14	7.73	4.93	2.46	24.05	N.D.
Swiss						
Pasteurized process American	22.47	8.09	5.04	2.66	N.A.	N.D.

^a Calculated from data based on nutrients per 100 g edible portion.

^b Total nitrogen X 6.36.

^c Source: Feeley, R. M., P. E. Criner, and H. T. Slover. J. Am. Diet. Assoc. 66:140, 1975.

^d Source: Posati, L. P., J. E. Kinsella, and B. K. Watt. The Fatty Acid Composition of Milk and Eggs. Paper presented at the 57th annual meeting, American Dietetic Association, Philadelphia, Oct. 7-11, 1974.

^e Source: Lacroix, D. E., W. A. Mattingly, N. P. Wong, and J. A. Alford. J. Am. Diet. Assoc. 62:275, 1973.

^f Average of values for long- and short-set types.

^g Source: National Cheese Institute. Unpublished data.

N.A.—not available

N.D.—none detectable.

Carbohydrate

Most of the lactose, the main carbohydrate in milk, remains with the whey. In ripened cheese, the small amount entrapped in the curd is transformed into lactic acid and flavour components, as well as propionic acid in the case of *Swiss* cheese, within 14 to 21 days of ripening. A wide range in lactose content of creamed cottage cheese has been reported principally because lactose is an optional ingredient frequently added to the creaming mixture.

Carbohydrates, particularly lactose, are not nutritionally significant in ripened cheese, although their hydrolyzed products are available. For those patients medically diagnosed to be deficient in the enzyme lactase, cheese becomes the important source of the many nutrients in milk, particularly calcium.

Minerals

The role of calcium in bone health is well documented and recognized. Dairy foods are the major source of calcium in the American diet. Calcium content may also influence cheese texture; it is high in hard cheeses and rather low in some soft cheeses.

The amount of calcium that remains in the curd has been reported by some to depend on the method of coagulation. In ripened, renneted, whole milk cheeses (*Cheddar* and *Brick*) 80% of the milk calcium along with 70% of the milk phosphorous is retained and concentrated. By comparison, cottage cheese made without rennet and with acidification resulting from the action of starter culture alone, rather than by the additional action of milk-coagulating enzymes, retains less calcium and phosphorus because precipitation occurs at the isoelectric point of casein and because acidified water is often used to wash these curds.

Water-soluble salts of potassium, sodium, and magnesium are removed with the whey so that only residual amounts of these salts remain. Nevertheless, appreciable amounts of these elements are reported to be in process cheese products.

Vitamins

Fat-soluble vitamins, particularly vitamin A, are retained in cheese made from whole milk but are not, of course, present in cheese such as uncreamed cottage cheese made from skimmed milk. Generally, little or no change in the vitamin A content has been observed during ripening or storage of cheese for a year.

Water-soluble vitamin content of cheese varies with the type of cheese, the microorganisms used as starter cultures and as ripening agents, as well as the period of ripening. Losses in thiamin, riboflavin, niacin, vitamin B₆, pantothenic acid, biotin, and folic acid occur during the separation of the curd from the whey. While relatively little change occurs in the centre portion of soft-ripened cheeses, the outer layers showed an increase in most of these vitamins, more significantly for riboflavin. This observation has been attributed to the synthesis of these vitamins by surface ripening microorganisms.

The importance of the B vitamins in nutrition is well established although dietary allowances have only been recommended for some of them. A one-ounce portion of Cheddar cheese provides approximately 6% of the U.S. RDA for riboflavin for children over four years and adults.

PASTEURIZED PROCESS CHEESE

Pasteurized process cheese is prepared by mixing and grinding several batches of natural cheese with the aid of heat and an emulsifying agent. *Pasteurized process cheese food* is similar to process cheese except that it contains more moisture and less fat, the cooking temperatures and acidity are higher, and optional

ingredients like skimmed milk, cream, and cheese whey can be added. The final product has a softer body compared to process cheese. *Pasteurized process cheese spread* is a product of many forms and flavours, made similarly to process cheese and cheese food except that additional moisture is incorporated to give a spreading quality to the product. Because of the heat treatment applied during their manufacture, process cheese products have a long shelf life.

The composition of cheese, cheese foods, and cheese spreads is governed by the definitions and standards of identity promulgated by the Food and Drug Administration (FDA). These regulations specify not only the maximum moisture and minimum fat content, but also ingredients that may be used, and processing requirements. In effect, they attempt to assure the consumer uniform composition and quality in the product. In conforming to these standards, process cheese cannot contain more than 3% emulsifying salts, and its fat and moisture content must generally equal those of the natural cheese from which it was derived; process cheese foods must contain not more than 44% moisture and not less than 23% milk fat; and process cheese spreads must contain not less than 44% but not more than 60% moisture, and not less than 20% milk fat.

Process *Cheddar* and process *Swiss* cheeses contain slightly less calories, fat, protein, and calcium but significantly more phosphorus and sodium than the corresponding natural cheeses. The same trend is observed for process cheese food and cheese spread although the differences are more pronounced. Particularly notable is the marked increase in carbohydrate content of these products as compared to that in natural cheeses and process cheese. This increase can be attributed to the legal addition of optional ingredients like skimmed milk and cheese whey during cheese food and cheese spread manufacture.

Although nutrition labelling of cheese is voluntary except for cottage cheese, nutrition information based on a one-ounce serving size for labelling most domestic cheese has been made available by the U.S. National Cheese Institute (NCI) for use by the industry as shown in Table 2. Although changes in these data are not anticipated, the Institute will continue to monitor cheese samples for required nutrition information and will notify the industry if need be.

OTHER "CHEESES"

Since cheese is an excellent source of fats, protein, vitamins, and minerals, a satisfactory replacement should provide these nutrients in like quantities and in a form that is readily available for human metabolism.

Products which stimulate natural cheeses or process cheese products are currently on the market.

A product made in semblance of cheese or process cheese products in which non-milk ingredients supplement or replace any or all of the milk nutrients does not meet the standards of identity for a cheese or cheese product. Yet it only can be labelled "imitation" if it does not meet the FDA nutritional standards. Cheese analogues which meet nutritional standards will be assigned a standardized name by the FDA. On the other hand, cheese analogues which do not meet the FDA nutritional standards will bear the term "imitation" followed by the standardized name.

The historic precursor of the vegetable-based cheese analogue is the Chinese food "sufu", which is made from soybeans. There are also cheeses based on peanuts and cassava. Continued research is, however, required to meet consumer satisfaction, nutritional adequacy, and legal approval for cheese analogues.

A full list of references can be supplied on request.

Table 2: Proximate analysis of common cheeses and percent contribution to U.S. RDA.^a [Amount of nutrient per one-ounce (28 g) edible portion].

CHEESE ^b	CALORIES	PROTEIN g	CARBOHYDRATE g	FAT g	% of U.S. RECOMMENDED DAILY ALLOWANCES (U.S. RDA)			
					PROTEIN	VITAMIN A	RIBOFLAVIN	CALCIUM
Cheddar ^c	110	7	1	9	15	4	6	20
Swiss	100	8	0	8	15	4	4	25
Monterey	100	6	1	8	15	4	6	15
Mozzarella, low moisture part skimmed	80	7	1	5	15	2	4	20
<19% fat	90	7	1	6	15	2	4	20
>19% fat	110	10	1	7	20	2	4	30
Parmesan	100	9	1	7	20	4	4	25
Romano	100	7	1	8	15	4	4	15
Edam or Gouda	100	6	1	8	10	4	4	15
Blue	90	7	1	7	15	4	4	15
Provolone	100	2	1	10	4	2	2	2
Cream Cheese								
Pasteurized Process								
American	110	6	1	9	10	6	6	15

^a Source: National Cheese Institute. Unpublished data.
^b Contains less than 2% of the U.S. RDA of vitamin C, thiamin, niacin, and iron.
^c Nutrition information also for washed curd, stirred curd, or Colby.

SUPPLEMENTARY FEEDING AND
COST-EFFECTIVENESS ANALYSIS

by

*James M. Pines**

Supplementary feeding is rarely viewed as one of the alternative services available for the achievement of health goals. Association with disposal of agricultural surplus, disaster relief, and welfare programmes diverts attention from the important potential of supplementary feeding as an instrument of health policy. Despite difficulties of quantifying benefits and predicting them with precision, it is possible to identify circumstances in which a "service package" giving major emphasis to selective supplementary feeding of infants is likely to be the most efficient alternative for maintaining their health. Concern for lowering the cost of health services and improving effectiveness in the use of diminishing food aid justifies increased attention to systematic analysis of supplementary feeding, despite the need for other interventions attacking fundamental socio-economic causes of malnutrition.

The subsidized provision of additional food, to increase intake of specific groups, can have significant preventive and curative health consequences.¹ Nutrition rehabilitation centres, for example, are now widely accepted as a way of using controlled feeding to cure serious malnutrition and reduce future illness.

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¹For discussion of past feeding efforts, see Berg, "The Nutrition Factor", (Washington 1973), Chapter X.

When compared with hospitalization of malnourished children, these centres show impressive cost savings.¹ The rehabilitation centre treats a current state of malnutrition and also prevents the further decline that is almost inevitable without it. The timing of supplementary feeding determines whether impact is primarily preventive or curative.

Increasing the food consumption of a child who is presently near adequate nutrition status, but has a high probability of soon falling into serious malnutrition, extends the rehabilitation centre principle to earlier prevention. Added intake ceases to be "medicine" and becomes a form of "immunization" against malnutrition. The conditions under which this "preventive feeding" is an efficient investment can be delineated. The role of feeding services in health planning then flows from review of these conditions in relation to national health status and health care goals.

Because the impact of "immunization by feeding" is likely to be greatest among infants between six months and three years old, an example from this group illustrates well the considerations involved in defining optimal conditions for feeding and its contribution to reducing the costs of health care.

For any infant population, health goals are likely to include restoration to adequate nutritional status of part or all suffering from malnutrition serious enough to require hospitalization or rehabilitation. There exists within the same population

¹In 1971, R. Cook estimated the cost of hospital treatment at \$95 to \$950 and rehabilitation centre costs at \$25 to \$70. "Is Hospital the Place for the Treatment of Malnourished Children?" Journal of Tropical Paediatrics and Environmental Child Health, Volume 17, pp. 15-25.

another group at risk of deteriorating from sub-clinical malnutrition into more serious conditions requiring treatment.¹ Factors contributing to the probability of such deterioration can be identified and infants classified according to incidence of these factors among them. In the absence of preventive action, a substantial percentage of the group at risk will later need rehabilitation or hospitalization, if child health status within the community is to remain stable. Although immunization against childhood diseases may arrest some decline, low food intake can make these measures inadequate to prevent occurrence of serious malnutrition.² For some infants, particularly those with consumption below the requirements of a healthy child, additional food is necessary to avoid malnutrition. To the extent that costs of supplementary feeding for a group are lower than treatment expenses for those in it thereby enabled to avoid treatment, systematic feeding is a more efficient alternative for maintaining nutritional status than waiting for the at-risk group to become sick enough to need rehabilitation or hospitalization.³ Since malnutrition carries with it reduced resistance to disease and infection, this conclusion is also relevant to maintenance of broader health status levels.

¹See Morley, "Paediatric Priorities in the Developing World", (London 1973), Chapter 9 (pp. 158-169) for discussion of the at-risk concept.

²Scrimshaw, Taylor and Gordon. "Interactions of Nutrition and Infection", (WHO, Geneva 1968) pp. 266-267.

³This is an application of the principles set forth by B. Cvjetanovic in "Cost-Effectiveness and Cost-Benefit Aspects of Preventive Measures Against Communicable Diseases", Human Rights in Health, CIBA Foundation Symposium No. 23 (Amsterdam 1974), pp. 187-203.

The advantages of "preventive feeding" are frequently neglected because of the concern to take care of already existing serious malnutrition. A broader view, emphasizing the savings from reducing future malnutrition, calls attention to possibilities for using supplementation as an alternative to later treatment. Increased precision and effectiveness in programming feeding services will eventually permit redirection of existing MCH facilities and staff away from nutritional rehabilitation and hospitalization. It may also influence the allocation of resources to, and within, health ministries, accelerating a shift to prevention without sacrificing response to current treatment needs.

The efficiency of anticipatory feeding for those at highest risk depends in part on the accuracy of prediction. If, for example, 90% of those classified as being at high-risk would, in three months, have declined into serious malnutrition, preventive feeding is far more efficient than if prediction were only 50% correct. Early feeding of the high-risk group may also be more efficient than confining feeding to those failing to show adequate weight gain, a common paediatric practice. When ability to predict incidence of malnutrition is high, added cost of feeding an entire group at risk, before weights become unsatisfactory, may be less than the financial and social costs of waiting for weight records to trigger feeding and other special attention likely to be required. Effective prediction permits the threshold of prevention to be pushed back without increasing the total cost of services.

The efficiency of immunization by feeding also varies directly with the incidence of malnutrition within any infant group. If the percentage of infants that will require rehabilitation or hospitalization is higher, the cost of preventing one case needing treatment is reduced. Higher incidence of malnutrition increases the likelihood that any infant immunized through supplementary feeding would have become malnourished, reducing

the impact of difficulties in predicting those at risk. If incidence is high enough, selective feeding of those most at risk may become less efficient than feeding an entire group.

As hospitalization and rehabilitation costs rise, the relative advantages of preventive feeding also increase. Comparison of costs and benefits for feeding and treatment also shifts in favour of prevention if the cost of feeding services declines. The cost per "successful immunization" may decrease because of more efficient delivery of services or because the percentage of success rises. Improved management, substitution of volunteers for paid staff, and better transportation arrangements, for example, might reduce the cost of delivering services. With no change in delivery costs, introduction of a more acceptable food, accompanying food delivery with educationally more effective packaging and advice, or improving regularity of recipient attendance, might increase the effectiveness of the services. As anticipatory feeding becomes a more widely accepted part of national nutrition and health policies, other ways of lowering costs and improving effectiveness are likely to be identified.

Some of the consequences of selective immunization by supplementary feeding are shown by a quantified example based on reasonable estimates of relevant variables. Assume that feeding will take place in an area with 1,000 children between six months and three years old, where current incidence of malnutrition has led to hospitalization of ten infants and supervised rehabilitation of another 30 each year. With an average cost of \$500 per hospitalization and \$50 for rehabilitation, the health system spends \$6,500 annually for the treatment of malnutrition. If it is possible, by preventive feeding of 100 infants identified as being most at risk, to cut hospitalization and rehabilitation needs by half, treatment costs can be reduced by \$3,250. 40% success in prediction (i.e. 40 of the at-risk children would have become severely malnourished), combined with an immunization effectiveness

rate of 50% among the forty, or various combinations of these two percentages, could produce the desired outcome. Only 20 malnourished children would then need hospitalization or rehabilitation.

The example does not consider morbidity consequences or likely reduction in mortality through early preventive feeding, though intervention might well bring these about along with cost savings.¹ Even with this omission, supplementary feeding is more efficient if the 100 high-risk children can be fed for no more than \$30 per child, a figure that would permit multi-year services in many existing feeding operations.

It is unfortunate that current pre-school feeding selection and evaluation practices have not yielded data to test the hypothesis suggested by the above example. As maternal and child health services are extended to new areas, experimentation with feeding programmes based on the early immunization of at-risk infants can provide new insights into the costs and consequences of service alternatives.

This attempt to focus attention on the benefits of a well-considered feeding strategy, and on some of the factors that should influence it, deliberately abstracts from many important related issues. Successful encouragement of more favourable intra-family feeding practices, for example, can make supplementary feeding unnecessary and is a preferable alternative whenever feasible. Anticipatory feeding contributes to the acceptance of these practices and insures against the consequences of failure in efforts to introduce them. The problems of reaching infants most

¹Sarris, K. and Stickney, R.E. "Approximate Model for Estimating the Potential Reduction of Malnutrition and Mortality by Various Interventions", Unpublished paper distributed by Massachusetts Institute of Technology International Nutrition Programme, 1974.

at risk are formidable. Assuring that food delivered is supplemental rather than substitutional also presents difficulties, when consumption of total requirements cannot be controlled.

The role of preventive feeding forms part of a broader issue, the proper balance among immunizations, feeding, and other child health services. The artificial separation of supplementation here highlights the need for better consideration of it in determining that balance. Decisions about the duration of supplementary feeding influence costs and also raise questions about the ultimate goals of infant health services, emphasizing the primacy of family nutritional self-sufficiency. Despite their importance, none of these considerations nullifies the utility of viewing direct early provision of additional food as an alternative to later special care and hospitalization.

Most countries cannot provide or assure adequate nutrient intake for all pre-school children. Because of this, precision in establishing criteria for selecting beneficiaries of supplementary feeding is a critical element in the efficient use of food and health service resources. The health care system is the most convenient vehicle for applying these criteria, even if it is not given primary responsibility for food delivery. Development and use of accurate indicators for predicting those most at risk of serious malnutrition can improve substantially the contribution of infant feeding services to the achievement of health goals. By directing efforts to the stratum of infant population for whom the worst consequences of malnutrition are a high probability, but not yet a reality, such a strategy can bring prompt and measurable reduction in the incidence of these consequences.

JAMAICA'S CROP OF GOOD IDEAS*

*by**Peter Goodwin*

The worst kind of crisis for a food exporting country is shortage of food for domestic consumption. Jamaica has launched a radical campaign to achieve self-sufficiency in food production which, despite the gloomy economic climate, seems to be succeeding.

The agriculture ministers from Commonwealth countries during their week-long conference in 1975, discussed the ways and means of improving their individual self-sufficiency in food and how to develop their rural areas. Perhaps the most dramatic project disclosed - and possibly a model for many other underdeveloped, tropical countries - was "Operation GROW" launched in Jamaica in response to the boom in commodity prices of the early 1970s.

At that time, Jamaica's cash crops were not sharing in the price boom. But her agricultural inputs - tractors, fertilisers, pesticides and the like - were costing ever more in terms of boxes of bananas and tons of sugar. Operation GROW, standing for Growing and Reaping Our Wealth, was basically a three-pronged attack on the problem, with a scheme to introduce Government food-farms, a system of agricultural loans, and a radical land reform project. Today, the first two aspects are little talked about in Jamaican agricultural circles, having now been eclipsed by the third: a scheme called Project Land Lease.

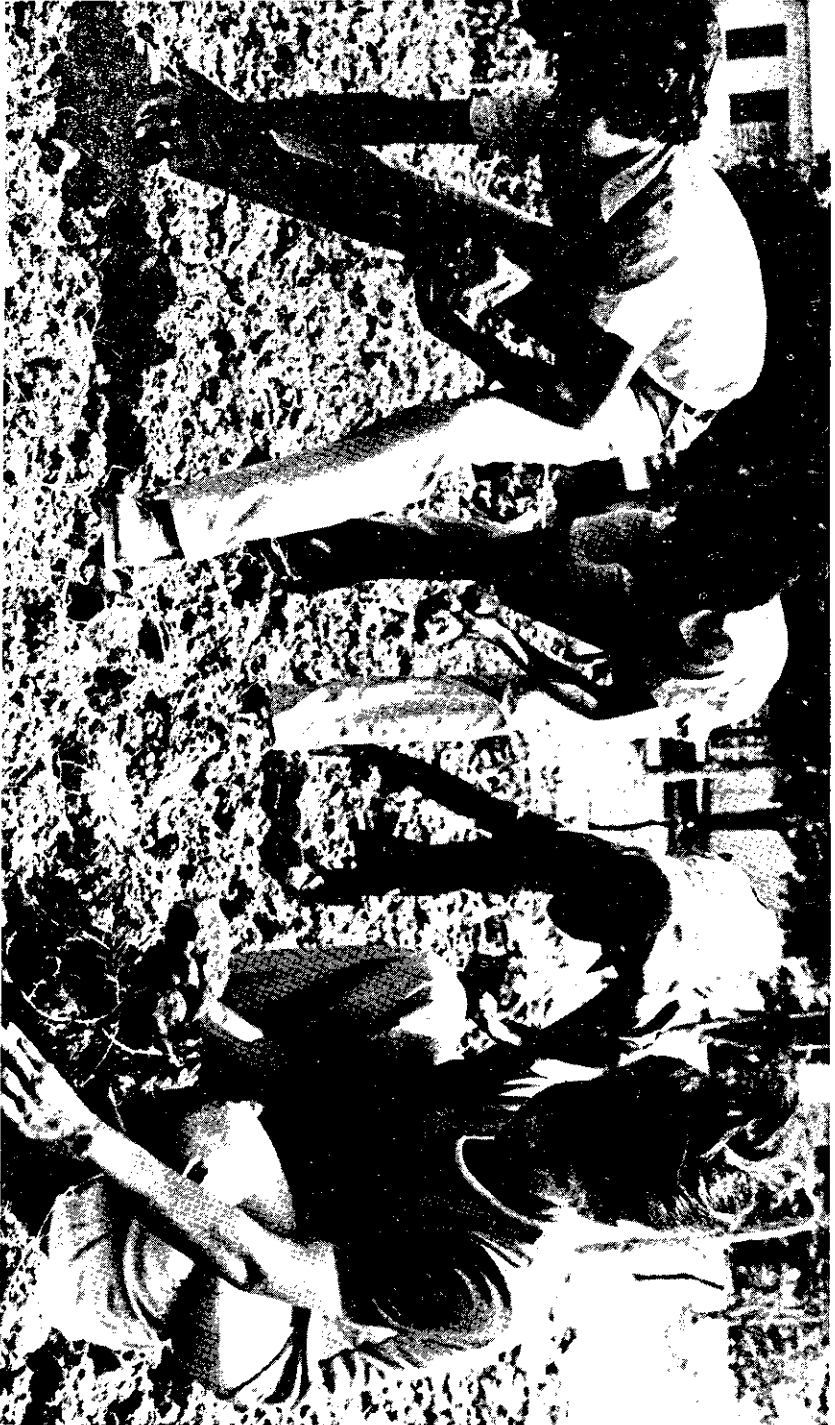
*This article was reproduced from *New Scientist*, London.

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The bauxite companies had long been a bone of contention in Jamaica; only very recently has the Jamaican Government succeeded in getting anything like a fair deal, in Jamaican minds, for the rich resources of bauxite being exported from the island. But to make up for the formerly inadequate bauxite levies, some of the companies developed schemes for assisting local agriculture, which succeeded in creating genuine goodwill between themselves and the local communities. Out of this, in particular, arose Alcan's scheme for offering leasehold tenancies of land owned by the company to local farmers. Each tenant received a few acres to supplement his tiny freehold farm. Alcan kept the supplementary tenancies to within two miles of the existing freehold farms, so that no conflict of interest or inconvenience would arise. With Alcan's success to guide them, the Jamaican Government decided to set up an island-wide scheme for leasing under-utilised land to small farmers. Appropriately enough, they asked Alcan's Ted Tatham to mastermind the project.

At present, Jamaica has 180,000 farms of less than five acres, a small number of extremely large estates (former plantations), and some medium-sized farms which occupy only a comparatively small area of land. The small farmers often grow 15 or more different crops as well as keeping farm animals and poultry. Surely, one asks, it would be more economical to settle for a smaller number of crops under intensive cultivation? Not so; apocryphal tales abound, such as the one about the citrus farmer who harvested his entire orchard, had it waiting by the roadside to be collected at the appointed time, and then had to wait a further week because the truck was delayed...His crop was ruined. Farmers are unwilling to risk putting all their eggs in one basket. And, as barter of goods is common in country areas, it makes sense locally to have a varied selection of crops to trade with. Moreover, most small farmers find it difficult to accept cooperatives, preferring the independence to maintain their families.



[photo: API, Jamaica]

Operation GROW: mobilizing labour reserves in a programme aimed at agricultural self-sufficiency.

Leaving the land

But the younger generation often feels differently about country life, which may have neither electricity nor running water and little entertainment. Many have deserted their families to seek an easier existence in Kingston, which now holds some 600,000 of Jamaica's two million population. Project Land Lease aims to make the small farms viable and ultimately to attract youth back on to the land. But at present the outlook is admittedly catastrophic: the average age of the farming community is 55; so unless drastic measures can be taken to get young people back on to the land, Jamaica's agricultural output could slump drastically. While the large estates on the Jamaican plains are important to the country's agricultural productivity, it is nevertheless only the small farmers who cultivate land which cannot easily be farmed on a large scale. It is, therefore, among the small farms that land reform is most needed and has the chance of achieving the best results.

Since April 1973, some 11,000 farmers have received small allotments of land under the Land Lease scheme. Before long, the Government hopes to be allocating land to 10,000 farmers annually. But the whole scheme depends on the availability of currently under-utilised land and appropriate measures for its redistribution. An added incentive for encouraging agrarian reform is that it could improve the country's balance of payments. Paradoxically, Jamaica imports such national dishes as rice, goat meat, and wheat. Yet all imported foods (or at least acceptable substitutes) could be produced at home. What is needed is a change of habits - both among consumers as well as producers. The Land Lease project might just prove to be the catalyst needed.

But the further stages of Project Land Lease will be the real test of the Government's commitment to land reform. The first phase, involving allocation of land only, is merely a question of buying and leasing land; investment in the land itself, and improvement of it, has been minimal so far. The further stages of Land Lease are going to be increasingly expensive.

Phase two of the project aims at giving farmers larger portions of land, designed to make their entire farms viable - viability being defined as sufficiently large to yield at least J\$1,350 annual income at present values. The tenancies will be on 49 year leases rather than the 5-10 year leases of the earlier phase of the project. Some roads and services are to be provided as well as credit facilities for buying fertilisers and other inputs.

The final phase of Land Lease goes even further. Viable farms are to be set up complete with housing, services and roads which should then (so the reasoning goes) attract bright young agriculturalists to enter farming careers. Ultimately, a switch might be made to medium sized leasehold farms. And this, it is hoped, will produce the full agricultural revolution that is needed.

But as world inflation continues, how far will political expediency permit such a bold plan to succeed? Jamaica is still in the early process of preparing the groundwork. In education, for instance, agriculture is now being regarded as among the most important of subjects. Some schools are already famous for their progress in this direction. The Green Island Secondary School recently won the All Island Agricultural Competition with its 1,000 laying hens and school land producing vegetables and goats for the local market.

Not far from the Jamaica School of Agriculture, near Spanish Town, is another school with extensive agricultural tuition as part of the curriculum. Students at St. Catherine's High School learn the rudiments of agricultural science by producing chickens for the school canteen, flowers to beautify their buildings and a variety of vegetables and other crops. Examinations are said to be hampering the system at present because the British GCE examinations in agriculture deal only theoretically with the subject. Soon, however, a practical examination carrying equal weight as the theoretical papers is hoped to be introduced for applicants to colleges of higher education.

Home Grown Rice

But given suitable land farmed by trained agriculturalists with a high degree of motivation, what practical steps can be taken to achieve self-sufficiency in domestic food? A glaringly obvious candidate for development in Jamaica is rice production. Rice is a form of grass; and Jamaica is highly suited to grasses. Some parts of the country have even been found to be more suitable for rice production than for the crops currently grown. Interestingly, one side effect of the present world glut in bananas is that increasing quantities are being consumed locally in Jamaica. Green bananas are an acceptable substitute for wheat and rice in many meals, so a drive to encourage banana consumption has the indirect effect of reducing cereal imports. The Jamaica Banana Board has introduced several innovations, among them banana chips, banana raisins, and even a baby food containing a mixture of banana meal and soya.

Meat is a significant item on Jamaica's overseas shopping list. Curried goat is one of the Jamaican national dishes (served, incidentally, with rice). Yet good carcasses have to be imported in large numbers. Even though beef cattle are particularly successful on the island, there is still considerable shortfall

which has to be made up from imported beef. An even greater proportion of milk is imported, and the entire island has only a few thousand head of sheep. However, if domestic meat production is to be increased, animal feeds are going to be crucial. And with recent inflation in feed costs, Jamaica clearly has a problem on her hands here.

One of the men responsible for solving this problem is Douglas Graham, Chairman of the Agricultural Development Corporation. He asserts that as Jamaica is largely natural grassland, with a growing period of 12 months in the year, the potential for supporting livestock is enormous. With rotational grazing, proper weed control and fertilising, together with adequate subdivision of grasslands, he reckons that much can be done to improve livestock production. At present, Jamaica's natural grasses are a problem in themselves: they grow so quickly they choke most legumes which would otherwise be suitable to help "fix" nitrogen direct from the air. But given the right legume, grass production would need far less imported fertiliser.

Another important potential source of animal feed is a by-product of the rum industry. Graham points out that fermented settlings from rum production are a rich source of protein. With suitable equipment, it is even possible to use the heat of fermentation to dry the settlings ready for consumption. The Agricultural Development Corporation is also experimenting with such innovations as chopped hay made into pellets and fortified with molasses and other additives. Such feeds can be entirely indigenous in origin. And while they may not produce such rapid liveweight gains as imported feeds, they can be very competitive on a cost basis and have little drain on the country's foreign exchange resources.

Perhaps the greatest obstacle to reform in Jamaican agriculture is the proliferation of official bodies to administer and advise the many different sectors of the industry. There are, for

instance, parallel extension services to cover each of the principal crops. Under such circumstances there are simply not enough extension officers to cover the large numbers of small farms. Yet combined, they could become a potent force for implementing change. Central coordination in all sectors of the industry is urgently needed. Perhaps the overall vision of Operation GROW and Project Land Lease will provide the necessary stimulus for effective coordination.

Policy making is a creative process requiring hard facts which then have to be moulded and fashioned according to the prevailing political, social and economic environment. There are no definite scientific criteria by which we can judge the validity or value of policy proposals.

"Food Policy - Editorial Aims"
Food Policy (2 November 1975)
Vol. 1, No. 1.

NEWSPAPER CLIPPINGS

REASSESSMENT ON THE FARM

From The Jamaica Daily News, 28 September 1975

It is often said that while Jamaica's agricultural sector has the capacity to produce the volume of food necessary to feed the nation, the actual output has not kept pace with the demands of an increasing market. So that, in fact, the true potential of the country's agriculture and farm sector is yet to be realised.

The result is that the supply gap created has to be filled repeatedly by the importation of large quantities of food items which also contributes to a worsening of the balance of payments.

This inability of agriculture to improve its productivity to satisfy the local demand has been variously attributed, in part, to the lack of adequate financing without which it could hardly be expected to respond to the needs of the country. The local financial institutions also have been, rightly or wrongly, criticised for the low priority accorded to agriculture in their credit and investment portfolios.

The truth of the matter is that with successive Governments there has been more and more money channeled to this sector, although in all probability such allocations have not met the real requirements of the farming community.

There is, for instance, the Agricultural Credit Revolving Fund which in June this year disbursed some \$561,970 to farmers. There is also the Self-Supporting Farmers' Development Project which during June made some \$250,000 available to farmers, and at the end of that month farmers in this scheme were indebted to the tune of over \$10.5 million.

Financing facilities are also provided to farmers through other lending agencies such as the Dairy Industry Development Scheme, through the Jamaica Development Bank in addition to the

farm loan schemes operated by the commercial banks.

It is obvious, however, that agriculture which has never been among the more glamorous occupations, now faces a serious dilemma. In addition to the perceptible limits to growth due to shortage of capital, there is the perennial drift of agricultural workers into industry and other employment programmes of the Government, thus creating labour shortages in many spheres.

The effect to this diversion of labour is to drive some hitherto productive enterprises out of business; or in some respects, to encourage a greater utilization of agricultural machinery with the hope that this would raise labour productivity.

But the switch to machinery may only increase capital requirement needs and once this process of increasing cost starts it becomes well-nigh impossible to contain. The net result is that the financial requirements of the industry soars; thus the pressure on Government for additional source of financing.

If agriculture is ever to assist the Government out of the existing inflationary predicament, it seems that there will have to be a vast improvement in how the limited funds are used, for the level of productivity will have to be stepped up. There is also much needed improvement in the quantity of produce being turned out to meet local demand. It certainly does not make sense, for instance, for the Government's Agricultural Marketing Corporation to extend its number of shops if, for the most part these shops either remain empty or are stocked with imported food items. This certainly could not be the objective of the AMC.

The limited funds which can be made available to farmers ought to be deployed in the most efficient manner so that, barring natural disaster, the country can expect a reasonable return. And whatever farmers can do, whether by collective or cooperative arrangements, to eliminate farm wastage and additional costs, which

ultimately have to be borne by the consumer through higher prices, ought to be given more than frivolous attention.

It is only by a more earnest application that the country will be able to get more out of the land.

EATING LESS

Americans ate less in 1975, an average 1,419 pounds of food per capita against 1,424 pounds in 1974, according to the Department of Agriculture. And using the Department's index, which takes into account substitutions of grains for meat, consumption was down even a bit more, 1.3 percent for the year, to the lowest level since 1968.

Pork consumption plummeted 20 percent to 54 pounds per person in 1975 from 66 pounds in 1974, accounting for most of the drop.

Beef consumption rose about 2½ percent to 120 pounds per person in 1975 from 117 pounds in 1974.

Milk, cheese, fruit and vegetable consumption all rose slightly, but sugar use dropped to its lowest level since World War II to 90 pounds per person in 1975 from 97 pounds in 1974.

- New York Times
11 January 1976

*ST. KITTS' SUGAR**From The Jamaica Daily News, 15 January 1976*

The first official production estimate for the 1976 crop was given on January 14 as 30,000 tons of sugar.

This yield is forecast from an expected 289,506 tons of cane grown on 9,899 acres.

Last year, 25,103 tons of sugar was manufactured from 215,984 tons of cane grown on 8,698 acres.

The figures followed opening discussions Monday on terms of employment for sugar workers, between the St. Kitts-Nevis Trades and Labour Union and the Sugar Industry Rescue Operation (SIRO).

During the talks, 30 proposals on working conditions were submitted by the union.

SIRO agreed to revive and extend a joint production committee set up many years ago and which had proved effective in ensuring efficient and expeditious reaping.

The committee will now comprise two persons from the union and two from SIRO with the Labour Commissioner as Chairman.

CAJANAQUOTE

"You have something more powerful than the atomic bomb - you have the soybean."

Rumania's Minister of Agriculture, Angelo Miculescu, to Secretary of Agriculture, Earl L. Butz during a recent trade-promotion tour by the American official.

New York Times, 4 January 1976

AGRICULTURAL BOOM IN ANTIGUA

From The Jamaica Daily News, 12 January 1976

Minister of Agriculture, Lands and Fisheries, Robert Hall, said that Antigua increased its agricultural programme to over one hundred per cent in four and a half years.

Mr. Hall told a Press conference that in 1970 five acres of pineapple were yielding 2,225 dollars (E.C.) whereas 40 acres were grown in 1975 giving 40,000 dollars (E.C.). In 1970 Government planted 30 acres of vegetables while in 1975, 160 acres were cultivated Mr. Hall said.

He added that his Government had created incentive for small farmers by first banning importation of several vegetables and finding markets for local produce.

There were only 576 small farmers in 1970, he claimed, "and now today there are over 2,000 people who have answered the call to return to the land."

CAJANAQUOTE

"A man doubtful of his dinner or trembling at a creditor, is not disposed to abstracted meditation or remote inquiries."

Dr. Samuel Johnson (1709-84)

...NUTRITIONAL SELF-SUFFICIENCY IN GUYANA?
From *The Jamaica Daily News*, 16 October 1975

In the nationwide address to mark the beginning of Agriculture Month, Minister of Agriculture, Cde. Gavin Kennard observed that Guyana has achieved nutritional self-sufficiency and can survive on a diet consisting of locally produced foodstuff for every man, woman and child.

The Agriculture Minister said that there is more than sufficient sugar, rice and starchy root crops; there is enough animal protein to be selected from the totality of production of fish, shrimp, poultry, eggs, beef, mutton, green vegetables and fruit, and even wild meat.

Farmers were then congratulated throughout the country when the Minister exclaimed, "Your achievements have made it possible for us to select as our slogan for Agriculture Month, 1975: 'Guyana Feeds Herself.'"

Outlining the achievements, Cde. Kennard noted that the rice industry is heading for a record crop of some 188,000 tons this year compared with 163,000 tons last year.

"Ground provision production has risen sharply, the Guyana Marketing Corporation has purchased so far this year 7.26 million pounds compared with 6.20 million pounds for the same period last year - recording an increase of 17 per cent.

"With respect to animal proteins, the output of pork so far this year will be 3.5 million pounds compared with 2.5 million pounds in 1974 - an increase of 28 per cent.

"Eggs will increase to 3.05 million dozen compared with 2.9 million dozen in 1974; fish production will be 36 million pounds compared with 34 million pounds in 1974 - an increase of 6 per cent - and shrimp will reach 15 million."

RICE SELF-SUFFICIENCY TARGET IN JAMAICA SET FOR 1985
From The Daily Gleaner, Jamaica, 20 December 1975

The Agricultural Development Corporation is presently engaged in a rice growing programme aimed at making the island self-sufficient by 1985. The programme is expected to utilise 50,000 acres if self-sufficiency is to be achieved. And Mr. Douglas Graham, the ADC's Chairman has disclosed that 20,000 acres are to be planted by the end of 1976.

Some 2,000 acres of rice have already been planted. 1,100 acres belonging to three rice farms owned by the ADC and the remainder representing total holdings of small farmers.

The variety being emphasised is the *CICA-4* developed in Colombia. It is being used because of its high productivity and its suitability for milling which demands a very even grain.

The programme involves utilising lands owned by the ADC at Amity Hall in St. Catherine, Vernamfield in Clarendon, Elim in St. Elizabeth and 1,630 small holdings in the parishes of Westmoreland, Trelawny and St. Elizabeth.

Milling

Milling of the rice is carried out at the ADC owned mill located in Spanish Town which is of the type using horizontally opposed stones and rubber rolled shellers. The bran which is a by-product of the milling is presently being used to feed sheep, cows and goats owned by the ADC.

The desirable agronomic characteristics of the *CICA-4* variety are its dwarf nature which reduces incidences of lodging and facilitates the use of mechanical harvesting equipment. In addition it has a growing period of 120 days from the time of planting to harvesting, thereby allowing for two crops of rice to

be planted and harvested within one year. At present the variety yields on average on most ADC farms approximately 4,000 lbs. per acre.

Land preparation practices involve harrowing which is done in two directions, each run being 90° to the other. However, if field conditions become too wet for successful harrowing to take place, the "puddling" technique is employed. Puddling involves using a rear mounted rotovater and is an adoption of a technique presently used in Japan for preparing rice lands for planting.

On the ADC farms the seeds are planted by a broadcast method using a fertiliser spreader. The farms are irrigated by tapping some nearby water source and establishing "bunds" which are responsible for ensuring that the irrigation water does not escape from the fields. In the early stages of the growth of the crop irrigation is done intermittently so as to ensure oxygen coming in contact with seeds, thereby facilitating a high percentage germination of planted seeds.

Plant protection practices are conducted by aerial spraying with a *Dithane* and *Benlate* mixture and this is used to offset the incidence of "blasts", a fungal rust that affects various rice species and may have disastrous effects on expected yields. Spraying against "blast" is done twice during the four months period required for growing of the crop.

Harvesting of rice on all ADC farms is done mechanically and involves the use of a John Deere or Massey Ferguson combined harvester. The harvesters serve to separate the paddy from the leaves, following which the paddy is sent to the factory in Spanish Town where it is first cleaned, then dried to the required moisture percentage required for successful milling.

NEWS BRIEFS

An anthropometric survey to determine the nutritional status of children under 5 years of age has just been completed in Trinidad. The survey was carried out as a joint exercise by staff members of the Ministry of Health and of the Caribbean Food and Nutrition Institute.

The second part of the Workshop on Food Economics and Food and Nutrition Policy and Planning will take place at the Trinidad Centre of CFNI, March 8-20th. The highlight of the Workshop is expected to be the preparation of a "mock draft" of a food and nutrition policy for a Caribbean country.

The first part of the Workshop took place in Jamaica in July 1975.

Dr. W.K. Simmons joined the staff of CFNI (Jamaica Centre) as Nutritionist in January. He previously worked with the World Health Organization in Kenya and was, until his present appointment, PAHO Nutrition Adviser in Recife, Brazil. Dr. Simmons is married and has two children.

Students doing the Diploma in Community Nutrition Course have just completed a three-week field assignment which has taken them to a variety of rural and urban locations throughout Jamaica. This innovation in the Course structure enabled the students to undertake practical work in teaching, public health, extension and community programmes with counterparts from their own disciplines. They were also required to conduct three family studies to provide them with greater insight into the nutritional problems at the family level.

CAJANAQUOTE

"It is sobering to reflect that the cost of a three minute television commercial for a food product is about the same amount of money as most university nutrition departments in this country (Great Britain) have for their annual research budgets. The capital investment in human nutrition research has been so inadequate that if any food company wanted to do a medium scale human trial on contract at short notice no one would have the plant or the trained manpower to do it."

*A.S. Truswell
Professor of Nutrition,
Queen Elizabeth College,
London.*

*In "Nutrition Problems
in a Changing World."
(London).*

FROM THE EDITOR

NEW FOODS: A PERSPECTIVE

"For me, the philosophy of food seems to boil down to three things: freshness, flavour and texture".

*Lin Yutang
From "The Importance
of Living".*

"There is no question that many of these deaths (from malnutrition) are due to the world's social limitations rather than its physical ones".

*Meadows et al
From "The Limits to
Growth".*

During the last decade an extraordinary degree of attention has been focussed on the problems of growth - more specifically on the capacity of the world's resources to match the needs of a rapidly increasing population. One of the principal concerns is about food: will we be able to feed ourselves? Can we alleviate in any appreciable way the suffering and loss of life caused by malnutrition?

The scientific and technological approaches to solving the overwhelming human problems of hunger and malnutrition have, of necessity, developed in the context of economic feasibility and overt pragmatism. One must therefore ask, will the advent of new foods - be they single-cell protein or textured vegetable protein (TVP) be any more meaningful in terms of solving the world's malnutrition problem than the Green Revolution has been? And what socio-economic levels of the population would enjoy or benefit from their use?

To pose these questions is, perhaps, to take too limited and too practical a view of new foods. It may be argued that the demand for food is no more a right of those who eat for survival than it is for those who can afford to have "a philosophy of food" and be discriminating in terms of "freshness, flavour and texture".

For many of the underfed people of the world their plight can be greatly alleviated by their obtaining just a quantum more of the same foods from which they so cleverly fashion their subsistence diets; for others, there is the often-heard simplistic solution that they should modify their food crops and eating habits. But how easy is it to effectively activate the whole chain of events, from the initial motivation to change, or greater production, right through to the proper distribution and use of such foods? In the end we realise that in striving to make the world a better place, even at the basic level of meeting man's need for food, we should see new foods as only another strategic approach - exciting, but limited. The real answer still lies in the realisation of positive social change which, in turn, can only be generated by appropriate political action.

THE EDITOR

TOPICS AND COMMENTS

NEW SOURCES OF FOOD*

Many new ideas and techniques are being tried out in developing countries to try to combat the effects of the threatened world-wide food shortage. These include:

- INDIA - Making use of the leaves of the "drumstick tree", so far a largely untapped source of food.
- BANGLADESH - Developing a new strain of soybean with a much higher yield of protein than the normal varieties, which in themselves are very nutritious.
- PHILIPPINES - Using every available piece of land on city fringes, such as Manila, for growing food crops, especially legumes. Even land surrounding health centres is being used to grow food.
- MEXICO - Experiments are taking place with a new "wonder-crop", *triticales*, which scientists hope will give a fresh impetus to the "Green Revolution". *Triticales* is a cross between high-yielding wheat and dough-resistant rye and is also being grown in China.
- INDONESIA - The narrow strips of land between rice paddies and other "fringe areas" are being used for growing legumes. Vegetables produced on such land are now replacing fish and eggs, while maize is taking the place of cassava and yams.

*From "UNICEF News", Issue 81/1974/3 page 33.

EAST AFRICA - Experiments have recently taken place in using semi-arid land, unsuitable for raising domestic livestock, to breed various species of antelope as a new source of meat. "Cropping" operations in Uganda and Kenya have yielded substantial quantities of meat from surplus elephant and hippo.

AND SOME OLD ONES:

Scientists at the Harvard School of Public Health, Boston, are advocating wider cultivation of sugar cane, as they claim that crude, unrefined sugar is the most economical method of producing energy-giving carbohydrates in the critical years ahead, yielding many more calories per acre than any other natural food, including maize and potatoes. And Somalia, in East Africa, is doing a thriving trade in exporting camel meat to Saudi Arabia.

...AND PUPPY DOGS' TAILS

In the United States 360 babies are born every minute. But between 2000 and 3500 dogs and cats are being born every minute, and thereby hangs a tale!

Harry Pearson

*"Pet Explosion in
America"*

Jamaica Daily News

US PROMISES A BEAN-FEAST*

By Graham Rose

New, "semi-dwarf" varieties of soya beans promise sensational increases in the future yields of the world's most protein-rich crop, and could soon become a vital weapon in the war against starvation. That is the confident belief of a group of plant breeders, agronomists, engineers and food technologists at the Universities of Illinois and North Carolina.

As news of the yields of this season's experimental crops pours into his office in Urbana, Illinois, Dr. Richard Cooper of the Regional Soy Bean Laboratory is becoming very excited indeed. Yields of more than 70 bushels an acre are being regularly recorded. With previous varieties on the best land good growers could average only 50 bushels.

This is the sort of breakthrough soya bean breeders have been seeking since the early years of this century when the crop was introduced to America from Manchuria where it has been used for at least 3,000 years. Paradoxically, one of the main keys to these higher yields has been the dwarfing of the plants. "We've completely re-engineered the soya bean by breeding," says Dr. Cooper. "By reducing the average length of the stem to approximately 30 inches from the normal 60 inches we've developed a plant which doesn't collapse prior to harvesting."

Once the traditional straggling beans have collapsed, much of their potential yield is lost. The new semi-dwarf beans carry fewer pods, but this loss has been overcome by new planting techniques. Normally farmers plant their beans in rows 20 inches apart to allow weeds to be controlled mechanically. New chemical weed killers like *Basogram* (discovered by the German chemicals giant BASF) mean the beans can be planted close together in seven-inch rows.

*From *The Sunday Times*, 21 September 1975.

There have also been great advances in harvesting. Ripe bean pods dry out quickly and tend to burst open, shedding the beans on the ground - a process which has been aggravated by the cutters of existing combine harvesters. But Dr. Ralph Nave of the University of Illinois' agricultural engineering department has redesigned the cutters and added blowers to prevent shed beans from falling off the harvester. He believes he can save the farmer two bushels of beans an acre. Since 50m acres of soya beans are grown annually in the US, the development could save farms up to US\$400 million and the world 2.5m tons of food.

But even without this additional saving, the yield potential of the new beans will be greeted with joy in poor countries. Dr. Bill Thompson, who directs INTSOY (an agency set up by the US Government to spread the benefits of soya bean research), says the beans are expanding rapidly in northern India where they can be grown during the monsoon season before the normal wheat crop is planted. He is delighted by the way American varieties of soya bean have performed in the tropics - largely the result of patient research by men like Dr. Charlie Brim at the University of North Carolina.

Brim has made thousands of crosses to select new varieties, a laborious business because soya bean flowers are minute and never actually open. To transfer pollen collected painstakingly from the anthers of one floret to the stigma in the floret of another plant, the tiny petals have to be prised apart with forceps. Years of this nerve-wracking dexterity have enabled Brim to provide many new disease-resistant varieties which can be grown in a wide range of temperatures and latitudes.

New food sources must fit snugly into the established dietary patterns of developing countries, and food scientists at Illinois have been working on prototype soya-based foods. Much of the previous work in this field has been carried out by giant food

companies using the crushed residue of the beans from which the oil has been pressed for the production of cooking oil and margarine. These companies have extracted the protein and used it to synthesize products like simulated chicken, beef and bacon.

"Neither the products nor the complicated chemistry are appropriate to developing countries," says Les Ferrier, one of the Illinois team. "We've concentrated on developing simple ways of preparing the whole bean using simple equipment which can be found in any village."

Ferrier and his colleagues have found easy ways of preventing the slightly unpleasant flavour of cooked soya beans from developing. They have also produced a series of dry flaky foods to which other natural ingredients can be added for flavour. These flakes and flours can be used to prepare traditional breads, chapatis, tortillas, etc. in conjunction with local cereals. A prototype baby weaning food and a milky beverage are already proving very successful in India.

INSECTS À LA CARTE*

By Celia Haddon

ENTOMOPHAGY, or eating locusts, ants and other creepy crawlies, could help the world's protein crisis. Now that meat is considered an inefficient and expensive form of protein and alternative sources demand complex and expensive technology, the humble grub, beetle or ant may offer a partial solution.

Insect consumption is quite common among some primitive people, points out Dr. V. Meyer-Rochow, an Australian zoologist, writing in the journal of the Antipodean Association for the Advancement of Science. Traditionally aborigines have found a valuable source of protein in the witchetty grub. It tastes of



soft-boiled egg and butter, with a woody flavour, and 10 large grubs provide enough protein for one adult. Honey ants and other insects make up their traditional diet.

*From *The Sunday Times*, 2 November 1975.

In the Arctic Eskimos used to enjoy certain dishes that included a thriving maggot population much in the same way that some perverse European gourmets maintain that *Gorgonzola* is at its best when crawling with insect life. In Africa, locusts, grasshoppers, and termites have often been eaten. In Asia, water-beetles and giant waterbugs used to be delicacies, just as some posh American and European stores occasionally stock chocolate-covered ants.

"Insects are extremely nutritious," comments Dr. Meyer-Rochow. "They consist of easily-digestible proteins and fats, and small but significant amounts of carbohydrates, minerals and vitamins. There can be no question that insects are a neglected resource to combat protein deficiency in certain underdeveloped countries." Indeed 100 grams of fried termites Dr. Meyer-Rochow enthuses, have a calorie count which puts them among the richest foods.

Looking into the future, the enthusiastic zoologist suggests that battery insect farming might be a commercial possibility. He speculates that selective breeding might do for insects what it has done for more traditional farm animals such as pigs, cows and sheep.

Other entomologists are less enthusiastic. At the Centre for Overseas Pest Research in London, for instance, one expert admitted that locusts were both nourishing and tasty with a flavour somewhere between veal and tunny fish. "The problem is that nowadays locust swarms are dealt with by insecticides and this could present great dangers for humans thinking of eating them." Entomophagy may take some time to catch on.

UK WATER-FARMERS BOOST WORLD FOOD*

By Brian Silcock

A method developed in Britain for cultivating greenhouse crops without soil, is beginning to transform the horticultural scene in many parts of the world. Because of its commercial advantages, growers are taking it up enthusiastically in places as far away as Australia and California, as well as in Britain.

And its long-term implications are not just commercial. According to the Hudson Institute, the American think-tank run by Hermann Kahn, the new technique "is one way in which mankind at last has the possibility of removing hunger from the face of the globe."

The method, developed by Dr. Allen Cooper of the Glass-house Crops Research Institute at Littlehampton, Sussex, is called the "nutrient film technique". It is a new form of *hydroponics*, a method of growing plants which has not previously shown much practical promise.

The plants are grown in plastic troughs, closed at the top except where the plants emerge. Along the bottom of the troughs flows a thin layer of water containing the necessary nutrients. Tomatoes, cucumbers, strawberries, lettuces and flowers are the chief crops being grown commercially at present, but the method is equally suitable for dozens of others. They can be started as seedlings, cuttings, or even seeds sown on a mat at the bottom of the trough. The roots soon grow to form a dense mass, mainly above the water level, which ensures a good oxygen supply.

Dr. Cooper believes that the method could even be applied to grass and cereals. Instead of narrow troughs there would be wide pre-seeded porous mats, enclosed between two sheets of

*From *The Sunday Times*, 8 February 1976. Mr. Silcock is Science Correspondent for "The Sunday Times" of London.

plastic, the upper one pierced to allow the growing plants to emerge. "You could make a meadow in the desert," he said.

Commercial equipment is already beginning to appear on the market. An Italian plastics firm, for example, is selling a triangular-section plastic trough that can be clipped together. Other firms have developed devices to monitor the concentration of nutrients in the circulating water and to top them up automatically.

The advantages to the grower are many. It cuts out the need for soil cultivation and sterilisation in glasshouses. Sterilisation costs around US\$2,000 an acre annually. The ease with which one crop can be replaced with another increases productivity. One grower in Queensland is producing 10 lettuce crops a year, another in California gets 7 crops of cucumber. Quality is also better than with conventionally-grown crops. The water-grown tomatoes are already attracting a premium price because of the superior flavour.

There are other advantages in the offing. It looks as if heating the circulating water could be a partial alternative to heating a complete greenhouse - thus cutting fuel bills. The heating requirement - of a continuous supply of warmish water - is ideally suited to solar and wind-powered heaters. Use could also be made of waste heat from power stations, steel-making, and other industrial processes.

Probably the most dramatic advantages will be in arid areas, for no water is lost by drainage into the ground and hardly any by evaporation, because the top of the trough is closed. It also makes it possible to bring into agricultural production land that is at present unused, because it is too saline, too rocky or too steep.

WHY TURN WASTE INTO PROTEIN*

by

Colin Tudge

At a conference¹ food technologists extolled the virtues of processes that convert waste materials into food. Here we present a very different view.

Protein is an essential nutritional commodity, and unlike many others (such as vitamin K or magnesium) it must be available in macro- or on the world scale mega-quantities. Therefore to expend thought on protein production is, if you are interested in feeding people, worthwhile. Protein is also important gastronomically; and a diet that does not satisfy gastronomically is no kind of diet. Humans could survive on pig-swill - indeed, you could not sustain a pig on food that could not theoretically sustain a human.

The world is short of food. Correction: an estimated 430 million people in the world (about one in eight) do not get enough to eat. Part of that food deficit is protein deficit.

Protein is protein. But certain forms are better than others; the amino acid spectrum of some proteins accords more closely with human requirements. And protein is never produced,

*This article was reproduced from *New Scientist*, London. The weekly *Journal of Science and Technology*. 17 April 1975. Mr. Tudge is Science Editor of "World Medicine".

¹International Symposium on Food from Waste, National College of Food Technology, Weybridge, Surrey, England, April 1975.

in nature, in isolation; some may be accompanied by gastronomically desirable oils and chemical indecipherables, or essential vitamins, while some are either potentially toxic or are laced with toxins. But if you get rid of the contaminants and make good the amino acid shortfalls (possibly just by feeding more) then, nutritionally, one protein is very like another.

Industry and agriculture both throw away or at least dissipate enormous quantities of organic molecules, notably as oil by-products or as cellulose or low-grade polysaccharides from plants. With inorganic nitrogen added, these molecules can be utilised by various microorganisms to produce high-grade protein. So, we are told, it is sensible, useful, and philanthropic, to mop up these wastes, and use them to produce a vital foodstuff.

LUDDITE OBJECTIONS

According to the food industry, objections to this almost self-evident council are "luddite", "irrational", "romantic", "elitist", or all four. In particular, the "public" is so hooked on traditional food - by which the industry means roast beef, or meat pie and chips (knowledge of cooking plays little part in the food technology syllabus) - that "it" is suspicious of all innovation. Second, the "public" has an irrational fear of microorganisms, which "it" equates with germs. But doesn't it know that cheese, beer and even leavened bread production is pure microbiology? Can't the "public" see that the growth of *Aspergillus*, or *Fusarium*, or what you will on bits of old leaf and stalk merely extends traditions that may be thousands of years old? Should we not *develop*?

But wait a minute. Of course the world wastes food. The biggest waste by far is the misuse of grain to support industrialised pig and poultry units in the West, and to a lesser extent beef units. An agriculture that did not use grain as the

chief source of feed for livestock (though perhaps using grain as a supplement, or to tide over lean periods) could nonetheless produce large quantities of meat. The West produces so much meat that Westerners die from the surfeit. To pretend that human beings are naturally Gadarene is a food industry lie, based on its attempts to jettison the meat surpluses, in turn produced by the embarrassing grain surpluses of the 1950s and 1960s. The West (including Japan and the USSR) gives more grain to pigs and poultry than the whole of the Third World consumes, people, livestock and all.

The second biggest waste is the underuse of land; the mile upon mile in the Third World squandered not only for lack of irrigation or fertiliser, but for want of land reform; split into too-small, and even smaller, units, or profligately ranched or "planted" to swell the coffers of the rich. And what of Britain - "most efficiently agriculture in the world", according to those lazy thinkers who cannot be bothered to do their sums - with its outmoded drainage (Strutt report), its abandoned hills, and its phrenetic, accountant-inspired underuse of manpower?

The third biggest waste is food, once harvested. Some say that in Nigeria a quarter of all harvested food fattens rats, insects, and microbes; some say the figure is nearer 40%. This problem has to do with silos, with conventional pesticides and fungicides - and with labour and more labour. Perhaps Third Worlders do not waste food once it reaches the plate (the Chinese peasant cuisine is fanatically conservative - one reason for its subtlety and variety) but in Britain one quarter of all food is dumped after it has been processed or cooked. And the 55 million people of Britain probably eat as much primary foodstuff as half the subcontinent of India.

With the possible but arguable exception of wasted leaf protein, as detailed in particular by N.W. Pirie (Nature, Vol. 253, p. 239), the "waste" of industrial and agricultural by-products is so small as to be scarcely worth considering. In general, the world's food problems have to do with trade; equity; corruption; medieval apportionment of land; exploitation of rich countries by poor; and, within both poor and rich countries, exploitation of poor people by rich. At best then, taken overall, these ingenious technological devices are irrelevant.

But surely within the context of particular countries, where usable substrates *are* thrown away, where people *are* short of food, such attempts are worthwhile?

The answer to that, in brief, was provided by the keynote address given at the International Symposium on Food from Waste¹ by Professor Steven Tannenbaum of Massachusetts Institute of Technology, and by (choosing more or less at random) the paper by F.K. Imrie and his colleagues at Tate and Lyle Ltd. Professor Tannenbaum argued that "direct human food production by fermentation of most waste materials is unlikely at present due to the problem of meeting safety requirements". Which means that it costs so much to convince the FDA and UN Protein Advisory Group that rats and rabbits do not keel over when plied with industry's new goodies, and to draw the inference that humans probably would not either, that you might as well settle for feeding pigs and chickens.

The Tate and Lyle delegates described part hypothetical, part practical use of such organisms as *Aspergillus niger* and *Fusarium* to produce protein from the residues of plantation crops, such as papaya, olive, and palm. The initial project is for a 100 ton per annum plant in Central America.

¹International Symposium on Food from Waste, National College of Food Technology, Weybridge, Surrey, England, April 1975.

INTENSIVE LIVESTOCK HUSBANDRY

But to produce *high protein animal feed*? What for? Such feed production makes little sense except in the context of intensive livestock husbandry - high capital, high energy, low labour, high cost. And beasts do not live by protein alone. Assuming the feed is to be used in the producing country, where are the putative livestock to get their energy source? In truth you can envisage a husbandry system in which such supplements make good the shortcomings of low-grade grazing, but such visions seem to have little connection with the recommendations of the UN Protein Advisory Group, which advises local protein production from local primary crops, notably cereal, beans, and potatoes.

In general, as the Tate and Lyle contribution illustrated, the economics make sense only if the price of the high-protein supplements compares to that of soya in Western Europe. And if a Third World people could afford such prices, they would have no food problems; as last year's World Food Conference pointed out, at present there is no shortage of food worldwide - only an inability of those who lack it to pay for it.

In short, if such high-protein feeds were used in situ, they would most likely be used to support a livestock industry whose products would be available only to the rich elite - and whose consumption of other primary feed materials would in the end possibly decrease the supply of food to the rest of the population. Most likely such feeds are destined for export - to the US, Europe, the USSR, and Japan, whose over-indulged livestock industries are possibly the biggest single drain on world resources. However, you look at it, production of high-grade protein in Third World countries would probably do nothing to solve those countries' food problems.

But these technological extravaganzas are not only irrelevant, they are also pernicious. First, because they are primarily designed to support the western livestock industry, and thus serve to feed the very profligacy which above all else is at the root of the world's food problems. Second, and more subtly, because they tend to justify the use of Third World acres to produce high-price plantation crops for the rich world, rather than - as was repeatedly urged at the World Food Conference - to use those acres to feed the indigenous population. Going one step further, it is a respectable political thesis that the Third World will never "develop" so long as it is at the mercy of world trade agreements made by richer powers in their own interests, and that it will never shake off those richer powers until it has achieved self-reliance (not necessarily self-sufficiency) in food. And that to become reliant on western-orientated companies for *protein* is probably the most retrograde step any Third World country could take.

But if these activities are irrelevant, and pernicious, why do the major food companies and their technologists pursue them? The best analysis I know is in Ross Hume Hall's *Food for Nought* (Harper and Row, reviewed in *New Scientist*, vol 65, p 664). It has to do with the Cartesian obsession with breaking problems down, so that they begin as problems of people, and then become delegated to agriculturalists, and so on down the line until they are dealt with as problems of chemistry. Less subtly, it is simply that major food companies must make money, and cannot do anything that does not make money. That cannot be done except by due deference to markets. The only market worth talking about in accountancy terms is that of the West, because the West consumes, and the West has the ability to pay. Ergo, the enterprises must be western orientated.

So what? Just because the food companies are not solving the world's food problems, should they be castigated? Could you not say as much, or as little, about Leeds United?¹ Of course. Except that fabulous Leeds do not pretend to solve anybody's problems. But the food industry does, and not only politicians but also "the public" believes that that is what it is doing. So long as we pursue this technological course in the interests of profit, we make it less possible for the ideals of national autonomy and equitable international trade between equals - which alone can solve the world's food problem - to take place. And however well meaning the motives of individuals, the result is evil.

Granted, we live in a lunatic world where it may be more "economic" to use land for the wrong purposes, and to turn the "waste" into animal feed rather than use the same land to produce human food, and compost such waste as there is or feed it direct to livestock. But should we strive so officiously to perpetuate this lunacy?

¹*Leeds United is one of the glamour teams in the English Football League.*

NON-AGRICULTURAL SOURCES OF FOOD*

*by**Robert J. Flannery*

THE WORLD POPULATION is growing at an almost exponential rate, with a doubling time of about 36 years. World food resources are already under pressure, and one day - maybe sooner than we think - conventional means of providing food may fail to keep up with population growth. The famine and resultant social and political upheaval that would occur would be disastrous.

One way to increase the supply of food has been to improve the efficiency of food production by the application of technology. Such improvements have helped the food supply keep pace with population growth in most parts of the world, but with population increasing from 3.6 billion to 6 billion by the year 2000, we seem to be reaching a limit on how much more technology can do for conventional food production. To aggravate matters, the supply of additional arable land is dwindling.

Some advances are being made in new directions. New sources of foods from plants that are under development include cottonseed protein, peanut flour, triticale, alfalfa protein, and algae. The *bee-falo* promises fattened red meat finished on range grass rather than on cereal and soya feed, thus sparing these

*Reproduced from *Food Technology/Journal of Food Science*, Vol. 29, No. 8, p. 64-67, August 1975. Based on a paper presented at the 35th Annual Meeting of the Institute of Food Technologists, Chicago, Illinois, June 8-11, 1975 by Robert J. Flannery, Vice-President, R&D, Amoco Foods Co., Naperville, Illinois, USA.

resources for human food. Optimum feed compositions and environmental conditions have already been applied for red-meat animals and poultry. The same kind of technology is now being applied to seafood through fish farming.

Nevertheless, these developments are still tied to agriculture and its climate dependence, land requirements, and energy-intensive techniques. We need an alternative approach that is not climate-dependent, with much less demand on land and energy.

"MINIFOODS" ARE ONE ALTERNATIVE

Throughout history, man has adopted living things from his environment to serve as food; these include vegetables, grains, fruits, meats, fish and poultry. However, there is a whole class of foods which have become common in the human diet, but which have not been recognized until fairly modern times. These are the single-celled "plants and animals", which, because they are so small as to be invisible, have not consciously been "adopted" as foods, although baker's yeast has been with us for millennia, and countless kinds of beverages, cheeses, breads, and other foods require the use of single-celled organisms for their making.

The term "single-cell protein" was coined some years ago to classify these real and potential foods, which include yeasts, bacteria, and fungi. I prefer to call them by a more descriptive and palatable term - "minifoods". I will discuss yeasts in detail as an example of such foods.

From both a chemical and nutritional point of view, the components of yeast are the same as those of other foods - proteins, carbohydrates, fats, vitamins, and minerals. On a dry basis, yeast ranks as high as beef and egg in protein content, about 50%; wheat is low, about 14%. Beef and egg are high in fat, again about 50%, while yeast has about 7% and wheat flour has

practically none. Wheat has 85% carbohydrates, yeast has 23%, and beef and egg have practically none.

Beef, egg, and animal products in general tend to be well balanced in essential amino acids. Wheat and cereals in general are not well balanced, being especially low in lysine. Yeast is deficient in methionine but is very high in lysine. This may partially explain the nutritional enhancement obtained when yeast is added to grains. For example, adding yeast to corn breakfast cereals and wheat pasta not only increases the amount of protein but also improves the quality of the combined proteins; the effect appears to be synergistic. Only 5% of yeast in corn gives a 35% increase in PER; 9% yeast in wheat almost doubles the PER.

Yeast also contains vitamins and is particularly rich in the B vitamins. The sodium content of yeast is low. In addition, yeast contains little fat, and the fatty acids it does contain tend to be unsaturated, with nearly 50% linoleic acid.

HOW THEY ARE PRODUCED

Although it is not immediately apparent, the steps in growing "minifoods" are analogous to those in raising a crop or a herd of cattle. *Sterilization* is analogous to plowing - getting rid of all the weeds that would compete with the crop. It is important to kill off all foreign organisms in the growth medium and the fermentor, lest some of them thrive and contaminate the culture. *Inoculation* is like seeding - a small amount of live culture is added to the fermentor. *Fermentation* is like tending the crop - growth takes place naturally, and nutrients are added as the culture grows. *Separation* is like harvesting. In some cases, filtration will work, but because the cells are so small, usually centrifugation is required. *Pasteurization* is required not only to kill any foreign organisms, but to stop the growth of the culture itself. *Drying* is done for the same reason that crops

are dried - to make the product storable. These steps are typical for the production of most "minifoods".

There are many advantages to this method of food production. It is free of climatic constraints and can be carried out in any part of the world. It is independent of weather - droughts, flooding, frost, and wind damage that periodically produce worldwide severe losses of crops cannot happen. "Minifoods" grow very rapidly - the doubling time is only a few hours - and therefore the recovery time is short. In contrast, in temperate climate, if drought kills a field of wheat, it takes a year to replace it. If you reduce steer or dairy herds (as is now being done), it takes two years to replace them; with swine, it takes about 9 months; with poultry, several months. But with yeast, it only takes a few days. As one result, the equivalent of pest or disease loss in conventional food production is negligible in "minifood" production. Not only is growth rapid, but the growth rate is constant - day and night, winter and summer. "Minifood" plants require no arable land - and very little land at all. An acre of land can produce 43 lb. of beef protein, 450 lb. of soya protein, but 2 million lb. of yeast protein.

Finally, the substrate on which the "minifood" grows is quite flexible. *Sugars and Grains* are used mainly for beverage production, where the yeast is a by-product used for pharmaceutical products, health food, and animal feed. *Industrial By-Products* such as sulfite liquor, molasses, and whey are used to grow yeasts for use in foods, mainly as B-vitamin or flavour carriers. *Municipal Cellulose and Feedlot Wastes* (and other industrial wastes such as potato peels) are generally in the R & D stage. *Methane and Methanol* derived from natural gas are being explored, chiefly with bacteria, but with some progress with yeast; the products are intended mainly for animal feed. *N-Paraffins or Gas Oils Containing Them* (all from petroleum) are the best-established development projects, but are aimed at animal

feed. The product will feed cattle, swine, poultry, and fish. *Ethanol* is being used in a commercial process in the United States to produce torula yeast for direct human consumption, a process 4-10 times more efficient than producing feed for animals raised for human food. The ethanol substrate can be made from grain alcohol, but that is expensive (even without the alcohol tax). Ethanol of the same quality can also be made by hydration of petroleum-derived, pure ethylene.

ADVANTAGES OF TORULA YEAST

There are four yeasts that are already established as food components: baker's, brewer's, fragilis, and torula. They are all grown on carbohydrates. The use of baker's is obvious. Brewer's and fragilis are used as health food or additives, but in minor amounts. Torula from sulfite liquor or sugars has been used as a flavour carrier or B-vitamin supplement, but it has many other food applications than those:

- Used as a food additive, it can bind fat and water, provide emulsification, stabilize emulsions, enhance the flavour of meat, cheese, spices, and seasonings in various foods, act as a thickener, and impart opaqueness to sauces, gravies, and salad dressings. Yeast can also serve as a carrier of such things as vitamins, minerals, flavours, aromas, and amino acids. In blends with other additives, additional functional benefits are seen. All this is in addition to its nutritional properties.
- In breads, the added yeast (besides that used for leavening) gives improved loaf volume, better crust colour, and enhanced yeast flavour and aroma, as well as added nutritional value. Egg flavour is enhanced in cakes, doughnuts, and waffles.

Chocolate flavour is enhanced in cakes and frostings. Opacity and viscosity are improved in pie fillings.

- In meat balls, pork sausage, hamburgers, and pizza topping, added yeast gives a juicier product with more meat flavour, alone or in combination with extenders such as bread crumbs or soya. The cheese on the pizza can be extended with yeast, with flavour benefits. So, too, can the pizza dough be extended with yeast to increase extensibility.

Compared with conventional batters for onion rings, shrimp, chicken, and beef or pork patties, batter made with yeast provides better cohesion, better adhesion to the product, better batter pickup, less fat absorption, and better browning. In luncheon meats, yeast exhibits strong fat-emulsification powers. In chili, sauces, and gravies, the flavour, thickness, and opacity are enhanced.

CAN HELP FOOD SUPPLY

Although "minifoods" are not replacements for conventional foods, their functional properties and uses allow them to be readily added to conventional foods to improve their nutritional value and be readily accepted by consumers. As mentioned before, they are a good source of protein and other nutrients and are not dependent on agricultural factors such as climate. They have a rapid growth rate and grow continuously. They are easy to transport and store. Their biological replacement time is short. And the technology for producing them has already been developed.

There is still, however, a problem. Finding enough capital to build all the plants required to have a major impact on the impending food gap will be difficult. For this reason, the

proliferation of "minifood" production plants will not be rapid. Nevertheless, "minifoods" can help in solving at least a small part of the food problem.

Every contribution is needed in the fight against world hunger - better field protection, harvesting, storage, and distribution techniques for field crops; increased production of legumes and pulses, especially in developing nations; increased production of safe chemical and biochemical adjuncts such as amino acids to improve nutritional quality; development of unconventional food sources such as "minifoods"; and population control. All these are needed for a safe transition to the year 2000.

CAJANAQUOTE

"The state of irrigation and drainage around the world is very sobering. It is a great opportunity to increase food production. At the same time, one must recognise that a very substantial part of the irrigated land is affected by soil and water deterioration."

*Professor Gilbert White
University of Colorado*

NUTRITION EDUCATION AND TRAINING PART II

by

*Hans D. Cremer**

NUTRITION AS A SCIENTIFIC DISCIPLINE

When the FAO/WHO mission visited European countries in 1961, they found that nutrition was not regarded as a subject or a scientific discipline with a special department of its own, like the chemical or biological sciences, including their usual classical subdivisions such as inorganic and organic chemistry, or botany and zoology. However, today schools of nutrition or schools of home economics exist in some countries, one dealing more with the nutritional, the other more with home economics aspects of the subject.

In 1956 at the University of Giessen in Germany a Nutrition Institute was created with the name "Institute for Teaching Nutrition". This was a research institute with an inter-faculty structure represented equally by Agriculture, Medicine, Veterinary Science, Hygiene and Pure Science but was attached to the Faculty of Medicine. In order to avoid the difficulties which could result when a medical faculty awards a degree to students who are not medical doctors, a four-year course has been conducted under the auspices of the Faculty of Agriculture, but with the collaboration of the Faculties of Medicine, Veterinary

**This paper is based on a guest lecture given at the University of the West Indies, under the auspices of the Caribbean Food and Nutrition Institute. Dr. Cremer is Professor Emeritus of Human Nutrition, University of Giessen, Germany.*

Medicine and Science. This consists of four years of study terminating in the award of the degree of Household Economics and Nutrition, with specialization in either of these two fields.

NUTRITION AS A SUBJECT WITHIN OTHER FIELDS

Since we know how important correct, well-balanced nutrition is for the well-being of man, the principles of good food and proper nutrition should be taught to members of all fields who have anything to do with the production and distribution of food and with food economics. Even sociologists and psychologist and especially teachers who know so much about nutrition should teach nutrition aspects whenever and wherever relevant within their fields and educate the consumer. Even politicians should know the importance of good nutrition for the physical and mental efficiency and development of the people.

Many people would make better food choices, many housewives and mothers would feed their families better if they knew more about:

- (1) The consequences of poor nutrition for health and efficiency.
- (2) The need for certain nutrients in the diet.

The importance of nutrition education is strongly stressed by Dr. Autret, former director of the Nutrition Division, FAO in his foreword to the FAO publication "Learning Better Nutrition":

"Ignorance is the ally of hunger. Together with poverty, which it often accompanies, it is basically responsible for virtually every case of malnutrition, and in countries where food supplies are inadequate, existing resources are generally badly utilized. Many a case of kwashiorkor could be prevented if mothers knew how to make the best use of what food there is; and the food shortages of a number of countries could be overcome if farmers were able to produce more efficiently.

Educating both producer and consumer, therefore, is fundamental to any course of action in improving the state of nutrition of a population and ensuring that families spend their money wisely."

Dr. Autret made it clear that an important part of the nutrition gap is lack of information. The same ideas were expressed by two famous specialists in nutrition:

Cicely Williams, the remarkable Jamaican doctor who first described protein-calorie malnutrition in Africa and introduced the name "Kwashiorkor" to medical literature, agreed that in most developing countries malnutrition is caused by poverty, but not due to economic poverty so much as to a poverty in knowledge of the nutritional needs of a child.

Dr. Likimani, when he was Chief Public Health Officer in the Government of Kenya, pointed out that "practically every case of malnutrition is due to ignorance, and only some are due to ignorance combined with poverty."

A clear example of nutritional ignorance is the limited consumption of legumes. Different kinds of legumes are most important sources of proteins in many developing countries; but weaning infants are not fed peas and beans for fear that they will cause illness. They are commonly eaten only by adults, even though the protein requirements of infants are relatively much higher than those of older people. Rolf Korte, who is now Nutrition Advisor to the Government of New Guinea, has carried out special tests for digestibility and wholesomeness of legumes and has applied this knowledge in Africa. Many legumes could be a very potent source of proteins especially for very small children.

Another example of deficient knowledge in nutrition is the vitamin A deficiency in Indonesia: fruits and vegetables, rich in carotene, are commonly available even to low income families. Young children, however, seldom consume vegetables, especially boys, since vegetables are not regarded as suitable food for young men.

NEED FOR NUTRITION EDUCATION IN DEVELOPED SOCIETIES

Malnutrition as a public health problem is not confined to the developing countries. Overeating can have almost as serious consequences as underfeeding, and obesity has become a major problem among people whose food supplies are ample and whose energy requirements have been reduced because of a decrease in heavy work. Obesity is associated with various diseases, such as cardiovascular disorders, and metabolic diseases such as diabetes mellitus, gout, etc. The following data from the Metropolitan Life Insurance Company shows that obesity is not a trivial condition:

Excess mortality for specified cause among men
and women approximately 20 percent or more
above average weight, aged 15 to 69 years

Disease	Excess mortality ¹	
	Men%	Women%
Coronary artery disease	35	35
Vascular lesions of the nervous system	53	29
Malignant neoplasms	16	13
Diabetes mellitus	133	83
Pneumonia and influenza	32	27
Disease of digestive system	68	39

¹Compared with all persons insured at standard risks.

The statistics of the Life Insurance Company show that for a man of 45 years an increase of 10-12 kg. above standard weight reduces his life expectancy by 25%. This makes him likely to die at 60 when he otherwise might have lived to 80, had he not been obese. It should be emphasized that obesity is the most common nutritional disorder in the most industrialized countries. This means that even if there were no other nutritional problems in these countries, the training and knowledge of nutrition specialists would be justified by the help they can give to overweight people.

Thus, nutrition education means to get people acquainted with the value of already available or easily available resources and persuading them to modify existing practices. Nutrition education is an important consideration as an element in an overall nutrition strategy.

But to educate the people does not mean automatically better knowledge. An evaluation of education programmes may be neglected on the assumption that nutrition education does not need evaluating or such evaluation may be scheduled to take place after the end of a nutrition education campaign, and many projects are never completed.

How important evaluation could be even if its outcome is disappointing, is shown by an example from India. Years ago when I was Chief of the Applied Nutrition Branch of FAO one of my duties was to initiate so-called Applied Nutrition Programmes in India. After 12 years of practice, in the early 70's Indian scientists started to evaluate some programmes and - as Alan Berg reported in his book "The Nutrition Factor" - in many cases they did *not* find any encouraging results: one could not detect any significant differences in general dietary practices "particularly with respect to nutritionally desirable commodities which are promoted under the programme." Knowledge and understanding of

nutritional needs was no greater in villages within the programme than in those outside the programme. The general failure of the programme was attributed more to "the conceptualisation behind the programme", not so much to uselessness of nutrition education programmes in general. Apparently we have to learn more about how to adapt special education methods to the special needs of people or to the special situation in a given country.

NUTRITION EDUCATION CAMPAIGNS

Nevertheless, we should think a bit more about ways and means of educating people, and of conducting effective nutrition education programmes. Traditional nutrition education activities in many developing countries have been partly disappointing and have raised the question of whether food habits can be changed by education. However, recent experiments in many parts of the world and observations of nutrition workers in Thailand show that existing food habits are not completely immutable. Foods that were totally foreign to many people are now regarded as dietary staples.

Important aspects of nutrition education include better nutrition of children, the encouragement of breast-feeding, the provision of food supplements to nursing infants at an appropriate age, avoidance of waste, better preparation of family meals which are nutritious and adapted to the family food budget. But first people must see a reason to change their habits. This means that the education campaign must identify the problem, stimulate interest and action, explain the need for change and demonstrate the results of a change in habits. Krishnaswami, an Indian nutritionist, has published a book about his experiences in nutrition education in India, in which he includes some relevant issues:

"The potential causes of hidden resistance to change must be identified so the message can be designed to address obstacles such as economic resistance (*"I can't afford it"*), social status resistance (*"every one else eats this way, and they can't all be wrong"*), and uncontrollable forces of fate conditioned resistance (*"we have been eating this way for generations"*)."

Since malnutrition is a mass problem, nutrition education probably ought to be channelled through the mass media, instead of the face-to-face contact that has dominated nutrition education up to the present. But the situation in many developing countries militates against communication via the mass media. Many, often the majority of adults in developing countries, are illiterates. In some countries language differences raise additional problems: India has 14 basic languages, many as different from each other as German from Japanese, and some African countries have more than a hundred different languages.

Another difficulty is transport and frequency of mass communications. In India, for example, newspapers reach only 1% of the population. Even television is not a suitable instrument of mass communications in many developing countries. From the approximately 300 million television sets in the world only about 5% are found in South Asia, Africa and the Arabic countries of the Middle East altogether. Nevertheless, commercial advertising and sales promotion have shown that by use of mass communications some people can be reached.

Up to now nutrition education appears not to have brought about large scale changes in eating habits. If nutrition education will remain a part of our nutrition strategy, substantial changes are necessary. A better understanding is needed, as to why people change their habits; how best to communicate with them

and what messages to communicate. Nutritionists cannot do this job alone. Social scientists should have a part in designing and directing nutrition education efforts. Psychologists and specialists in education should participate. Nutrition education can be effective only by an interdisciplinary approach.

RECORD FOOD OUTPUT IN '75

Preliminary figures show that developing countries had record food productions in 1975, the United Nations Food and Agriculture Organization in Rome says.

It cautioned, however, that it had not yet established any firm trend that would signify a major breakthrough.

Food shortages requiring emergency outside assistance are now reported only in the Comoro Islands, Lebanon and Timor, all three troubled by internal strife, compared with 14 countries a year ago.

The United Nations agency attributed production increases chiefly to favourable weather conditions. It added that heavier emphasis placed on agriculture by the traditionally hungry countries also helped. Even so, the Organization still lists half a billion people as underfed or malnourished in Africa, Asia and parts of Latin America.

- *The Daily Gleaner*
(Jamaica)
12 February 1976

THE EFFECTS OF FOOD PROCESSING ON NUTRITIONAL VALUES*

The major goal of food preservation is to free man from total dependence on geography and climate in providing for his nutritional needs and wants. While there are a few areas of the world where fresh fruits and vegetables are available year-round, without food preservation methods most of the world's population would be faced with a "feast or famine" situation - a large volume, large selection during a short harvest period, followed by a long winter and spring, eating only a limited number of staples such as the grains and a few root crops.

While all preservation methods contribute to this major benefit, each also operates in a trade-off situation - they lead to an inevitable loss in certain nutrients. Nutritional losses occur whether food is processed commercially or at home, and they also occur if a food is stored in an unprocessed state.

The major consideration, then, in evaluating food processing from a nutritional standpoint is the trade-off between increased food availability and the effects each of the various kinds of processing have on nutrition (including the effects of no processing at all). Also to be considered are the *degree* or *extent* of loss (it is often greater in home processing, for example, than in commercial) and the relative importance of the loss of a specific nutrient from a particular commodity (loss of

*Reproduced from *Food Technology/Journal of Food Science*, October 1974. A Scientific Status Summary by the Institute of Food Technologists' Expert Panel on Food Safety and Nutrition and the Committee on Public Information.

vitamin C from milk during pasteurization and refrigerated storage, for example, is relatively unimportant, considering that milk is a minor source of this nutrient in the daily diet, compared with other foods such as citrus fruits).

Adding to the evaluation process is the fact that food processing methods affect flavour, texture, and appearance. The processes that lead to improvements in these aesthetic qualities (and consequently to reduce rejection of the food by finicky eaters) frequently lead to better retention of nutrients as well.

PROCESSING EFFECTS: PLUSES AND MINUSES

Early man preserved his food supply by smoking, salting, and drying, and these basic methods are still utilized today. An analysis of these and other methods of food processing reveals both favourable and adverse effects on nutritional quality.

For example, on the positive side, heat processing destroys the antidiigestive factors in cereal grains, peas, and beans, thus making both the proteins and carbohydrates in these products more utilizable by man. Heat processing also destroys the enzymes which bring about the destruction of vitamin B₁ in fish and fish products, and the factors that would otherwise tie up the vitamins and iron in egg white.

In general, however, the overall effect of heat processing foodstuffs or drying them is to decrease the nutrient content, particularly vitamins A, B₁, C, and E. Heat processing or periods of long storage may also reduce protein availability, while drying - either alone or accompanied by smoking and storage - may reduce the stability of any fat components, leading to rancidity.

PROCESSING LOSSES VS. NATURAL DIFFERENCES

Variations in the nutrient content of raw food materials will affect the content of vitamins and minerals in the final food product as much as - and some times *more* than - the processing itself. Raw foods may vary widely in their vitamin content because of genetic variations, climatic conditions, and maturity at harvest. This is especially true of the vitamin and mineral content of some fresh fruits and vegetables. These variations may be quite extreme - for example, carrots may vary 100-fold in their concentration of carotene (provitamin A), and samples of fresh tomato juice have shown 16-fold differences in vitamin C per serving. Similarly, investigators have found a wide range of thiamine concentration in pork muscle, depending in large part on the thiamine content of the diet the pigs received.

These natural differences are of long standing. Although the data are somewhat sketchy, it does not appear that the raw foods being produced today are any different (in terms of vitamin content) from those produced two or more decades ago.

LOSSES OCCUR DURING COOKING

Another factor which must be considered in evaluating nutrient losses resulting from food processing is the extent and kind of losses that occur during the preparation of the food for the table. Normal home cooking frequently leads to high losses of nutrients in food. In fact, the major loss in vitamin and mineral contents of foods often occurs during final preparation in the home or institution prior to eating.

Water-soluble vitamins, such as vitamin B₁, riboflavin, and niacin, are particularly subject to cooking losses through leaching. Losses in the fat-soluble vitamins and vitamin C, on the other hand, generally occur during heating and storage in the presence of air.

Because of the large losses that occur in the home, the actual vitamin content of table-ready foods is frequently about the same *regardless* of the type of processing - or lack of processing - the food has undergone. For example, a bowl of peas placed steaming on the table will contain 35-45% of its original, "raw" vitamin C content regardless of whether it was prepared from fresh peas (45%), frozen peas (40%), or canned or freeze-dried peas (both 35%).

WHAT HAPPENS TO VITAMINS AND MINERALS?

The major methods of food preservation are blanching, heat processing, drying, freezing, and fermentation.

Blanching is the initial process in most preservation methods for fruits and vegetables. These foods are blanched to inactivate biological systems which would otherwise degrade the flavour or colour, and the systems which cause the loss of vitamins.

Steam blanching of spinach, as an example, results in the retention of 90-100% of vitamins B₁, B₂, and C, and niacin. Water blanching (for 2³/₄ to 5 minutes in boiling water) results in a retention of 65-90% of the same vitamins.

Minerals in food materials, on the other hand, are stable to heat. Any losses usually result directly from leaching into the water used for processing, or (in even larger amounts) into the water used for cooking.

Heat Processing includes canning in either metal cans or glass jars. Most vitamins, with the exception of riboflavin and niacin, break down when heated (i.e. are heat-labile). As a consequence, some nutrient losses can be expected in heating operations. Some vitamins, such as riboflavin, are also unstable with respect to light; significant losses of these materials may

be expected in usual handling operations when the food material is exposed to both light and high temperatures.

Heat transfer is slow in conventionally sterilized products, particularly non-liquid products such as meat. Since heat is applied to the outside of the product (or its container), the outer material is subject to more total heating than necessary, in order to achieve sterility in the center. For example, in the canning of beans (a semisolid), approximately 55% of the vitamin B₁ is retained, while in tomatoes (a more liquid product), approximately 70% of the vitamin C is retained.

High-temperature, short-time sterilization is receiving increased attention today because of the different effects of increased heat on bacterial destruction compared to chemical reactions. For example, an 18°F rise in processing temperature will usually produce a 10-fold increase in bacterial destruction, while only doubling the chemical reactions which lead to the destruction of certain vitamins and flavours. This system thus results in the retention of a higher percentage of nutrients and flavours than does conventional canning. Beans processed in this manner, for example, retain 90% of their original vitamin B₁, and tomato juice will retain an equivalent percentage of vitamin C.

Drying. The process of drying does not cause major losses in vitamins. This is true of conventional dehydration methods, and even more true for the newer methods such as puff drying and freeze drying.

Sulfur dioxide is frequently added in the dehydration process, with the primary intention of preserving the product's colour. It also results in an *increased* retention of vitamin C, since sulfur dioxide inhibits a biological system which can cause a major loss of this vitamin. The addition of sulfur dioxide *does* cause a considerable loss of thiamine, but since most food

products which are dehydrated and sulfured are not major sources of dietary thiamine, the net dietary effect of sulfur dioxide addition is positive.

When dried food products are stored in air, losses of vitamins A, C, and E may occur from reaction with oxygen.

Refrigeration and Freezing. The freezing process, like dehydration, does not in itself result in a significant destruction of vitamins, with the exception of vitamin E. Any losses in frozen foods occur during the blanching process prior to freezing, as noted above.

Fermentation. There is no major concern with nutrient losses with this method of preservation. In fact, there may be an increase in the B vitamins due to microbial synthesis during fermentation.

Storage. Vitamin losses during storage and distribution of canned or dried foods may vary widely, depending on the temperatures at which they are held during the various stages of distribution. The retention of vitamins in canned tomato juice, for example, is very markedly decreased by storage at temperatures higher than room temperature, although vitamin A retention is somewhat less affected by storage conditions.

Storage temperatures are also important for the retention of quality, including nutritive value, in frozen foods. Thus, storage at 0°F or lower results in excellent retention of the vitamin content of frozen foods. The major factors affecting losses after long storage at these low temperatures are the oxygen permeability and light transmission characteristics of the packaging. At storage temperatures above 15°F, however, easily oxidizable vitamins will be lost over a period of time. For example, half of the original vitamin C in asparagus, peas, and lima beans will be lost during storage at 15°F for 6 months.

WHAT HAPPENS TO PROTEINS?

Proteins in foods may become less available physiologically during processing or storage - that is, their molecular structure may change so that the body is less able to utilize them. Recent publications suggest that the mechanism by which these changes occur is a complex series of chemical reactions, some of which involve free radicals; these reactions occur much more readily in the presence of carbohydrates such as simple sugars.

Amino acids, the "building blocks" of proteins, may be destroyed or rendered non-utilizable when proteins are heated to high temperatures, and they may also be lost (at a slower rate) when foods are stored at room temperature.

The browning of food by heating or long storage may lead to loss in palatability and protein availability, as well as to the production of undesirable changes in the physical properties of food. On the other hand, most baked and fried foods are intentionally browned to "improve" their appearance and flavour. Maple syrup owes its flavour and colour to the browning reaction, and the distinctive caramel flavours which may be generated in dairy products are the result of the browning reaction in milk or milk components. Thus, while it is clear that browning may affect the nutritional value of foods, it may also enhance their acceptability.

WHAT HAPPENS TO CARBOHYDRATES AND FATS?

As indicated earlier, carbohydrates may be made more digestible, and thus more available, by mild processing. The major loss in the availability of carbohydrates is due to their interaction with protein, as noted above. In most cases, even this loss is relatively minor, with more significant effects occurring in the protein constituents themselves.

Fats in foods are not significantly altered by processing, but may be degraded during prolonged storage in the presence of air.

PROCESSING DOES NOT CAUSE MAJOR LOSSES

On an overall basis, the food preservation techniques in greatest use today do not result in major losses in the nutritive value of foods, and the more sophisticated methods of food preservation now being developed by advanced technology will retain an even higher percentage of nutrients. Factors to be considered in efforts to increase the retention of nutritional values must include the home preparation of food, institutional food systems, and further improvement in food processing technology.

BIBLIOGRAPHY

- Bender, A.E. (1966). "Nutritional effects of food processing." *J. Food Technol.* 1: 261.
- Bender, A.E. (1968). "Nutritional effects of food processing. 1. Vitamin losses. 2. Mineral salts, protein specific commodities. 3. Equipment and methods." *Rev. Nutr. Food Sci.* 11: 2; 12: 10; 13: 6.
- Chichester, C.O. (1973). "Nutrition in food processing." *World Rev. Nutr. Diet.* 16: 104.
- Hollingsworth, D.F. (1970). "Effects of some new production and processing methods on nutritive values." *J. Am. Diet. Assn.* 57: 246.
- Hollingsworth, D.F. and Martin, P.E. (1972). "Some aspects of the effects of different methods of production and of processing on the nutritive value of food." *World Rev. Nutr. and Diet.* 15: 1.

THE FUTURE OF TEXTURED VEGETABLE
PROTEIN (TVP) PRODUCTION IN GUYANA:
AGRICULTURAL AND NUTRITIONAL
CONSIDERATIONS

by

*Omwale**

For many years small quantities of a meat substitute have been marketed in the Caribbean. The product is a textured vegetable protein (T.V.P.) made from extruded soya bean protein. The cheaper "vegetable meat", as it is sometimes called, has been used either as a minced meat extender or on its own in hamburgers and other dishes. Meanwhile, the cost, but not supply of animal products has been increasing rapidly, as has been the widespread propaganda concerning the need for high protein foods. It is likely, therefore, that industrial production of T.V.P. might soon come up for serious consideration in the region.

In that context this article attempts to evaluate for Guyana:

- (1) The probable impact of T.V.P. production on the nutritional status of vulnerable groups in the community.
- (2) The probable impact of T.V.P. production on the nation's agriculture.
- (3) Possible Government policy with regard to subsidizing the production of T.V.P.

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I. THE PROBLEM OF MALNUTRITION

Symptoms of Malnutrition

Protein-Energy Malnutrition (PEM) was estimated in 1971, during the Food and Nutrition Survey¹, by comparing individuals' weights to the Harvard 50th centile (Table 1). In urban areas 20% of all children 0-5 years old had weights less than 80% of this standard; 37% of rural children in this age group were similarly affected. These rates increased to 27% and 48% respectively for the 5-14 years age group. East Indian children (mostly rural) 0-5 years old were three times more likely to suffer PEM than African children (mostly urban) - 44% as against 15%.

Anaemia of a mild nature was found to affect most age groups in the population except pregnant women who were severely affected. Although no statistically tested evidence exists, observations suggest that intestinal parasitism associated with poverty conditions was mainly responsible for anaemia; thus even among families with iron intakes well above recommended levels there was considerable anaemia. Anaemia was, however, more prevalent in urban than rural areas.

Obesity was observed in two-thirds of urban and one-half of rural women, the prevalence rates being much less in men.

Food Consumption

Income was significantly associated with dietary intakes of energy, protein, iron, riboflavin and niacin for the population as a whole.

¹The National Food and Nutrition Survey of Guyana, 1971.

The Government of Guyana and the Caribbean Food and Nutrition Institute.

Table 1: Percentages of malnourished persons in the population as indicated by weights below 80% of Harvard standard weight for age¹.

Age	Sex	Percentage	
		Urban	Rural
0-11 months	MF	6.8	24.2
12-23 "	MF	28.0	36.0
24-59 "	MF	20.8	40.7
0-59 "	MF	19.9	36.7
5-14 years	M	27.1	48.3
	F	25.2	48.6
15-49 "	M	21.9	12.7
	F*	11.1	23.0
50-64 "	M	0	37.8
	F	10.0	14.6

*Not pregnant or lactating.

Inadequacy of energy and nutrient intake was expressed as percentages of persons consuming these food ingredients at levels below 80% of recommended allowances. The prevalence rate of inadequate energy intake was 50% in rural as compared with 44% in urban households. Protein intake was better since the prevalence of inadequate intake was 41% and 34% in rural and urban areas respectively (Table 2).

¹The National Food and Nutrition Survey of Guyana, 1971.

The Government of Guyana and the Caribbean Food and Nutrition Institute.

Table 2: Percentages of households with energy and nutrient intake below 80% of recommended allowances¹.

% of recommended level	% with inadequate intakes of:				
	Energy	Protein	Iron	Riboflavin	Niacin
60-79	27	20	9	20	20
30-59	18	16	3	38	16
<30	2	3	<1	10	3
<80	47	39	12	68	39

Table 3 shows that 28.5% of the population had inadequate energy intakes associated with below median earnings. The prevalence of inadequate protein intake in this respect was 23.5%.

Table 3: Inadequate energy and protein intake related to income¹.

Nutrient	% of households with inadequate intakes in income range		
	\$115-\$300	<\$115	<\$301*
Energy	55	65	28.5*
Protein	45	55	23.5*

*Households with inadequate intake *and* income below \$301 expressed as a % of total population.

¹The National Food and Nutrition Survey of Guyana, 1971.

Diet composition differed considerably between urban and rural families. Meat, including poultry, contributed 29% of dietary niacin in rural, as compared to 22% for urban households. For protein the figures were 18% and 19% respectively. Table 4 shows meat to be relatively unimportant as an energy source, 7% and 6% of total intakes in rural and urban areas respectively. On the other hand legumes and oil seeds were much more important in the diet of rural than of urban people in terms of energy, protein, and iron intakes. Families that reared poultry, who were largely rural, also tended to have better protein intakes than non-rearers.

Table 4: Contribution of meat to diet¹.

Location	% of nutrient intake from meat				
	Energy	Pro-tein	Iron	B ₂	B ₃
Urban	6	19	10	16	22
Rural	7	18	8	10	29

Prohibitions of meat consumption were recorded for 42% of all households. The prevalence was considerably greater among East Indian families than those of African descent. Thus beef, the most commonly eaten form of meat was found in only 15% of East Indian households as compared to 58% for Africans.

¹The National Food and Nutrition Survey of Guyana, 1971.

The Government of Guyana and the Caribbean Food and Nutrition Institute.

At-Risk Groups

Young children and pregnant women in larger families, particularly in rural areas appear to be at greater risk of malnutrition than the rest of the population. More precise definition of the groups at risk would however be useful. It is important, for example, to know how vulnerable are the small farming families in particular ecological settings. However, the problem appears to be one of inadequate food intake resulting in energy deficiency. No protein deficiency has been demonstrated in the absence of energy deficiency. For most at-risk individuals therefore, protein requirements can be met most economically while satisfying energy requirements by increased staple consumption. Young infants represent an exception because of the bulk such a diet would imply.

II. *IMPACT OF TVP PRODUCTION ON AGRICULTURE*

Possible Effects on Cropping Pattern

Table 5 shows the current production pattern as well as productivity of selected agricultural commodities¹. The estimates of 1976 demand along with 1975 and 1976 production targets of the Government are also given.

In 1970 the consumption of beef alone² amounted to some 12 million pounds. If as estimated, increased TVP production (57% protein) amounted to an extra 5% of this quantity by 1980, then 0.6 million pounds more TVP will have to be produced.

¹Carter, B. and Telfer, I. "The Philosophy and Experience of Maximising Food Supplies in Guyana". Paper presented to 10th West Indies Agricultural Economics Conference, Guyana, 1975.

²Guyana Ministry of Agriculture (1972). "Our Agricultural Revolution".

This will require about 1 million pounds of soya beans. At the current average productivity of 1.29 thousand pounds per acre¹, an area of about 800 acres will be required for this quantity of beans. Under present conditions the production of two crops each year utilizes 44 man-days per acre and yields a net return of Guy\$60.5 per acre². This should be compared for attractiveness to black-eye peas which require only 28 man-days per acre per year but give a net return of Guy\$123 per acre over two crops each year².

The 1975 production target requires a five fold increase in 1974 soya bean production to a level of 1.2 million pounds grown on over 900 acres, primarily for oil. It is further projected that some 15,000 acres in all will be required for oil production to meet current demands. The protein requirements for increased TVP production therefore, appear to be small compared to the current expansion trends stimulated by the oil demand. Strategies for meeting oil needs will, therefore, most likely produce enough protein for the demands of an expanding TVP industry. The Government's plans for soya oil production are integrated into the agricultural development programme in a specific way. Thus one might expect no necessary distortions in the cropping patterns as a direct result of TVP production. The net returns per acre to the small farmer are unfavourable compared to black-eye peas and other currently produced legumes; it is therefore unlikely to undermine the production of these. Small scale corn producers, however, obtain net returns of only Guy\$20 per acre² and for these producers soya bean might be attractive.

¹Carter, B. and Telfer, I. "The Philosophy and Experience of Maximising Food Supplies in Guyana". Paper presented to 10th West Indies Agricultural Economics Conference, Guyana, 1975.

²Guyana Ministry of Agriculture (1972). "Our Agricultural Revolution".

Table 5: Selected agricultural data (Carter & Telfer¹)

Commodity	1974 Yield/ acre	Production			1976 Demand
		1974	1975 ^d	1976 ^e	
Black-eye peas ^{a,b}	1.00	1200	1300	1500	1400
Soya beans ^{a,b}	1.29	250	1100	1250	-
Red kidney beans ^{a,b}	1.00	-	120	-	-
Rice ^{a,c}	0.0007	163	180	180	60
Sugar ^{a,c}	0.003	351	360	400	33
Corn ^{a,c}	1.76	6000	13200	16000	22000
Beef ^b	-	8300	8000	10000	10000
Pork ^b	-	2500	3000	3000	3000
Poultry ^b	-	12500	12500	12900	12900
Mutton ^b	-	-	120	-	-
Goat meat ^b	-	-	50	-	-

^aTwo crops ^bThousands of pounds

^cThousands of tons ^dEstimate ^eTarget

Rice production is highly organized and lucrative. One can, therefore, assume that soya bean production for TVP will not affect the areas under rice. Finally, the regions identified for soya bean production are mostly in the intermediate savannah lands. Settlers in these areas constitute, for the most part, unemployed people and school-leavers not required for the current agricultural programme.

¹Carter, B. and Telfer, I. "The Philosophy and Experience of Maximising Food Supplies in Guyana". Paper presented to 10th West Indies Agricultural Economics Conference, Guyana, 1975.

Although there is no indication that increased TVP production, of the magnitude considered, need adversely affect other crop productions, careful evaluation is required. The mode of soya bean production encouraged by industry via price incentives or land ownership would need to be constantly examined to ensure that no conflict existed between these patterns and the national agricultural goals.

Possible Effects on Trade

The increased production of TVP is consistent with increased quantities of locally produced edible oil. This will help reduce the import bill presently incurred. The import of machinery and ingredients for processing and possible enrichment however, needs to be considered as a foreign exchange burden.

Since the production of other crops (e.g. rice and sugar) is unlikely to be affected then trade in agricultural products will also be unaffected. If soya bean production were to encroach on other crop production some effects might be seen on the quantities of marketed surplus. However, there seems no evidence for such displacement and no direct effects can be expected. The TVP itself will likely appear as a competitor of meat so that consequential price changes for food or cash crops cannot be anticipated. Such changes would, of course, affect the marketed surplus.

Effects on Agricultural Development

The production of soya beans for industry with specific quality demands would undoubtedly contribute to the development of agronomy and the spread of skills to those involved. The processing aspects would also have spin-off value in terms of technological development. How beneficial these will be for agriculture as a whole depends on the extent to which small farmers and other "disadvantaged" persons are encompassed by the activity:

the more of these the better. The livestock development programme currently in progress is unlikely to be challenged by TVP production of the scale envisaged. Meat is consumed primarily by the wealthy and current demand exceeds local production. The use of TVP as a partial meat replacement will be largely restricted to middle income groups for whom the cost of meat is an important consideration. The demand for meat will therefore not likely fall below the production planned. Certainly soya bean production is not a challenge to livestock production in terms of land or labour use.

III. NUTRITIONAL IMPLICATIONS OF TVP PRODUCTION

TVP as a Meat Substitute

Soya beans and TVP are nutritionally different from meat as shown in Table 6. If, therefore, unfortified TVP is used in complete substitution for meat the current dietary patterns may cause some people to suffer further energy and nutrient deficiency. However, if cooked with vegetable fat (excluding coconut oil) it could be beneficial as a meat substitute in protecting some people at risk of coronary heart disease. This is particularly applicable to those obese persons in the population.

If TVP replaces meat in the diet, reinforcement should be considered in view of the important contribution meat makes to the intakes of riboflavin and niacin.

Effects due to low price of TVP can be expected to occur primarily among higher-income meat-consuming sectors of the community. Substitution for meat can be expected among these but the level of food consumption should insure against any severe effects. A few poorer people including some adherents to prohibition might be expected to increasingly use TVP as a 'meat type'.

For many of these the result would be an uneconomical provision of energy which is short in the present diet. To the extent that TVP replaced possible cereal consumption, one could say that relatively expensive food was used for energy that could have been supplied by cereals at a lower cost with simultaneous provision of a more adequate diet. Meat consumption by the rural poor appears to be largely poultry produced by the household. TVP has to be purchased and is therefore unlikely to affect their meat consumption unless 'exchanged' for chicken. The price of TVP would need to be appropriately low for this to occur. Urban poor might substitute TVP for their small purchases of meat if the price was as low as that of the cheap cuts they purchase.

Table 6: Comparative composition of beef, soya beans and TVP expressed on dry matter basis (per 100g)¹

Product	Crude Protein (g)	Methionine & Cystine (g)	Fat (g)	Carbohydrate (g)	Iron* (mg)	Riboflavin (mg)	Niacin** (mg)
Beef (lean)	56.7	2.2	40.5	-	2.1	0.78	25
Soya bean	38.0	1.1	19.6	21.7***	1.5	0.33	2.2
TVP (extruded)	56.9	1.7	0.1	36.1	2.2	0.38	14

*Absorbable iron based on 30% and 20% of total in beef and soya bean respectively.

**Niacin equivalents, including Tryptophan.

***Available carbohydrate.

¹After Food Standards Committee. Report on Novel Protein Foods. H.M.S.O., London, 1974. (FSC/REP/62).

The diets of infants at risk of malnutrition could not possibly be assisted by increased TVP supplies not only because of the problem of bulk, but because they suffer the same restrictions in infant use that currently affect meat and legumes¹.

Other effects can be anticipated as a result of the provision of new jobs and incomes for poor individuals involved in TVP production expansion: these people will consequently be more able to afford a better diet. The precise number of such individuals and their current degree of poverty needs to be considered in an evaluation of the net effects of expanded TVP production. Moreover, price changes in food and cash crops produced and purchased by the poor might also affect their diet. Soya bean is, for Guyana, an unfamiliar and not popular food in its unprocessed form: subsistence farmers growing it might therefore tend to purchase more of their foods on the market rather than retain soya beans for home consumption. Exposure to the market would tend to reduce food consumption in some cases because of variable harvests of the new crop, as well as substituted purchase of non-food items encountered for the first time in this way.

IV. GOVERNMENT SUBSIDY POLICY CONSIDERATIONS

Effects on Livestock Development

The demand for meat is currently in excess of local production. The land, labour and capital available for beef production is in no way threatened by expansion of TVP production. The development plans for the livestock industry involves Government financial support. Since the consumers of meat are largely

¹The National Food and Nutrition Survey of Guyana, 1971.

The Government of Guyana and the Caribbean Food and Nutrition Institute.

wealthy, the issue of TVP subsidy for the most part hinges on the socio-economic status of future consumers and producers. If TVP production and consumption would involve the poorer, more at risk nutritionally, then subsidy of the production would be an appropriate means of redistributing income. In fact, a simultaneous withdrawal or reduction of support for beef production would make it even more effective since beef is largely produced and consumed by the more affluent. However, if the livestock development project succeeded in embracing small producers, such action would be against their interest. The producers and consumers of TVP, beef, pork and poultry need to be identified so that effects on them of possible subsidy policy could be quantified and weighed systematically in respect of alternatives.

Price Stabilization

Subsidy of TVP might in the short run result in stability of meat prices. If some restraint is thus placed on the increasing cost of meat, and restriction of its consumption to the wealthy is eased, total demand might increase. This would encourage uneconomical use of resources in the production of food, but would extend meat consumption to a few more.

Any decision on subsidy therefore needs to weigh the costs and benefits as outlined above and employ a strategy to give results consistent with explicit values and objectives.

V. *SUMMARY*

The available data with respect to nutrition and TVP in Guyana suggest the following:

- (1) Those most nutritionally at risk are children and pregnant women from poor, mainly rural households. These groups are characterized by prohibition of the consumption of meat by infants whose bulky diet results in widespread energy and nutrient deficiency. Other groups have prohibitions affecting adult meat consumption as well. Meat consumption among these people is mainly restricted to home-grown poultry.
- (2) TVP results from soya bean production and processing. These activities appear unlikely to affect the production of other agricultural commodities since, in any case, soya bean expansion for oil extraction is planned by the Government. The foreign exchange costs of importing machinery and enrichment ingredients should not exceed the associated reduction in oil import costs.
- (3) The fact of dietary energy shortage and patterns of meat consumption among the nutritionally at risk make it unlikely that TVP would represent an economic means of nutritional improvement. On the contrary, the attraction of a low-cost simulated meat might lead to its replacing cereal, which is more likely to provide the poor with an adequate diet.

- (4) Subsidy considerations need to be made against a background of explicit socio-economic objectives. Support for TVP might help slow down the rapid increase in meat prices and its exclusive consumption by the wealthy. This, in turn, might keep demand high enough to maintain uneconomical use of limited resources for meat production.

Current knowledge, therefore, hardly recommends TVP production as a socially beneficial venture in Guyana.

CAJANAQUOTE

"For hunger is caused by plunder and not by scarcity; the fruits of the earth and of generations of toil are unjustly divided up; the earth is the birthright of all human beings; and what comes from the earth can and must provide nourishment for all the earth's children rather than private gain for few."

*Transnational Institute
Report.*

*Quoted in "International
Journal of Health Services"
Vol. 5, No. 1, 1975.*

VERY INTERESTING -
THOSE ORIENTAL VEGETABLES*

by

Walter H. Hodge

Among the advantages of having one's own vegetable garden is the chance to plant and grow the unusual. I find some of the most fascinating vegetables are of the Oriental cuisine. The variety is large, and a few of the perennial kinds can be grown with ornamentals in border plantings.

Among better known vegetables of the Orient are sprout-yielding mung beans, edible soy bean, snowpeas, pak-choi, and pe-tsai - Chinese relatives in the varied cabbage clan - bamboo sprouts, water chestnuts and East Indian lotus root. Then there are the unique Oriental cultivars of some of our own familiar domestic vegetables, including the deep-red coloured, coreless carrot of Japan; giant radishes the size of a soccer ball; the small, slender delicate-flavoured eggplants; climbing cucumbers and minature watermelons and yellow flesh.

Of the lesser-known vegetables, one should mention the giant burdock or gobo (*Arctium lappa*) with its rather distinctly flavoured edible root, udo (*Aralia cordata*) whose tender young shoots are eaten like celery, Chinese yam (*Dioscorea batatas*) with curious starchy roots, mioga (*Zingiber mioga*), a kind of ginger whose flower buds are the parts eaten, potherb mustard or mizuna (*Brassica rapa* var.) that produces edible greens from June to frost and Chinese arrowhead (*Sagittaria trifolia* var.) with edible tubers.

*Reproduced from *The New York Times*, 1 February 1976.

Dr. Walter H. Hodge, a systematic botanist, served four years as head of the National Science Foundation, Tokyo office.

Plants already established in the U.S.A. as ornamentals are also utilized in the Orient as vegetables; flower buds of daylily (*Hemerocallis*), starchy bulbs of gold-band lily (*Lilium auratum*) and tender shoots of shade-loving plantain lilies (*Hosta*), and garland chrysanthemum (a variety of *Chrysanthemum coronarium*). In Japan the chrysanthemum flowers are eaten deep fried as tempura.

Given proper growing conditions and the correct spot in the garden, the majority of these exotic vegetables of the Far East are easy to grow. The species familiar as ornamentals are better grown as such. These would include also mioga as well as its close relative, the common ginger, more properly a spice plant rather than a vegetable.

Bamboos are woody-stemmed long-lived perennials and are also almost exclusively planted in Western countries as ornamentals from starts set out in late winter or early spring. Young sprouts of any species of the "running bamboos" (*Phyllostachys*) are edible, though the shoots of some are sweeter than others. To be crisp and tender, bamboo sprouts must be dug just as the shoot tips break through the ground in spring.

Once sprouts elongate above ground, they are too tough to eat. To prepare for the table simply remove the stem sheaths by husking them as an ear of corn. The crisp inner white shoot can be sliced for cooking.

The Oriental plants that yield water chestnuts (*Eleocharis dulcis*), lotus root (*Nelumbo nucifera*) and arrowhead tubers (*Sagittaria trifolia*) are all aquatics and not suited for the ordinary vegetable plot. (In the Orient, these aquatic plants are used for intercropping in a flooded paddy field with rice.) Any of the sun-loving plants can be raised in a garden water lily pool. Simply treat these aquatics as ornamentals and harvest them

for food in the fall. Water chestnut plants with their simple grasslike stems and insignificant flowers are the least ornamental, but lotus and arrowhead both produce attractive leaves and flowers.

Simply plant them in a bushel box in soil richly fertilized with well-rotted manure. Submerge the box in the pool so that the top of the soil is several inches below the water surface. Harvest the crisp edible underground structures at the end of the growing season after the leaves have either dried off naturally or been frosted.

Oriental leguminous vegetables - mung bean, soy bean and snowpea - are grown similarly to bush beans and garden peas. Like the garden pea, the snowpea thrives in cool weather and is picked when the pods and developing peas are immature. Mung and edible soy beans are frost-sensitive and are planted when the weather is settled.

Try eating home-garden soy beans in the favourite Japanese style. When full-grown but still green, simply parboil the pods in very salty water and then shell and eat the beans out-of-hand. They're delicious!

Although western gardeners consider radishes a minor vegetable, they rank as the most important of all vegetable crops in the Orient. They are usually eaten in one form or another at most meals, either fresh, grated, cooked or as pickles. The larger portion of the radish crop is dried and processed into many kinds of Oriental-style pickles.

The radish cultivars in the Orient are always white and mild-flavoured. They have the same forms as the American kinds, but not the same size. They produce large roots each weighing several pounds or more.

The Sakurajima radish (so-called because it hails from tiny volcanic Sakurajima island in Kyushu near Kagoshima), is claimed to be the world's largest radish. Individual roots of this cultivar sometimes weigh seventy-five pounds or more, and this size is attained in seventy days from seed! A half-dozen Sakurajima radishes will require as much garden space as six tomato plants. Although they are all large, Oriental radishes are as easy to grow as our domestic varieties.

Other Oriental plants producing root vegetables include the hardy Chinese yam and gobo. The former may be either grown from seed or vegetatively; yams are usually hilled up and as climbing vines they require support. The roots of gobo are a favourite vegetable of the Japanese. Superior cultivars produce long, slender, dark-coloured roots. For their best development, grow like Oriental radishes in deep friable soil.

Mature gobo roots are soft in texture, and are eaten in a number of ways - deep fried as tempura, sliced in soup (especially miso soup), prepared with fish or meat, or cooked simply in soy sauce.

Unlike gobo, udo, another unique vegetable of Japan, is a tall sprawling herbaceous perennial. It requires a spot in the garden where it can develop undisturbed over the years. In this respect it resembles garden asparagus, but will thrive in partial shade. The tender young shoots are harvested in early spring. The Japanese usually serve udo shoots uncooked with their favourite dish of raw fish (sashimi). One or two udo plants are adequate for the home garden; when established each will require the same space as a rhubarb plant.

NEWSPAPER CLIPPINGS

CARIB FOOD PLAN

From The Jamaica Daily News, 11 February 1976

The scheme begins to take on significance for the man in the street when it offers possibilities of employment for some twenty six thousand people in the livestock industry and in the agro-industrial operations which will result from livestock development.

In the context of the employment needs of the region, which according to CARICOM Secretary General Alister McIntyre, is in the region of 100,000 jobs annually if full employment is to be reached by 1980, the scheme would appear then to be merely scratching the surface.

But the people of the region, the political leaders and the technical planners cannot afford to be overcome by the magnitude of the overall human problems of becoming as near self-sufficient as possible in food, and in trying to bring about as full employment as our resources will allow.

From a strict Jamaican standpoint, the livestock plan envisages an expansion of the island's cattle by 25,000, and an increase in sheep and goat herds by 120,000 animals by 1980.

The implementation of these plans will require in addition to the capital to finance this kind of development, personnel at many levels, and it is here that coordination and cooperation will be of the utmost importance.

The Commonwealth Fund for Technical Cooperation through which it is now possible to bring qualified West Indians abroad on to a roster under their special skills will, it is hoped, help in a small way in overcoming the personnel problem.

But within the region, the need for pooling personnel and knowledge will be even more urgent and necessary if the ambitions of the project are to be realised.

The target date of 1980 seems to impose a very tight schedule, and there can be no time for dilly-dallying.

The overall food plan so far involves Jamaica, Belize, Guyana, Trinidad and St. Kitts. The other islands will have eventually to be brought into the plan in terms of getting agricultural development on stream.

The success of the three days of talks here in ironing out some of the bugs of planning will go a long way to making the progress smooth for next month's meeting of regional agricultural ministers, and eventually regional Heads of Governments.

The three days of discussions and planning which CARICOM agricultural and financial technocrats begin here tomorrow are extremely important for the region, first from the point of view of increasing livestock production, and second, reducing our import bill in this area of our trade.

Taken in conjunction with the \$300 million safety net agreed on in principle at the St. Kitts meeting of Heads of Government in December, and viewed in the overall context of the Caribbean Food Plan, the attention which will be given to increasing livestock production in the region over the next three days should ensure a measure of overall coordination of planning to reduce the region's staggering food import bill.

The plan for developing a livestock industry worth \$400 million may at first seem ambitious, but it is this kind of bold approach, both at national and regional level which will be required if the present imbalances in our trade and in our balance of payments are to be corrected, and if economic stability is to be achieved.

Quite apart from the advantages of feeding ourselves, the creation of jobs, and the economic utilization of land must bring other important social benefits to the people of the region.

For example, it is hoped that the ten-year plan for increasing the region's population of cattle, sheep, goat and poultry, and to increase fish production will bring into more economic use, and in some cases into use for the first time, one million acres of land in the member countries.

CAJANAQUOTE

"...If one could get rid of preconceived ideas, prejudices, the drawing for prestige, feelings of superiority and inferiority, if one could break loose from partial interests for the benefit of common interest so as to give free rein to creative imagination, one could find new formulas, expand the frontiers of information for development, transforming it into applied information tied to social progress, the real reason for the existence of information services."

György Rozsa

From "The Great Illusion"

*Ceres, September/October,
1975.*

WEIGHTS ON CANS OFTEN CONFUSING

By Francis Cerra

From The New York Times, 8 February 1976

The drained weight of pears canned under 16 different brand names varied by as much as 45.8% despite the fact that all the cans showed the same net weight, according to tests conducted by the Suffolk County Department of Consumer Affairs.

James J. Lack, Commissioner of the Department, said the purpose of the tests was to show that "net weight information is deceiving" because it is the combined weight of fruits or vegetables and the liquid and that there is a need for minimum-drained-weight labeling. He said that Department had embarked on a regular programme of drained-weight testing and intended to release the results of tests on a new commodity every other week.

CHANGE IS URGED

Present laws require only a net weight statement. The United States Food and Drug Administration proposed late last year that drained-weight labeling be required on all canned goods. The proposal also specified minimum drained weights for each canned commodity.

The National Cannery Association objects to the proposed Federal drained-weight regulations on the ground that complying with the regulations would increase the cost of all canned goods. As for the possible benefits to consumers of drained-weight labeling, a spokesman said, "we still think consumers buy by volume and experience."

AMC SPECIAL SHOPS MEETING VITAL NEEDS

By Carole Walker

From The Jamaica Daily News, 11 February 1976

The Agricultural Marketing Corporation's expansion programme involving the setting up of 'special' shops and mobile routes in low income communities throughout Jamaica is one of the Government's most successful social programmes.

Thousands of Jamaicans in the low income group living in villages and towns are eating better as a result of the programme.

In the recent incidents of counter-flour poisoning resulting in stocks of flour being seized from retailers 'specials' played a valuable part in supplying the communities with foodstuff.

The success of the 'special' shops programme - which can be seen by the amount of trading they do - shows that they have become an accepted feature of the Jamaican scene. Every parish is now served either by 'special' shops or mobile units. However, still more are needed to meet present needs. Expansion of the programme is continuing and plans are that eventually, all lower income persons will benefit.

Surveys show that last year about 237,000 persons were benefiting from the programme which handled locally-grown foodstuff and grocery items to the value of approximately \$2,350,000. In addition, the shops were the only outlets for the Cuban condensed milk, 'La Crema', which is sold for 17 cents per tin, and remains the cheapest condensed milk available in Jamaica.

At the end of 1975, with 36 shops and 40 mobile routes in operation, the AMC had extended these services to all parishes. The target for the end of the current financial year as announced by the Minister of Marketing and Commerce Vivian Blake, is 40 mobile routes (already opened) and 60 'special' shops.

By selling locally-grown foodstuff 20% cheaper than in regular AMC outlets where prices are normally lower than average, the 'special' shops were without doubt providing a valuable service in lower income areas hard hit by the high cost of living. It is significant also that the programme makes a serious attempt to supply the nutritional needs of customers.

Broadly speaking, 'special' shops stock three categories of items - locally-grown foodstuff, grocery items and meat. Food kind is mainly Irish potatoes, yams, bananas, peanuts, pumpkins, red peas, onions, carrots and cucumbers. A glance at prices shows yam at 15 cents per lb. compared with 25-30 cents per lb. in Parish Council markets and pumpkins at 5 cents per lb. compared with 20-25 cents per lb. outside.

A few locations of 'special' shops are August Town, Greenwich Town, Trench Town in Kingston, Granville just outside of Montego Bay, Nain in St. Elizabeth and Little London in Westmoreland.

Demand for 'special' shops is high and the growth of the programme has kept pace with projections. The success has been partly due to the immense planning which has gone into ensuring that those who benefit from the programme are, in fact, those for whom it is intended.

For this reason, a community comes in for careful scrutiny whenever the site of an AMC 'special' shop is to be selected. Normally, shops are located at strategic points in the heart of the community. Average per capita income, population density, how fully the community is already serviced with basic agricultural and grocery products are all factors influencing the decision.

In industrial areas or one-crop zones, where the shortage of basic farm products poses a problem, the accent is on the sale of agricultural produce. For example, the 'special' shop in the bauxite producing area of Nain, St. Elizabeth, sells a variety of basic agricultural products grown in other parts of the island.

If an area is adequately supplied by private shopkeepers, the 'special' shop in that community may not stock the usual grocery items such as canned goods and meats. Such is the case with the Bay Farm-Olympic Way 'special' shop which sells only farm produce. This is because it is not the policy of the AMC to compete with private enterprise and the selection of sites is based in part on the availability of agri-produce within that community.

Although grocery items stocked by 'special' shops are sold at controlled prices and are therefore no cheaper than in privately owned businesses, the 'special' shops provide a very welcome service in communities where there is a lack of these items.

Once a site has been determined, an existing building is leased. This is then refurbished according to AMC specifications, and fixtures such as display shelves, freezers and a cash register are installed. The AMC has the responsibility for paying the rent and all utility charges.

Shops are managed by full time operators and their staff who are all trained by the AMC. Shops are opened for six days per week for a minimum of eight hours daily. An operator is required to know the members of the community by sight as one aim of the programme is to see that the benefits go to members of the community where the shop is located.

This is also one of the safeguards for eliminating the practice of purchasing goods at low prices and reselling at inflated rates as strangers cannot go from community to community stocking up on goods. Another method of preventing resale is by limiting the amount of each item a purchaser can buy.

Supplies are selected, graded and packaged at AMC warehouses and sent out to the shops on a daily basis. Each shop is closely supervised on a day-to-day basis from either the Kingston head office of the AMC or one of its eight rural branches.

The supervisor checks on general cleanliness, the accuracy of prices quoted on the price board, the quality of items on display and operator-customer relationship. He also makes a special point of listening to customers' views in the hope of discovering areas for improvement.

CAJANAQUOTE

"While population growth still accounts for the major part of rising food demand, a ravenous new rival has emerged: affluence, reflected by the industrial world's consumption of meat. This glorification of steak and hamburger now extends from North America across Europe and the U.S.S.R. to Japan."

Thomas Y. Canby

From "Can the world feed its people?"

National Geographic Magazine, July 1975.

NEW CEREAL CROP

From The Jamaica Daily News, 7 August 1975

China has developed a new man-made cereal crop higher in protein content than wheat and adaptable to conditions that are poor for wheat growing, the official Hsinhua News Agency said Tuesday.

Hsinhua said the new crop, "*octoploid triticale*", does not exist in nature and was made by crossing wheat and rye and providing chemical treatment to make the new crop reproduce.

Based on regional tests, it said, "the triticales varieties developed now have a promising future in those parts of China where wheat yields are kept low by aridity, alkalinity and low temperature in mountainous lands with high altitude."

The new crop's flour is comparable to bread wheat flour both in whiteness and baking quality, Hsinhua added. It said triticales straw can be used as animal feed.

"This achievement not only gives China a good new species of cereal crop, but also furnishes important experience that the evolution process of wheat might be accelerated and directed by man," the Agency said.

It said this would mean "breaking through the limitation of conventional breeding methods by which only new varieties could be developed within the limit of a crop species concerned," Hsinhua reported.

Developing the new crop involved finding an inexpensive domestic substitute for a costly imported chemical called *colchicine*, and overcoming the problems of infertility and shrivelled seed, Hsinhua said. It said more than 2,000 cross combinations were made and the problems were solved by careful selection.

In tests in Kweichow province, Hsinhua said, triticale gave an average yield of 2.14 tons a hectare, 30 to 40% better than local varieties of wheat and 20% better than rye.

BOOBY BAN

A total ban has been imposed on the importation of booby eggs so as to protect the birds from extinction, the API, Jamaica reports.

In the past, eggs sold locally have been collected from the Morant and Pedro Cays which are in Jamaican territorial waters.

The eggs are also available from the Serana and Seranilla Cays off the Mosquito Coast which are outside of the country's territorial waters.

Over the years, the number of eggs on the Morant and Pedro Cays have grown fewer and fewer and the size of the booby flocks have been declining.

It is felt that unless the collection of eggs is prohibited for a period, the birds will soon become extinct.

NEWS BRIEFS

The first Workshop on Food Economics and Food and Nutrition Policy was successfully completed in Trinidad on March 19th. The Honourable Overand Padmore, Minister of Agriculture, Land and Fisheries in Trinidad and Tobago gave the feature address at the opening, and the closing address was delivered by Mr. J. Jackman, Permanent Secretary in the Ministry of Health, on behalf of the Honourable Kamaluddin Mohammed, Minister of Health.

Approximately 20 participants from a number of CARICOM countries attended. Apart from the theoretical aspects of the subject, they carried out a practical exercise in Food and Nutrition Planning.

The second in the series of Maurice Pate Travelling Seminars for assisting countries in the implementation phase of the Strategy and Plan of Action to Combat Gastroenteritis and Malnutrition (SPACGEM) was held in Belize, February 24-26.

The visiting team was comprised of Dr. Philip Boyd, Chief of the Health Section of CARICOM, Professor Colin Miller, Professor of Paediatrics, U.W.I., and a CFNI staff member.

About 35 doctors, nurses and other health staff attended the three-day meeting at the opening of which a recorded address by the Minister of Health, Mr. C. Rogers, was presented.

CFNI's in-service training for food service workers continued in February in Trinidad when 45 staff members of the University of the West Indies and the Ministry of Health had a one-week refresher course. This was conducted by Miss Manuelita Zephirin, Public Health Nutritionist, who has been responsible for most of the Institute's training activities.

The 15th Annual Meeting of the Hospital, Institution and Educational Food Service Society (HIEFSS) was recently held in Biloxi, Mississippi. Topics discussed during the four-day meeting included:

- Macrovitamin Treatment in Schizophrenia
- Revisions in the Diet for Diabetes
- The Food Crisis
- Changing to the Metric System
- Conserving Energy
- Cost Control
- Breakfast in School

Mr. Alan Morrison, graduate of the 1974 Trinidad and Tobago Food Service Supervisors Course and a member of HIEFSS attended.

Graduates of courses conducted by CFNI in collaboration with Ministries of Health in Barbados and Trinidad and Tobago are eligible for membership in HIEFSS. These programmes meet the standards established by the American Dietetic Association and are to date the only ones outside the U.S.A. having this recognition.

Special mention was made of Mr. Morrison's participation in the HIEFSS Bulletin.

CANADIAN DIETETIC ASSOCIATION PRESENTS
ITS 1975 MEMORIAL AWARD TO
CARIBBEAN DIETITIAN

Miss Loretta Clifton, former President of CANDI, has been presented the Canadian Dietetic Association Memorial Award for 1975.

The selection of the winner of the Award is based on scholarship, personal merit and the professional potential of the applicant in dietetics, and the existing and future contribution to the profession of dietetics.

Miss Clifton obtained a B.Sc. degree in Home Economics from Macdonald College of McGill University following which she completed a dietetic internship at the Royal Victoria Hospital, Montreal. In 1969 she returned to the West Indies where she was employed as a dietitian with the Ministry of Health in Trinidad and Tobago. She is currently enrolled as a candidate for the Master of Science degree at Iowa State University.

Miss Clifton was instrumental in organizing the Caribbean Association of Nutritionists and Dietitians (CANDI) and served in various executive positions including the Presidency since this Association was formed. Her dedication and consistent efforts made this Association a reality.

Miss Clifton is recognized as a person with commitment to her profession and we look forward to her further contributions in the field of dietetics and nutrition.

FROM THE EDITOR

TWO IMPORTANT FOODS

In this issue we are presenting a rather comprehensive dissertation on *Cajanus cajan* - the pigeon pea, by Julia F. Morton, reproduced from HORTSCIENCE. This is not the first time that we have published studies on this prize food crop from which our Bi-monthly so proudly derives its name. Volumes 1, 3 and 4 carried articles entitled respectively "The pigeon pea today", "Legume production in the Caribbean", and "*Cajanus cajan* - The pigeon pea or gungo pea". Miss Morton, however, has gone beyond hard scientific data and invited us to see the pigeon pea as through a kaleidoscope, in all its delicacy, variety and colour.

Volume 1, Number 1 of CAJANUS refers to "the humble gungo or pigeon pea as a sort of unsung protein Cinderella in the Caribbean". We hope that years of promotion of the multimix principle and acceleration in local food production efforts will have hoisted it to its deserved place in the diets of the Caribbean people.

Whatever the reasons for the pigeon pea being a protein Cinderella, the reasons why the waters of the Caribbean - the sea, rivers and streams - remain under-exploited as a source of fish and other seafoods are not all clear and pose a number of rather difficult questions. Is it due to a lack of skill or enterprise? Is it related to low demand due to culturally-based food preferences? Does the marketing and pricing system either put fish out of the reach of the poor or promise only meagre returns to the fisherman? Has urban migration and industrialisation played an adverse role? These, and many other questions need to be answered to account for the many unsuccessful attempts to organise and develop the fishing industry in many of the island-governments of the Caribbean.

Fish and Peas! Two vital foods. Two foods with enormous potential for the correction of many of the nutritional deficiencies still rampant in the Caribbean. Above all, two foods that must be guaranteed a place in any policy geared to the improvement of food and nutrition in the Region.

THE EDITOR

CAJANAQUOTE

"Affluence is also affecting the environment's capacity to feed the population. Almost a quarter of the food consumed last year is attributable to this new factor. Affluence is not only changing patterns of food consumption but reshaping world trade. The major food importers are thus no longer the developing regions alone."

*Maurice Strong
United Nations Environment
Programme*

TOPICS AND COMMENTS

WASTE NOT, WANT NOT*

By Barry Nestel

During the past two years mankind has become increasingly conscious of the need to conserve the world's dwindling resources of fossilized fuels. Yet, at the same time that we are burning up fuel derived from solar energy produced millions of years ago, most of the energy currently being radiated by the sun is being wasted. Only a very small percentage of this energy is transformed into utilizable plant products. Furthermore, the process of making part of a plant suitable for human diets often involves the discarding of a large volume of material. Two projects in the animal nutrition field supported by the International Development Research Centre (IDRC)¹ seek to bring about a better utilization of incident solar energy in the coffee and sugar industries.

THE SITUATION IN THE SUGAR INDUSTRY

Much of the sugarcane plant is discarded during processing. Before harvesting the leaves are stripped off the cane plant and the stem is then milled to extract sugar. The extraction rate is usually such that between 10 and 14 percent of the stem is converted into crystallized sugar. In the milling process molasses is produced as a by-product, as is the residual stem from which the sugar has been extracted and which is known as bagasse.

*From "IDRC Reports", Volume 4, Number 3, September 1975.

Mr. Nestel is Associate Director of IDRC's Agriculture, Food and Nutrition Sciences division. He is based in the Centre's regional office in Bogota.

¹A U.N. Agency established 1970 in Ottawa, Canada, to initiate, support and conduct research into the problems of developing countries.

This is often used to fire the furnaces that drive the mill, but in a large factory bagasse may also be converted into fibreboard.

During the past five or six years considerable work has been done in Cuba regarding the use of high levels of molasses in animal rations. Some work has also been supported by the Canadian International Development Agency (CIDA) in Barbados on the use of de-rinded sugarcane in ruminant diets. Whilst both of these processes have had some initial success under controlled conditions scientific workers in other countries have encountered difficulties in repeating them on a commercial scale. These difficulties appear to be associated with the fact that both sugarcane and molasses ferment very readily, especially under moist conditions, and fermented sugar rapidly causes digestive disturbances in ruminants.

A detailed examination of this situation is under way in a new IDRC-supported project in Mexico where at the present time over 30 million tons of sugarcane are grown annually. Much of this cane is grown by small farmers and milled by small mills which are not always economic unless sugar prices are exceptionally high, as they have been during the past year. In Mexico, as in some other Latin American countries, there is considerable scope for expansion of sugar production for large scale operations but such an expansion could have serious socio-economic implications for small marginal producers located a long way from modern mills. Were sugarcane to be economically utilizable for animal feed there would be a rationale for some diversification within the industry, using sugarcane as a livestock feed in cane producing areas where sugar production was economically marginal. A successful technology in this respect would also have implications for a number of other countries such as some of the smaller Caribbean islands which were once sugar producers but have been forced to close down their small-scale sugar industries, because, although they are capable of producing more energy per acre from sugar than from any other crop, they are unable to process this energy economically in a small sugar factory.

The project in Mexico is coordinated by the National Council for Science and Technology (CONACYT). It is examining the practical implications of sugarcane products in livestock rations and studying the biochemistry of sugar fermentation and the economic implications for both the sugar and the cattle industries of diverting marginal sugar production from cane factories to ruminant stomachs.

The Mexican programme involves a unique combination of talents in the fields of economics, biochemistry, agronomy, animal nutrition and animal health. Its preliminary results indicate that the development of efficient cattle feeding systems using high levels of sugarcane diets - thus increasing small farm incomes by diversifying marginal cane producing areas - is a goal that will not be easy to achieve. However, the team working on this project is a very strong one with a broad based approach and they are convinced that the problem can be solved. A successful outcome would be of considerable importance in many tropical areas and the project's progress is being followed with considerable interest.

CAJANAQUOTE

"In a world that will necessarily have to march towards austerity in the global use of resources, and towards their better distribution, food wastage through overnutrition or the garbage can may not be tolerated."

Dr. Jacobo Schatan
Chilean director of the UN
Protein-Calorie Advisory
Group Secretariat

PEOPLE, Vol. 3, No. 1, 1976.

THE LITTLE BIG WORLD OF THE SHOPKEEPER*

By Malcolm Harper

Retailers have traditionally been despised and their role in the process of economic development has not been appreciated everywhere. There is, however, ample evidence that they have a vital part to play in the development of agriculture and the improvement of food distribution.

In rural areas, widely scattered small shops are the only effective source of supply of farm inputs such as fertilizers and improved seeds, of manufactured products that can form an incentive for increased production and of the foodstuffs that may have to be bought when subsistence farmers turn to cash cropping. In the rapidly growing urban areas of developing countries, there is a desperate need for economical and convenient outlets for food and other necessities, and shops can provide this service. They are also an important source of employment, and shopkeepers often progress to larger scale entrepreneurial activities after gaining experience in retail trade.

If small-scale shops are accepted as a valuable element in the economy, it is clear that they must be promoted and developed at the same time as the farmers and consumers whose interests they serve. Otherwise, increased farm production or consumer purchasing power will be unable to find an effective outlet and will thus be frustrated. Many developing countries have attempted to assist and encourage the small retail trading sector; small businessmen everywhere maintain that their most serious problem is their shortage of capital, and it is not surprising that this complaint has been taken at its face value. Governments have set up lending institutions to provide loans to them, since this type of lending is often unprofitable for commercial banks. The results have not,

*From "Ceres", January-February 1976. Mr. Harper is Director of the Marketing Development Centre at the Cranfield School of Management, England.

however, been altogether satisfactory; there has been a high default rate, frequent allegations that loans are awarded on a tribal or family basis rather than on an objective assessment of the potential borrower, and often little evidence of improvement in the businesses that have been awarded loans.

DEVISING A METHODOLOGY

The experience of small business lending has shown that improved management is needed as well as, or even in preference to, increased finance. Many countries have set up training institutions for small-scale businessmen, including shopkeepers, but here again there have been problems. Small businesses are typically dependent on one man, who cannot easily absent himself from the business. Small-scale businessmen in developing countries often have very little education, and they find it difficult to become adjusted to the classroom situation, or to apply generalized knowledge to their particular situation. Trainers and facilities are scarce, and courses are often attended only by the most progressive businessmen who are the least in need of assistance.

Loans and training have been provided for small-scale shopkeepers in Kenya for some years, and both forms of assistance, while achieving some useful results, have suffered from the difficulties described. Several authorities, in Kenya and elsewhere, have recommended that individual on-the-spot advice be provided, in the same way as field extension staff form the backbone of governments' assistance for small farmers. These suggestions have not been implemented, because of the cost and difficulty of recruiting staff of the qualifications and experience that have usually been thought to be necessary for advisers or consultants to small business. An experiment has recently been carried out in Kenya to investigate the possibility of employing extension officers with no business experience and only eleven years of education. Preliminary investigations suggested that the problems and appropriate remedies of small

businessmen were homogeneous with those of small farmers; what was needed was a simple procedure for diagnosis and recommendations. Over a period of some three years, a methodology was devised whereby the financial condition of a small business could fairly easily be determined, without the use of any complicated accounting techniques. This information supplemented by observation and assessment of the shopkeeper's capabilities, led to identification of individual problems. These might not be those of which the businessman himself was aware; the need for a loan, for instance, was often found to be illusory, since existing capital was not being employed effectively. Excessive stocks of slow-moving goods, or uncontrolled credit, were absorbing the resources of the business. The shopkeeper himself played an important part in the diagnostic procedure. Thus he came to understand the real nature of his problems at the same time as the consultant.

ADMINISTERING PROCEDURE

This procedure was simple to administer and comprehensive enough to cover any problem likely to arise for a small-scale shopkeeper in Kenya. It was now necessary to find out whether it could be applied in the field by extension staff who could easily and economically be recruited in the large numbers necessary to cover the bulk of the 25,000 small shops in Kenya. Five trainees were hired without difficulty from the large numbers of unemployed school leavers failing to proceed to the fifth year of secondary education, and were put through an intensive two-month course to familiarize them with the problems of small shopkeepers and the operation of the consultancy procedure. Much of the training was carried out in shops, and the practical work was supplemented by classroom exercises and discussion. After completing their training, the five consultants worked for some six months in the field. Each covered about forty small shops, and called on each shop at least once a month. The consultants were closely supervised, and the forms they used for recording the diagnosis and the

acceptance or otherwise of recommendations were regularly examined. An attempt was made to introduce an element of competition between the consultants, by comparing their success in persuading their clients to adopt new techniques. Apart from improved stock and credit control, recommendations included advice on marketing and publicity, simple record keeping with specially designed account books, the use of bank accounts and a variety of simple retail management concepts.

About a month after the end of the six-month period, all the shops were visited by an independent observer who ascertained whether the shopkeepers had in fact followed the consultants' recommendations; in addition, the shopkeepers were asked whether they would be willing to pay for the service in future. There were of course some total failures, since the consultants had not been permitted to neglect the less responsive in favour of those who were more receptive to their advice. Nevertheless, over 60% of the shopkeepers had followed three or more recommendations and nearly 70% expressed willingness to pay for continuation of the service. It was not possible to assess the effect on the profitability of the shops, since there was rarely any information available as to results before they were advised. An attempt was made to calculate the costs of the service, and it appeared that even if those shops where three or more recommendations were followed only benefited to the extent of US\$20 per year, the service would pay for itself.

The system is now being applied on a somewhat larger scale in western Kenya, and it has also been modified so that it can be used to advise other types of small business. It would appear useful for small-scale retailers of food and other necessities in developing countries, and the concept of a rigid procedure, combined with strict field supervision, may also have some application to the improvement of agricultural extension activities.

WORLD WEATHER WATCH*

By William J. Cremins

- Because of persistent dry weather, the U.S. Great Plains continues to be a major agricultural trouble spot.
- In the USSR - mostly the southeast winter wheat areas - potentially damaging cold in early February caught some of the crop with little or no snow cover. In general, though, snow cover has been above normal.
- Winter rains have been sparse in Malaysia, India, and Sri Lanka; only a few isolated spots received any significant moisture.
- Widespread storms and floods ravaged major crop areas of South Africa and Lesotho.

Unseasonable warmth and continued dryness increased stress on *Hard Red Winter wheat* and other crops in much of the central and southern U.S. Great Plains. Heavy precipitation in early February brought considerable relief to crops in much of the U.S. southwest.

Above average midwinter snow cover in the USSR protected winter grains against the cold. However, the southeast portion of the winter wheat region experienced potentially damaging cold in early February and snow cover was briefly inadequate in part of the area. Snow depth increased considerably in most of the spring wheat region.

*From "Foreign Agriculture", Vol. XIV, No. 9, March 1, 1976.
Foreign Agriculture Service, U.S. Department of Agriculture.

January rains benefited winter wheat in parts of Pakistan, India's northern wheat region, though, had only isolated areas of worthwhile rain. Elsewhere in India, Sri Lanka, and Malaysia, the prolonged dry spell caused much concern for crops.

Adequate winter rains sustained grains in most of the western Mediterranean region, despite extended periods of dry weather. Conditions have been excellent for winter wheat in Turkey and improved in Syria.

In eastern Europe wintering crops received above normal precipitation and snow cover appeared adequate during spells of cold weather. Although there has been little snow cover, temperatures remained relatively mild in western Europe, where heaving from freezing and thawing poses the biggest threat to crops.

Temperatures moderated from early winter cold in the southern People's Republic of China, favouring growth and development of crops. Winter wheat in the north was exposed to typical cool, dry midwinter weather and precipitation is needed.

In the Southern Hemisphere, February rainfall reduced stress on crops in much of northeast Brazil. Elsewhere in Brazil, especially in the major agricultural areas of the south, a balance of rain and sunshine benefited crops. Generous January rains arrested decline of Argentine crops and provided moisture to sustain surviving crops through relatively dry weather so far in February.

Weeks of persistent heavy rains and flooding caused extensive damage to crops in South Africa, especially corn and sorghum, and threatens crops in Lesotho.

Similar weather damaged soya beans and sunflowers and caused problems for cotton in Australia.

CAJANUS CAJAN - THE NUTRITIOUS,
HISTORIC, VERSATILE PIGEON PEA**by**Julia F. Morton**NOMENCLATURE, ORIGIN AND DISTRIBUTION*

The genus *Cajanus* of the family Leguminosae is generally regarded as embracing a single species, *C. cajan*. Its place of origin has been the subject of much speculation. Alphonse de Candolle found no convincing evidence of its existing truly wild in Asia though he believed that it had "been grown there for more than three thousand years". He considered it native to tropical Africa, from Zanzibar to Guinea, and supposed that it was carried by traders from Zanzibar to India or Ceylon. Sir Joseph Hooker, in his *Flora of British India*, reported it as cultivated up to elevations of 2,000 m. in the Himalayas. It was known to be well established in China and Indochina and some islands of the East Indies, though it was slow in reaching the Pacific Islands, and apparently was planted in Hawaii late in the 18th century. In 1772, it was introduced into Guam via the French ship "Castaries". Brown wrote in 1935: "Of very recent introduction in the Marquesas, where it is cultivated in a few places on Nukuhiva and Hivaoa". Remains discovered in tombs testify to pigeon pea culture in Egypt between 2,200 and 2,400 B.C.

Seeds are believed to have travelled the slave route from Africa to Bermuda, the West Indies, the Guianas and Brazil. In time, the plant became widely distributed and more or less

*Reproduced with permission from *HortScience*, Volume 11(1), February 1976. Presented at the 16th annual meeting of the Society for Economic Botany, University of Maryland, Baltimore, June 16, 1975. The author is Director, Morton Collectanea, University of Miami, Coral Gables, Florida 33124, U. S. A.

naturalized throughout the tropics, in some areas - particularly India, Madagascar, the Bahamas, Puerto Rico, Trinidad and Tobago, the Windward Netherlands Antilles and Panama - being an indispensable food; in others, valued mainly as a forage or cover crop, or remaining an occasional or minor, dooryard resource. In Mexico, the pigeon pea is little known outside of Yucatan. It receives little attention in tropical and sub-tropical Australia.

The pigeon pea was probably first brought to Florida by fishermen and spongers from the Bahamas (so called "conchs") who settled on the Florida Keys and in Coconut Grove and grew the bush in their dooryards.

Because of its broad geographical range, its vernacular names are legion. In addition to *pigeon pea*, other English names are *Congo pea*, *Angola pea*, *goongo* or *gungo pea*, and *Porto Rico pea*. In Cuba and Puerto Rico, it is known as *gandul* or *gandur*; in Yucatan, *chicharo de arbol*; in British Honduras, *chicharo*; in Guatemala, *cachito*, *frijol chino*, or *frijol japones*; in Salvador, *frijol de palo*, *alberga* or *alverja*; in Nicaragua, *garbanzo falso*; in Costa Rica, *timbolillo* or *quimbolillo*; in Panama, *guanadu*; in Venezuela, *quinchoncho*, or *guanadu* (the last rendered *wandu* in the Papiamento speech of the neighbouring Netherlands Antilles); in Colombia, it is *guanadu* or *chicharo de paloma*; and, in Peru, *pusoporoto*. In India, it is widely called *red gram* or, when dried and split, *dhal*, though the latter is applied also to other legumes, and there are numerous dialectal or regional names. In Java, it is best known as *katjang goode*; in the Philippines, as *kadios*; in Guam, *lenteja Francesa*.

DESCRIPTION

The pigeon pea is an erect, perennial (or annual), bushy shrub to 3.5 m. high, woody at the base, with somewhat ribbed, downy stems and having a vertical taproot and numerous rootlets, some bearing nodules inhabited by nitrogen-fixing bacteria.

The leaves are pinnately 3-foliolate, with lanceolate or elliptic leaflets 4 to 10 cm. long and to 3 cm. wide, acute at the apex, dark-green and silky on the upper surface, densely silvery-downy and dotted with glands on the underside. Flowers, borne in short axillary and terminal racemes, are 1.5 to 1.8 cm. long, yellow to orange-yellow, the standard often striped or splotched with dark-red or purple on the outside. The pedicels and calyx are brown-velvety. Seedpod is indehiscent, green or green-and-purple; oblong, to 8 cm. in length and to 1.4 cm. wide, more or less downy, obliquely constricted between the seeds, and terminates in a slender beak. The fresh hull contains an aromatic juice. Seeds are nearly round, smooth, 4 to 8 mm. in diameter, green when immature; when mature, are white, gray, yellow, brownish, sometimes mottled with purple-red, or may be all-red or black. They are very hard when mature and dry, become soft and enlarged when soaked.

PRODUCTION, TRADE AND ECONOMIC VALUE

World production of pigeon peas in 1967 was estimated at 1.21 million metric tons, placing this crop 5th in importance among legumes after beans, peas, chick-peas and broad beans. India is the world's leading grower of pigeon peas and in that country this crop has risen from 3rd to 1st place among edible legumes.

In the 1930's, 68,000 metric tons of dry split pigeon peas (dhal), valued at £10,683, were imported annually into Trinidad¹ from India. Importation was suspended during World War II, domestic production was encouraged, and the pigeon pea soon became the leading legume crop in Trinidad, the popular demand switching largely from the dried to the fresh, immature seeds. Still the supply was insufficient and, in 1961, Trinidad was importing green pigeon peas from Tobago and St. Vincent. A canning factory was established in Trinidad in 1962, with the Government conducting a

¹Now Trinidad and Tobago.

promotion campaign and contracting to purchase the output of immature peas in the pod from all growers at 22.2 cents per kg.

Production was mainly by farmers cultivating 10 acres or less and having the advantage of free family labour, and only a few farmers had as many as 50 acres.

In the Bahama Islands,¹ pigeon pea production, once sufficient for export, has declined in recent years to the point where they now import large quantities annually.

Puerto Ricans began canning the unripe pigeon pea in glass jars in 1928, including a few unshelled green pods in each for identification and attractiveness. The canning industry grew steadily and today absorbs 85% of the Puerto Rican crop. While Bahamian- and Puerto Rican-born residents of Florida retain their partiality for the seeds, this taste is not always shared by their offspring.

Pigeon pea culture is increasing in the Dominican Republic where the annual crop stood at 15,000 metric tons in 1967, as against 6,000 tons in Venezuela.

In Hawaii, the first test plantings were made at the University's Agricultural Experiment Station in 1906. Twenty-five years later, there were about 10,000 acres planted to this crop in the Territory and it was declared that "no other leguminous crop is known to have yielded so consistently year after year as has the pigeon pea". There the crop is valued primarily for forage, fodder, pasture shade and as a cover crop and very little for human food.

East Africa, in recent years, has begun to promote the pigeon pea as a domestic commodity and foreign exchange earner. In 1963, pigeon pea farming in Uganda was estimated at 52,206 hectares, and cultivation is steadily increasing. Uganda now stands

¹Now The Commonwealth of the Bahamas.

2nd to India in pigeon pea production. In Kenya, the pigeon pea has risen to 6th place in monetary value among food crops, the canned seeds being shipped mainly to the United States. Dalziel says that the pigeon pea is "little appreciated as food by West Africans" except in the former French colonies of Dahomey and Lower Congo. Williamson notes that there are marked tribal attitudes toward this vegetable. It is popular in the Southern Province of Nyasaland¹ but hardly ever eaten in the Central Province.

In northern Australia, the pigeon pea is sometimes grown as a green manure rotated with pineapples or bananas.

FOOD USES

In Java and India, very young pods in which the seeds are indistinct are cooked as a vegetable, often in curries, or are made into a kind of relish. Ripe seeds may be germinated as are mung beans to produce sprouts which are eaten when 2 cm. in length.

Immature seeds have wider appeal than mature, dried seeds, though more difficult to shell. Depodding is done by inserting the thumbnail near the apex and drawing the thumb down toward the base, to split the pod and detach the seeds. In Java, the young seeds are mashed with onion and other flavourings and eaten raw with rice. Elsewhere, they are usually boiled, thorough cooking requiring 1½ to 2 hours. Mature, dried, unsoaked seeds need to be cooked 4 to 5 hours. If soaked overnight, cooking time is reduced to 2-3 hours.

Also in Java, mature, dry seeds are soaked in water, pounded and fried, or are steamed and eaten alone or mixed with grated coconut or other foods. In India, it is the dried seed that is most important. Generally, the hulled seeds are made into

¹Now Malawi.

a puree (often spiced) eaten as a side dish with curries. It is frequently sopped up with a folded piece of thin, flat bread.

Cooking tests in India have shown that dhal of the lighter-hued, smaller but high-protein annual types require less cooking time than the darker, larger and heavier perennial types. The latter absorb more water and show a greater degree of expansion in volume but not in weight.

In the days of sailing ships, the dried peas were reduced to a meal or so-called "sago" which was in great demand as sea-fare.

In Puerto Rico, the fresh, immature seeds are very popular and sell for twice the price of the mature, dried seeds, because they are tastier, tenderer, do not need soaking and cook in less time. The most common method of preparation is as follows: onions, green pepper and garlic are chopped and lightly fried in oil; tomato sauce, water and salt are added and the mixture brought to a boil. Then pigeon peas are added. If immature, cooking proceeds for $\frac{1}{2}$ hour; if mature, dried and presoaked (overnight), cooking proceeds for 1 hour or until tenderness of peas is verified by squeezing one between the fingers. Then rice is put in, the heat lowered, and cooking continues for $\frac{3}{4}$ to 1 hour.

The traditional Bahamian dish, "peas and rice",¹ is very similar except that the fresh or dried pigeon peas may be cooked in advance to a very soft stage before being combined with fresh or canned tomatoes and onion already browned in bacon or ham fat or lard; when water is added and brought to a boil, the rice is put in with salt and pepper and cooked till tender and fairly dry.

¹A traditional Caribbean dish variously known as "peas and rice" or "rice and peas", prepared either with pigeon peas or red beans".

Types commonly grown in Puerto Rico and the Bahamas apparently do not require seedcoat removal. In the West Indies generally, the dried seeds are boiled thoroughly and eaten with rice or used in soup.

In Central America, the seeds are not popular with the Indians or persons of Spanish descent, but favoured by residents of West Indian origin. The latter are partial to the immature seeds. Dried seeds are sold in Guatemalan markets "partly for food, partly for planting as coffee shade".

FORAGE AND FEED

Lopped branches are fed fresh or dried to cattle and horses, as are the pod husks, leaves and broken seeds after the threshing operations. Puerto Ricans give the empty pods, moistened with slightly salted water, to their oxen. Utilization of the pod husk (or shell) is a great advantage since it has been calculated that it represents by weight 60% of the price paid the farmer for peas in the pod.

In Hawaii, the pigeon pea is grown mainly as feed for domestic animals - the plant for horses, mules, cattle and goats, as hay or milled to a meal; the seeds, flowers and buds for ducks, chickens, turkeys, pigeons and rabbits. Around 1920, the protein value of the plant was discovered in Hawaii to be about equal to that of *alfalfa* and the yield of forage per acre may be 10 times that of *alfalfa* which, of course, is rarely grown with success in the tropics.

In India, the seedcoats removed in the splitting of the peas and which represent 10% of the raw material, are prized as feed for dairy cows, as are also the "dust" and broken seed fragments, but these sell at higher price. Such by-products are incorporated into several commercial cattlefeed mixtures.

FOOD VALUE

The dietary importance of the pigeon pea has been recognized and publicized by the Caribbean Food and Nutrition Institute and it is noteworthy that Cajanus was chosen as the name for the CFNI journal.

Generally, the pigeon pea is held to be rich in high-quality protein (varying from 19 to 28%) and an excellent food when eaten with rice. The chief proteins of the pigeon pea are two globulins: *cajanin*, which represents 58% of the total nitrogen, and *concajanin*, which represents 8%. Both are high in tyrosine; moderately rich in cystine, arginine and lysine. Cajanin is deficient in methionine, tryptophane and threonine. Antimetabolites are low in comparison with the soybean and lima bean.

Busson presents the total amino acids of pigeon pea protein as follows: arginine, 6.7%; cystine, 1.2%; histidine, 3.4%; isoleucine, 3.8%; leucine, 7.6%; lysine, 7.0%; methionine, 1.5%; phenylalanine, 8.7%; threonine, 3.4%; tryptophane, -; tyrosine, 2.2%; valine, 5.0%; aspartic acid, 9.8%; glutamic acid, 19.2%; alanine, 6.4%; canavanine, 0; citrulline, 0; glycine, 3.6%; homoserine, 0; proline, 4.4%; serine, 5.0%. Twade and Cama in 1962 presented a comparative table of the amino acid composition of 3 globulin fractions. Values will naturally differ according to the strains studied.

Chemical composition of uncooked pigeon peas has been reported by various investigators. Results of typical analyses of unspecified strains or cultivars are shown in the table on the following page.

Chemical Composition of Uncooked Pigeon Peas

	Water	Protein	Fat (%)	Carbo-hydrate	Fiber	Ash
Unripe seeds	67.4	7.0	0.6	20.2	3.5	1.3
Ripe, dried seeds	10.1	19.2	1.5	57.3	8.1	3.8
Split, dried seeds	15.2	22.3	1.7	57.2	3.6	*

*Calcium, 9.1%; Phosphorous, 0.3%.

Vitamin content varies widely with the strain of pigeon pea. Average figures are reported as: thiamine, 500 μ /100 g.; riboflavin, 150 mg/100 g.; nicotinic acid, 2.3 mg/100 g; ascorbic acid content is low. Fatty acids are: linolenic, 5.56%; linoleic, 51.41%; oleic, 6.33%; saturated fatty acids, 37.7%.

The seedcoat, according to Friese in Brazil, yields a slightly acrid essential oil having the aroma of fresh butter.

The seeds contain the enzyme urease, which showed high activity when isolated in crystal form.

USES IN FOLK MEDICINE

In India, young tender leaves are chewed to relieve sores in the mouth. Javanese crush the leaves and place them on sores. It is claimed in Indochina that powdered dried leaves, taken in doses of 3 tablespoonfuls per day often successfully expel bladder stones. The leaf juice with salt is taken in cases of jaundice. It is used on wounds as a styptic.

In Argentina, a decoction made by boiling 20-40 g. of leaves for 20 minutes in a liter of water is regarded as an excellent remedy for skin diseases and is prized for relieving irritation of female genital regions. In West Africa, the leaf decoction is gargled to soothe sorethroat. It is reputedly diuretic, astringent, antidiysenteric; deterrent and vulnerary.

In some areas, it is used as a mouthwash to heal sore gums and halt toothache. In the Netherlands Antilles, pregnant women drink the leaf decoction for 7 or 8 months to promote an easy delivery. It is also taken to ward off colds and is used for bathing the body. Bundles of leafy branch tips are sold in the native market in Curacao.

Cubans regard the decoction of new shoots, leaves or flowers as pectoral. A decoction of the flowers alone is given in Argentina as a remedy for coughs, bronchitis, and pneumonia. In Columbia, a decoction of very immature pods is administered to relieve liver and kidney ailments. According to Petelot, fresh seeds have a marked remedial effect on incontinence of urine in men. In Curacao, the seeds are burned a little and added to ground coffee to make a decoction which is said to overcome headache and dizziness. In several areas, powdered seeds are applied as poultices on swellings and particularly on smallpox pustules.

The woody root is sold in Chinese shops, "varying from the size of the little finger to mere rootlets; the whole being connected by a knotted rootstock. Rats and mice are said to be fond of this root. It is considered to be the counter-poison par excellence. Anthelmintic, sedative, expectorant and vulnerary properties are also referred to it".

POTENTIAL THERAPEUTIC VALUE

Biochemists at the University of Kerala have demonstrated that a protein fraction extracted from dried, powdered pigeon peas administered to rats on a high fat-cholesterol diet, lowered the total and free cholesterol, phospholipids and triglycerides levels in the serum, liver and aorta.

Apart from the foregoing hints of pain-relieving and "sedative" action, there is only one, often cited, reference to the possible presence of a soporific principle in the seeds which causes sleepiness after excess consumption of uncooked pigeon

peas, as in certain Javanese dishes. Apparently this aspect has never been investigated.

OTHER USES

In southern Madagascar, the pigeon pea has been grown for rearing a special silkworm, *Boroceras cajani*, which feeds on the leaves and "forms its cocoons among tufts of grass placed within the bushes for that purpose". The plant was grown in northern Bengal and Assam as a host for the lac insect at the beginning of the 19th century. If pruned to prevent flowering, the plants could be maintained for several years.

The dried stems of the bushes produce fire by friction and have served as matches. They are used for fuel in India and those of the largest size burned for charcoal utilized in making gunpowder. In Hawaii, the charcoal was found good for poultry, "comparing favourably in this respect with willow charcoal". Thin, straight branches have been made into baskets, thatching for roofs, wicker lining for wells and wattling of carts.

REFERENCES

- Dalziel, J.M. (1948). "Useful plants of west tropical Africa." Crown Agents for the Colonies, London.
- Hooker, J.D. (1872-1897). "Flora of British India." 7 vols. London.
- Prasad, S.N. (1965). "Studies on sterility disease of 'Rahar' (*Cajanus cajan*)." *Allahabad Farmer* 39:235-237.
- Williamson, J. (1955). "Useful plants of Nyasaland." Government Printer, Zomba, Nyasaland.

(A full list of references can be supplied on request).

NUTRITIONAL STATUS: HISTORICAL AND GEOGRAPHICAL PERSPECTIVES*

by

N.T.A. Byam

THE "FORAGERS"

The most "primitive" method of food production known is carried out by groups of people called "Foragers": those who live by gathering food and by hunting. A few still survive, mainly in Africa and in the Arctic, and they possess certain characteristics:

- (1) Low population density resulting in ample personal territorial space.
- (2) High energy output by the men in hunting and the women in gathering fruits and roots.
- (3) Short adult stature because of the persistent lack of calories.
- (4) Good health: most of their deaths result from infection or accidents.

The proportion of the population over the age of sixty-five is about 7% which compares not unfavourably with Europeans at the turn of the century.

The essential feature of the diet of these people is that it is a mixed vegetable diet sporadically enriched with animal protein. It is also rich in essential or polyunsaturated fatty acids, low in salt, and, except for occasional treats of wild

*Based on a paper presented at the CFNI Workshop in Food Economics and Food and Nutrition Policy, Trinidad, March 1976. Dr. Byam is Specialist Medical Officer, Nutrition Unit, Wrightson Road, Port of Spain, Trinidad.

honey, devoid of simple sugars. The nutritional status of forager societies is characterised by the absence of obesity, no clinically observable malnutrition except in the presence of other illnesses, an absence of high blood pressure (in fact the blood pressure falls with increasing age), low serum cholesterol, and no dental caries.

When man evolved from the forager type of society it was because of acquiring one or both of two basic skills: domesticating animals, and raising crops.

PEASANTS AND PASTORALISTS

The peasant farming and pastoral societies were often at odds with each other, but closer examination of the situation shows quite clearly that they are dependent one on the other for commodities. A very good example of this is described in Jomo Kenyatta's "Facing Mount Kenya",¹ where he describes the traditional fighting between the peasant Kikuyu and the semi-nomadic, pastoral hunters - the Masai. However, it also emerges that the Kikuyu got some of their meat supply from the Masai, while the latter actually bought some of their weapons from the Kikuyu who were better metal workers, so that the true biological relationship between peasant and pastoralist was one of symbiosis.

WESTERN TECHNOLOGICAL SOCIETY

"Primitive" peasant farmers cultivated cereals and some legumes and they still foraged to some extent for food. With the emergence of landed society and of villages and cities, wealth began to be unevenly distributed. Alcohol made its appearance due to the fermentation of stored grain and specific nutritional deficiency diseases began to occur. The diseases of nutritional deficiency in this type of society included protein-calorie malnutrition and hypovitaminosis. However, many healthy societies

¹Kenyatta, Jomo. (1962) "Facing Mount Kenya: tribal life of the Kikuyu."

arose from this peasant farming structure, for example, ancient classical Greece, the ancient Egyptians and the Mayan civilisation. Provided that a mixture of crops was regularly grown these societies developed and came to little harm. The population density increased as compared with those of foragers but it did tend to remain static at a higher level. There was very little increase in the population of Europe, Asia, and probably Africa for nearly a thousand years ending in the mid-eighteenth century, because of disease and war. At about this point peasant farming and pastoral society began to develop into the technological/scientifically based society which we know in the Western World of today. Now there were two parallel but different groups in society:

- (1) The Affluent group characterised nutritionally by over-consumption, and a low energy output. This group is subject to an increase in vascular disease, hypertension, obesity and diabetes mellitus.
- (2) The Poor, urban or rural, still subject to malnutrition which is usually related to economically-determined nutritional imbalances. These have come in the wake of markedly increased population density.

POPULATION DENSITY AS A DETERMINANT OF NUTRITIONAL STATUS

The essential central factor governing nutritional status is population density which bears a distinct relationship to famine, due to many causes:

- (1) Crop failure resulting from disease, drought or insect pests especially where there is overdependence on one major food crop.

- (2) Natural disasters such as flood, earthquake, war and civil disturbances.
- (3) Inadequate food production due to insufficient and inefficient farming: cash crop rather than food crop farming, soil erosion, and climatic irregularities such as periodic floods and droughts.

Secondary to these problems there is also that of the maldistribution of available food, aggravated in some localities by transport difficulties and by hoarding in times of food shortage. Political factors are also important, particularly the extent and quality of government involvement in the whole food production, marketing and distribution process. The food processing industry has exercised a potent influence, arising out of modern scientific and technological advances. To some extent it has been a force for good, by increasing the shelf life of food, thereby preventing waste, and making a contribution to total food availability. Nevertheless, this industry has also given us highly-refined carbohydrate foods, the over-consumption of which has been encouraged through its advertising component. It has also consistently removed the product's natural fibre, which has some amount of dietary significance. These refinements have had such adverse results as a considerable increase in the incidence of diabetes and chronic vascular disease and in diseases of the colon. The frequency of occurrence of such conditions as cancer of the colon or the large bowel, diverticulosis and even appendicitis are now thought to be indices of nutritional status in respect of dietary fibre. These are relatively new or newly diagnosed manifestations of nutritional imbalance which might be laid directly at the door of the food processing industry.

*FACTORS INFLUENCING NUTRITIONAL STATUS IN THE CARIBBEAN**Family Size and Income Level*

In the Food Consumption Survey of Trinidad and Tobago¹ we note that the maldistribution of available income and population increase, are the main determinants of nutritional adequacy. A study of malnourished children also confirms these findings. Most of these children have parents who lack skills which would guarantee them employment, and most of them come from over-large families, the risk appearing to rise sharply from the third child onwards.

Our agricultural pattern also is an aggravated form of cash versus food crop production and so far from being overdependent on any single food crop we are mainly dependent on flour which is exported and rice which is so far only partially indigenous. The fact that we have been relatively free from serious climatic variations, except for the occasional prolonged dry season or local flood, has, therefore, had no serious effect, for good or ill, on nutritional status. However, we are strongly influenced by events elsewhere. For example, the failure of the 1975 Russian wheat crop which produced low yields of winter wheat is sure to have an effect on the local availability and price of bread since Russia will be buying many millions of tons of wheat from our traditional suppliers.

FOLK BELIEFS

Folk beliefs are usually formulated in stable societies on the basis of hundreds of years of experience and, at that particular time and within that environment, are largely

¹Report and Interim Report on the National Household Food Consumption Survey in Trinidad and Tobago, 1970. CFNI, Trinidad Centre; U.W.I., St. Augustine.

beneficial or protective against traditional dangers. An example is a great part of the Law of Moses which in its time was an excellent piece of Public Health legislation which modern advances have, of course, rendered out of date.

Folk beliefs become inapplicable and ignorance arises when two societies of different levels of development and with different cultures and dietary patterns come into contact and the influence of one begins to dominate. Here ignorance is seen as a failure to adapt successfully to unfamiliar conditions. An example of this was the enthusiastic adoption of maize as a food crop, leading to its spread from North America into Europe and Asia, where the dietary pattern was not always such as to compensate for the deficiency of the tryptophan/nicotinic acid deficiency characteristic of maize diets. The nutritional disease *pellagra* therefore spread in the wake of maize cultivation. Similar nutritional imbalances arising from the clash of cultures and alteration of the socio-economic circumstances of the people, or of patterns of production and processing of food, have led to other outbreaks of nutritional disease such as *Beri-Beri* in parts of the Far East.

CAJANAQUOTE

Malnutrition begins, quite commonly, in the womb. It ends frequently in a tiny grave.

From "People" 3:1:76

FOOD AND NUTRITION ACTIVITIES IN TRINIDAD AND TOBAGO*

by

R. Andrews

The objective of economic development is to provide a reasonable standard of living for all sectors of the population. Improvement in the nutritional status is one aspect of social and economic development since nutrition promotes good health which is essential to national productivity.

The Food and Nutrition Policy of Trinidad and Tobago is carried out through educational, economic, technical and legislative means. This is done with the prime objective of meeting the demand for food, forecasting the food supply and ensuring adequate nutritional requirements. This Food and Nutrition Policy is an integral part of the national economic development plan.

Trinidad and Tobago has available basic data including the Household Food Consumption Survey (1970), Food Balance Sheets from 1964, and the Household Budgetary Survey. Realistic demand projections of major food items can, therefore, be made taking into account nutritional requirements of the population, current food consumption patterns, population growth, income distribution, and nutrition intervention programmes.

THE NATIONAL NUTRITION COUNCIL

One of the main organs through which the Food and Nutrition Policy is implemented is the National Nutrition Council. This Council has superseded the Nutrition Coordinating Committee which

*Based on a paper presented at the CFNI Workshop in Food Economics and Food and Nutrition Policy, Trinidad, March 1976. Mr. Andrews is Director of Planning, Ministry of Planning and Development, Trinidad and Tobago.

was established as far back as 1962 as a result of an agreement between the Government of Trinidad and Tobago, WHO, FAO, and UNICEF.

Because of the increased importance of Food and Nutrition in the National Development Plan it became necessary to reconstitute the Committee to deal with questions involving National Food Policy. The National Nutrition Council was formed with an expanded membership including representatives from all organisations dealing with food and nutrition. Its main duties are to supervise (under the Ministry of Health) the Applied Nutrition Programme and to act as an advisory body to the Ministry of Finance (Planning and Development) on matters related to the National Food Policy.

THE FOOD AND NUTRITION POLICY

The Food and Nutrition Policy has as its main objectives:

- (1) To make the population more self-sufficient in sources of calories and protein.
- (2) To reduce dependence on imported staples.
- (3) To limit the size of families.
- (4) To increase the educational facilities for providing people with basic and necessary wage earning skills.
- (5) To provide nutritional support for the most vulnerable groups in the society.
- (6) To increase and improve facilities for dealing with diseases of nutritional deficiency.

In order to realize these objectives work is being carried out in several areas:

I. *FOOD PRODUCTION AND RURAL DEVELOPMENT*

Small scale community-based marketing, preserving and processing units are to be established in rural areas to process specific local products. These centres are to be managed on a cooperative basis by farmers in each area and, at least in the initial stages, be given technical aid.

The Ministry of Agriculture, Lands and Fisheries has embarked on a programme designed to increase local protein production, both animal and vegetable, with the emphasis on vegetable protein. It is hoped that vegetable protein will be used, both to supply human needs, and to reduce our reliance on imported sources of animal feeds. At the moment priority is being given to the production of rice and soya beans.

Soya Beans

The objective of the *Pilot Commercial Farm Project* was to determine the economic feasibility of relatively large scale highly mechanized systems of local production of corn, soya bean and sorghum. Soya has a yield of 1518.1 lbs. per acre, while the yields for corn are generally twice as high as that in neighbouring countries.

Trinidad can plant two to three crops per year. However, if corn is planted twice per year, or in rotation of corn/soya and corn/sorghum, this would increase the average yield per year much more. The rotation of corn and soya and corn and sorghum is also promising from the economic point of view.

Six hundred acres of soya have been cultivated at Piarco, and 500 acres at Chaguaramas, and this project has proved successful. Local factories can adapt their machinery to produce oil, and the meal can readily be used for livestock feed.

The *Chaguaramas Agricultural Project* has tested soya beans successfully for making a variety of foodstuffs including sausages, cakes, bread, and pastry.

The Ministry of Agriculture is now producing soya bean seeds which are to be sold at a subsidized rate to farmers. Guaranteed prices are offered to farmers by the Central Marketing Agency, and the Ministry of Agriculture is offering expert advice on soya bean production.

Rice

In order to encourage farmers to grow more rice, the Trinidad and Tobago Government has provided facilities and expertise in this field. A programme involving the bringing into production of 30,000 acres of land is in operation and at the moment 75% of this project has been completed. The rice development project involves rehabilitation of land that was formerly under rice production. To carry out rehabilitation work it is necessary to build embankments and carry out irrigation work, which is sometimes a lengthy process. Farmers are given further incentives by having a guaranteed price for their crops, and are being encouraged to use newer varieties which are sturdier and more productive.

Composite Flours

Wheat provides about $\frac{1}{3}$ of the energy and protein in the Caribbean. If, however, there is a change to a composite flour using local ingredients where possible, certain benefits would be derived:

- (1) There would be less dependence on foreign sources for a base staple.
- (2) Local production would generate employment and ultimately more income and improved nutrition among low income groups.

- (3) Foreign currency reserves would be increased.
- (4) A nutritious staple food would be added to the diet.

A working group to develop a composite flour is being set up and it is hoped that within a reasonable time this flour should be used commercially. The composite flour as envisaged should have significant inputs of locally produced flours, in order that the protein content of the final product would be no less than that of wheat flour.

II. YOUNG CHILD FEEDING

The manufacture of a local weaning food for babies from rice/pigeon peas, banana/rice/soya beans is being undertaken. This pilot project should be completed by the end of the year and after acceptability tests have been performed, it is hoped that the product will be manufactured on a commercial scale.

III. INTERNAL TRADE AND MARKETING

Steps are being taken to establish a single Food Agency administratively in the Ministry of Health, and operationally under the guidance of the National Nutrition Council. Such an Agency would be responsible for acquiring and storing supplies of basic and essential foods, either from local or overseas sources, and distributing such supplies to those target groups in the population designated by the National Nutrition Council, or other competent body, as being in need of aid. At the moment steps are being taken to obtain two million pounds of skimmed milk per year for at least the next two years. This would replace the now defunct UNICEF Child Feeding Programme.

IV. DAY CARE CENTRES

These are to be set up in socially deprived and nutritionally vulnerable areas. The aims are:

- (1) To provide a protective environment for preschool children and opportunity for mothers to go out to work.
- (2) To make a significant contribution to the daily nutritional needs of children under five in order to prevent the onset of protein-calorie malnutrition.
- (3) To train senior girls from primary and junior secondary schools in mothercraft techniques and sex education.

The first centre should be in operation by 1977 and will be run on a pilot basis, catering for 60 preschool children from the Couva area.

The Food and Nutrition Policy of Trinidad and Tobago includes an educational programme for health personnel, especially nurses, teachers and voluntary organisations. It outlines the provision of facilities for vulnerable groups such as infants, preschoolers and pregnant/lactating women through the Maternal and Child Health/Family Planning Programme, and a diabetic treatment programme operating in health clinics.

Progress is gradually being made toward establishing and implementing a viable Food and Nutrition Policy. At the moment a Food and Nutrition Plan is being drawn up to cater for the needs of the entire population. This exercise involves experts from the various fields and is designed to span the various stages in the production, marketing and consumption of food, taking into account the nutritional requirements of all sectors of the population.

FISH: A DEPLETED FOOD SOURCE*

by

Jane Stein

Imagine finding *krill* pate, *spinyfish* souffle or *coley* au gratin on the menu at your favourite French restaurant.

None of these dishes is a popular treat, nor are they found in gourmet cookbooks. But they are nutritious and they might even taste good.

Of more importance, these fish are available by the billions of tons in waters around the world. The oceans are not running out of fish - just the kinds mother serves and the species fishermen traditionally seek.

Fisheries management goes way beyond culinary arts: It is part of the larger problem of how to feed the growing world population. At present only 6 to 12 percent of the annual protein we eat comes from fish. As land-based protein sources become seriously and repeatedly threatened, ocean resources need to be expanded. But if present management practices are followed, fish too may become a seriously threatened source of food.

BONANZA OVER

Over the past 25 years, the world catch of fish more than tripled, growing from 20 million to nearly 67 million metric tons. But the bonanza years of 7 percent annual growth are over. After a standstill and even a decline in recent years, it is estimated that the world catch will increase at no more than 3 percent per year through the 1980's.

*From the *Miami Herald*, 14 March 1976.

U.S. fishermen did not share in the boom. Their annual fish catch remained at a relatively fixed level over the same time period, hovering between 2.4 and 3 million metric tons. In spite of this, however, many of their traditionally fertile fishing beds have disappeared.

Remember *Cannery Row*? It is John Steinbeck's look at life around the California sardine-packing plants, a thriving industry from the 1930's to early 1950's. A combination of intense fishing plus some bad climate conditions left the California sardines commercially extinct. In New England, the *haddock*, a staple for more than 200 years, is so scarce that commercial fishermen are forbidden to catch them.

Marine scientists report that *herring*, *mackerel*, *menhaden*, *sablefish*, *shrimp*, *yellowtail flounder* and *halibut* - all traditionally caught off the U.S. coasts - are among the fish stocks depleted or threatened with depletion.

When the first major conference to examine the state of marine fish stocks on a global basis was held during the United Nations' early years at Lake Success, the over-fished stocks noted were a few high-priced species - *plaice*, *halibut* and *salmon*. A map was produced for delegates which showed that 30 major stocks were under-fished. Today, a quarter of a century later, half of these 30 stocks are threatened with depletion. They are close to or beyond that level needed to maintain the stock at a productive level.

The significant - and scary - point of this, according to Sydney Holt, the British director of the Royal University of Malta's International Ocean Institute, is that "the history of development of a fishery from small beginnings to the stage of full utilization or overutilization can, in the modern world, be compressed into a very few years".

The blame for diminishing fish stocks cannot be placed fairly on any one factor. There are natural fluctuations that occur among marine resources; the causes are not always clear. More often, fishing is sufficiently intense to reduce the reproductive capability of the species through the reduction in numbers of spawning fish. Stocks also can be depleted because of the effects of the environment, such as a change in wind strength that alters upwelling of nutrients, thus effecting the food source for fish.

ANCHOVIES AND ALL THAT

Consider the great Peruvian *anchovy* fisheries, which grew from about one million metric tons in the late 1950's to nearly 13 million metric tons in 1970. There was a seemingly never-ending source of anchovies. Yet the Peruvian anchovy market dropped precipitously to 1.8 million metric tons in 1973. Apparently, it was the result of a combination of over-fishing and a current that warmed the water and reduced the salinity of the icy Humboldt Current, killing many organisms upon which the anchovy fed.

Environmental factors can rarely be controlled; over-fishing can. The Peruvian Government, in a realistic effort to rebuild the country's vital fisheries, has reduced by half the number of anchovy fishing boats and fishermen and has clamped on a quota of five million metric tons a year.

Though there may be natural fluctuations of fish stocks and ordinary currents, the oceans have been fished freely for hundreds of years without threats of stock depletion arising.

"What has happened in recent years," according to Jon Jacobson, director of the ocean resources law programme at the University of Oregon Law School, "is that new technologies have made it possible to catch virtually all of the available fish.

Catches are being made by bigger and more efficient boats, at ever increasing depths and at greater distances from home."

TRAWLER TECHNOLOGY

Heavy fishing efforts and the development of a new type of fishing trawler are essentially synonymous. Until the mid-1950's, trawlers fished with nets that were hauled in over the side of the boat. Then came the great advance: boats in which nets were pulled over a low ramp at the back end. These stern trawlers can use much larger nets and their engines can haul in from six to 10 times as much fish at one time as side trawlers can. The side trawlers would also become unstable under such heavy loads.

Stern trawlers quickly developed into floating fish factories - boats with equipment for freezing and canning fish or processing them into fish meal. These boats stay out at sea for as long as a year at a time. The crew changes every three months; the 70 to 90 men are helicoptered ashore or afloat. In contrast, New England fishermen traditionally stay out four to 14 days, bring in their fish and have it processed ashore.

The use of long-distance stern trawlers greatly contributed to over-fishing of the once flourishing fishing grounds off the coast of New England. Look at what happened to *finfish*.

Fifteen years ago, New England fishermen - with the help of a few Canadian vessels - caught less than 300,000 metric tons of finfish with standard trawlers. By the early 1970's, the finfish catch in this area had risen to more than 800,000 metric tons, but this time there were larger, long-distance boats doing the fishing, crowding U.S. vessels off their traditional grounds. The boats came from Japan, the U.S.S.R., Bulgaria, Rumania, East Germany, West Germany, Poland, France, Norway, Italy, Cuba, Greece, Ireland.

The 75-foot-long New England vessels were no match for the foreign trawlers, many of which measured more than 400 feet long, and the U.S. finfish catch began to fall to under 200,000 metric tons. In the Massachusetts fishing towns of Gloucester and New Bedford, more than one-half of the fishing industry jobs hinge on processing and packaging the frozen fish brought in by the Japanese.

Americans excel in one area of long-distance fishing. The U.S. tuna fleet, based in San Diego and Puerto Rico, plies the seas for as long as 200 days at a stretch. Highly sophisticated gear and electronic aids guide them to their catch, which they freeze in shipboard refrigeration plants. These ships are so highly mechanized that the crew on each boat is kept down to a dozen or so. One of the attractions for skilled tunamen is a share of the catch, which often nets them US\$25,000 a season - nearly double that of their New England brothers.

ANTARTIC KRILL

The highly mobile ships and electronic detection gear that fostered the convergence of long-distance boats off the coastlines of fish-rich nations are also used to locate and exploit new species.

Take the Antarctic krill, widely believed to be the ocean's main untapped food source. They have the potential of supplying a minimum of 100 million metric tons a year - an amount which exceeds the present total annual world catch of all aquatic resources. These small shrimp-like creatures, one-and-a-half to two-and-a-half inches long, were once eaten in huge quantities by the near extinct whale.

The Russians are cruising the Antarctic waters during the summer months, tracking the krill down with echo-sounding equipment, catching as many as 10 tons an hour in superstrong synthetic nets and then processing them aboard ship. Krill must be

processed quickly. If they are not cooked or frozen within two hours, autolysis - deterioration by self-digestion caused by highly active enzymes in the krill's organs - sets in. Aboard Soviet factory ships, krill are ground up into paste for use later on in soups, spreading with butter and cheese, enriching dumplings, meatpies and fishballs.

The Soviet Government has been promoting consumer interest in krill, pointing to its food value (between 13 and 20% protein) and flavour (similar to shrimp). Some Soviet men-in-the-street, however, describe krill paste as something less than tasty. Trying another tack, the Government is spreading the news that krill paste regulates metabolism, raises vigour, prevents fat and caries, and eliminates fatigue.

Other nations are joining the krill hunt. The United States has the technology available to fish for it - and probably will at some point. But, as the Russians are discovering, marketing a new species does not assure its widespread use.

20,000 SPECIES

There are more than 20,000 species of fish in the world's oceans, but only a few dozen are exploited. People eat fish with which they are familiar, and most are reluctant to try out new species.

The *coley*, for example, is more abundant in European waters than its close relative, the *cod*. The *coley*, however, is a black fish, and consumers seem to be turned off by the sight of a strange colour on their plates. Numerous species still abound off the American North coast. The spiny and smooth *dogfishes* are there and, prepared correctly, they are reportedly tasty. But a fussy public tends to reject them because they are a species of the shark. The *squid* has little appeal to most Americans, yet the Japanese consider it a delicacy and happily fish 30 million pounds a year off our shore. The general American public may think it is not up to eating new or unusual fish, but many of the popular

fish sticks sold in supermarkets are made from imported blocks of "trash fish", which are found in abundance off the Northeast coast and thrown away by U.S. fishermen.

The worth and volume of the catch of living resources could soar - if the catch of highly sought-after species was maintained and wisely used, and if currently underutilized species were sought. The potential catch of underutilized species is staggering: Just four species found on the U.S. continental shelf, *jack mackerel* and three kinds of crab (*red*, *Jonah* and *cancer*), could yield almost as much as the total existing U.S. fish catch.

Many conservationists, however, worry that exploitation of the new species of fish now being sought could create serious ecological imbalances. Krill, for example, are not only food for whales, they are also feasted on by various seals, penguins, albatrosses, terns and squid. How an annual catch of 100 million tons of krill will affect these species cannot even be guessed.

Marine biologist Brian Rothschild, director of the Southwest Fisheries Center, National Marine Fisheries Service, at La Jolla, California, fears that "the new fish stocks that are being sought will be as over-fished as the common cod. There is a big difference between saying, 'Let's manage fish stocks wisely' and actually managing them".

MANAGEMENT VS. EXPLOITATION

His colleague, Dayton L. Alverson, director of the NMFS' Northwest Fisheries in Seattle, feels that "while our ability to manage fish stocks has grown rapidly, our ability to harvest them has increased even more. As a result," he continues, "the gap between managerial ability and exploitative technology has widened".

Just how much can be taken out of the sea - and at what price? Marine resource specialists feel it is possible to harvest 118 million metric tons of conventionally sought-after fish

annually - almost double the present catch. Beyond that point, reproductive capabilities will be threatened.

There are numerous ways of controlling fish catches to protect the popularly desired species and, perhaps one day, the stocks now scorned. The quota system is often cited because it is designed to limit the catch to a desired level.

But protecting national fish resources by extending 12-mile jurisdictions outward to 200 miles is the trend in the making. Last year, Mexico and Iceland were added to the growing list of nations which claim exclusive rights to fish to 200 miles off their coastlines.

Despite this trend, it is unlikely that the Soviet Union and Japan will give up their investments in long-distance fishing. They and other nations in search of fish resources have started to contract for the rights to fish in currently unexploited areas off South America, in the Indian Ocean and off the coast of Africa in exchange for building processing plants ashore and training the locals in modern fishery skills.

Given the usual preference for short-term economics over conservation, this development gives no solace to those concerned with preservation of fish stocks. The sense of urgency for action in political, economic and conservation matters is great because of what the noted economist Barbara Ward calls the "quantum jump" in the use of the oceans. Fish stocks can be depleted within a few seasons, and may even be damaged before corrective measures are taken. There are lots of good fish in the sea, but for how long?

WANTED - A NEW DEAL IN HEALTH EDUCATION*

by

E.G.A. Bernez

I am reminded of an anecdote about a little boy who asked his mother, "Mummy, where did I come from?" After delivering a treatise on conception and reproduction the mother realised that his interest sprang from the fact that Johnny next door came from Chicago!

I am reminded also, of a quotation, which may be Chinese in origin, quoted by a former governor of Sierra Leone:

"Go to the people, live among them, love them, learn from them about themselves, find out what they recognise to be their problems and help them to use their own resources to correct these problems."

These words may sound deceptively simple, but they are laden with undertones and overtones; they suggest empathy, humility, patience and tolerance, prudence and understanding. They could be translated to mean that a keen perception of people's needs and sensitivity to these needs, combined with some familiarity with scientific methodology, are the determinants for effecting change, rather than professional qualifications and pretentious titles.

For change - in attitude and ultimately, in behaviour - is what health education deals with. It attempts to change indifference into informed involvement, passivity into conviction and support, and obstructiveness into critical appraisal.

*Adapted from an address given to the Educational Priorities Committee, St. Lucia, February 1976. Dr. Bernez is Medical Officer of Health, St. Lucia.

One blends the behavioural sciences of philosophy, psychology, anthropology, sociology and economics with the learning-teaching process to stimulate an awareness of health and a recognition of total health care as a valuable personal and community asset.

HEALTH EDUCATION IN THE SCHOOL CURRICULUM

Do we need Health Education, do we want it, are we ready for it or too late for it, what impact will it make and in what areas of life? These are questions to ask in deciding whether Health Education is a priority issue in curriculum development. We must also consider how to measure its effectiveness, who will carry out the programmes and with what assurance or safeguards, and whether it will be adequately funded and followed through.

In a UNESCO report at the 2nd session of the International Advisory Committee on the School Curriculum in 1957, it is stated the harmonious development of children is the general aim of primary education "in order to enable them to develop to the fullest extent, mentally, emotionally, physically and socially, and to live a full and useful life while *in school* and in later years".

As a guide to curriculum planning, the Committee chose as its *FIRST* specific objective "To stimulate and guide the child's physical development and establish in him sound health habits".

Of the 16 hours per day, more or less, of being awake, $\frac{1}{3}$ of a child's time is spent at school (disregarding weekends and holidays) and this regular and constant crucible is obviously important for inculcating in him worthwhile ideas and ideals. The remaining $\frac{2}{3}$ is shared between family and the community, but these two areas have to be served by different organisational patterns: nevertheless, the interdependence of school - family - community life underlies all plans affecting human existence.

In the PAHO/WHO report of the Caribbean Workshop in Health Education, 1973, it recommends strongly the development of a model Health Education programme in the Caribbean, which was Resolution No. 20 of the Caribbean Health Ministers' Conference in February 1973. It, moreover, recognises and fully endorses the view that community participation is essential to improving the health of the people, and that health education is the means by which this can be achieved. I would like to state the obverse, that unless and until community participation is stimulated and dove-tailed into the formal teaching, *NO* plan, however meticulous and well-intentioned or highly staffed, can get off the ground and stay there. In an effort to clarify the Health Education concept, one group's definition was: Health Education is concerned with changing behaviour with regard to health matters and involves the meaningful participation of the community, leading to a form of organisation geared toward the promotion of the health of citizens.

No fewer than fourteen recommendations were tabled, involving Ministries of Education, Health, Agriculture, Youth, Community Development as well as community participation.

Other features described are the low priority given to Health Education in teacher training, the introduction of health courses in high schools in Puerto Rico and the resultant increased interest of the students in the subject of Health. This development heralds an era when the Health Sciences, Nutrition and Rural Science will become compulsory examination subjects in secondary school.

SOCIAL CONSTRAINTS

In one specific area of the Health Education "package", viz. education in family life and human sexuality - we have some old shibboleths to contend with and their repositories are the parents and the Church.

Many parents pretend that they believe in their child's naivete or innocence all too late to be confounded with a new grandchild, or a charge of drug usage or drunkenness and dangerous driving. These same parents clamour that any education in human sexuality will be like exposing their children to promiscuity. Surely they do not seriously delude themselves that the 20th century child is that ignorant? To provide sex education within the school curriculum is to shatter the myth of the "Forbidden fruit", by acquainting youths with the potential dynamite of their bodies and instincts, and to teach them "a sense of responsibility for their own actions".

The Roman Catholic Church is adamant in its stand against all methods of birth control other than the safe period. However, having regard to the number of illegitimate parents in our island, how do we assess the efficacy and aptness of religious teaching from 1502 on? When the children whom we hope to educate ask us questions pertaining to sex out of wedlock, etc., will we defend the perpetration of illegitimacy or defend birth control methods? And if birth control is the lesser evil, can birth control have a different value rating in or out of the married life?

When we think of our Health Education "package", therefore, let us remember the background against which it must be viewed: the school, the family and the community. Our children do *NOT* exist in a vacuum. They come in most cases from homes with a mother and, in a fair proportion, a father-albeit (a shared father), and from a neighbourhood which may be a muddy, root-crossed slum area next to an overflowing garbage dump in Marchand,* or from the nouveau riche 'citadels' of Marisule,* the isolates of La Toc,* or the rarefied enclaves of Coubareil* or Ciceron,* or the honeycomb high-density camps of the C.D.C. flats.

*Place names in St. Lucia, West Indies.

In the words of Gabriel Mistral, Chilean poet and Nobel prize winner: "We are guilty of many errors and many faults, but our worst crime is abandoning the children, neglecting the fountain of life. Many of the things we need can wait. The child cannot. Right now is the time his bones are being formed, his blood is being made and his senses are being developed. To him we cannot answer 'Tomorrow'. His name is 'Today'."

What about the people themselves, what do they have to say about their problems? Day after day, outside my office I hear a widowed mother of four lamenting her lot.

Footay moin la paix. - Let me have some peace.

*Assay enbaytey choo
choot moin.* - I have no love of even
myself, why bother me
with your problems.

*Day soo chuivre ma nee
en kai la.* - Poverty dogs me.

*Moin nee kat tee mamai
pa duex nom, papa you
koochay ko Skerett la.* - The two fathers of my
four children lay
buried in the cemetery.

CAJANAQUOTE

"One thing we have learnt is that the simple distribution of foods to vulnerable groups is not a solution to the problem (of malnutrition). It will only maintain the situation if no other fundamental action is taken."

Dr. Moises Behar
Chief of Nutrition Unit,
WHO.

PEOPLE, Vol. 3, No. 1, 1976.

NEWSPAPER CLIPPINGS

NEED FOR POWERFUL DRIVE

From the Trinidad Guardian, 11 March 1976

What is obviously needed in the implementation of any regional food plan such as that thought out under the aegis of CARICOM in response to initiative from Trinidad and Tobago is a powerful drive by all concerned towards clearly-stated objectives. Prompt action and revision and report will be called for.

So far the Region tends to suffer from a plethora of dramatic plans and grandiose statements of purpose. It used to be that the colonial rulers relied upon the practice of sending around commissions to discover what should be done. Not enough action used to follow, it seems. Now we, more or less independent peoples, are tending to rely on ministerial pronouncements and conferences which tend not to be reflected in the performance of the technical sectors assigned the tasks of fulfilling the plans.

A case in point is Trinidad and Tobago, where as high an authority as the Prime Minister has been known to deplore the superficial returns actually achieved as a result of failure to activate the kind of large-scale programme implied in the provision of the multi-million dollar food plan for the country.

The Caribbean Ministers of Agriculture involved in the proposed Caribbean Food Corporation (which it is expected will be sited in Belize) are to meet soon to finalise arrangements for the Corporation's financing and operations. As defined by spokesmen, so far, the Corporation will set out to achieve large-scale production and marketing of food within the Region at first. The output is to include livestock and dairy products.

In view of the global food situation and our regional food production deficit this is a good idea.

In meat products there is a predicted world shortage looming, expected to last for some years and to be accompanied by climbing prices. Simultaneously, with the repeated shortfall of grain production in some of the largest nations, for instance, Russia, greater pressure is being placed upon Western industrial nations to increase food production, especially grain, for themselves and for greater numbers of foreign people, thus sending up prices to all comers lucky enough to get supplies. The position in milk products is not much better.

In this context the Region will tend to pay higher and higher prices for supplies that are daily growing more uncertain.

The plain solution is, of course, that the Region must produce enough indigenous food to see it through. It is this that the Corporation will set out to achieve.

The history of agricultural production in the Region holds out at this stage more fears than realistic hopes that the objective will be early or easily achieved. The financial target of TT\$800 million is not peanuts in any language and raising that sum is going to take plenty of imagination and purpose and cooperation, greater than most other regional ventures have required.

Agricultural production traditionally in the West Indies was limited by the demand of the export market. It was in crops destined for export that most capital resources and manpower were employed. The business of producing regional food for regional bellies was left to untutored subsistence farmers and the kindness of nature.

These are no longer enough. Indeed, some expert observers have given it as their opinion that in Trinidad and Tobago, for instance, not more than 25% of potential agricultural production is realised. The rest of the Region can hardly be better off than that. The result is that there is an overdependence upon foreign foods.

We have attempted here to use a Central Marketing Agency (CMA) to encourage production on the basis of guaranteed prices and markets and to facilitate consumption by providing wholesale marketing of the output bought by the CMA. In both tasks the CMA has failed.

One of the by-products of the CMA's failure is the erratic wide ranges of prices within very short spans of time with respect to many products. Tomatoes in Port of Spain were fetching TT\$2 a pound a couple weeks ago in the retail market. This week the going price was about 80¢ a pound.

Some indifferent planning and action by the agricultural bureaucrats and technical personnel apparently resulted in there now being a pronounced and prolonged shortage of chicken and of eggs. Correspondingly, there have come cries about black marketing of these products. This is almost to be expected in the present context.

This is to be deplored. But this is not enough. It must be corrected by energetic planning and action that achieves results, despite seeming obstacles.

Efforts in the private sector and by the Government of Trinidad and Tobago to produce corn and soya beans as base for animal and poultry feed are to be counted as good efforts but these must not be unaccompanied by efforts in respect of other agricultural products.

The business of feeding even Trinidad and Tobago may well tax the Food Corporation in its early years.

Our passage from primary production to agro-industrial production demands that we exercise the best efforts we are capable of. Nothing less will ever do.

'UNUSABLE' LAND COULD PRODUCE MILLIONS OF LBS. OF FISH

By A.J. Thomas

From *The Daily Gleaner, Jamaica, 5 November 1975*

Jamaica is reckoned as having 2.82 million acres of land. Of this, 1.9 million acres are said to be arable. But this latter figure is to some extent misleading. The Jamaican concept of arable land is that it is land fit for cultivation of land crops or livestock.

This is because of the limited concept of land utilization in a predominantly agricultural country. An agriculturist's reaction to a body of inland water is that it represents lost surface unless it has formed part of an irrigation system and thus is a source of water for agricultural purposes.

The agriculturist thinks only of draining the water so as to be able to plant land crops and grow livestock if the water does not form part of an irrigation system.

The Fish Culturist's reaction is different.

He speculates about the amount of fish which can be produced in the water. The Fish Culturist knows that very often the unit-area production of animal protein in water is considerably higher than that of adjacent land. One or two examples will illustrate the difference in unit-area production between land and water.

Some years ago when I was in Zaire, I discovered that from research work conducted there, it required a herd of 42 animals and about 400 acres of grazing ground plus a quantity of artificial fodder to produce a ton of beef (that is without wastes) without attacking the cattle "capital".

Against this, a ton of fish could be produced in two acres of water if a certain amount of food was available. This food consisted of costless waste from food processing factories.

At about the same period, exhausted cotton land in the U.S.A., when planted in grass, produced 150 lbs. of beef per acre per year whilst the same land put under water produced 600 lbs. of fish per acre per year.

"UNUSABLE"

Jamaica has more than 50,000 acres of swamp lands and because they are unsuitable for agriculture or livestock, they are classified as "unusable", when in fact they could be very productive of fish. And these remarks are not confined to freshwater swamps.

Even highly saline swamps could be made to grow fish successfully and the pond fish *Tilapia* commonly called "Perch", which was introduced into Jamaica is sufficiently versatile to adapt itself to fresh as well as highly saline conditions.

In fact, two of the considerations which influence its introduction were its salinity tolerance and its ability to thrive on the natural food produced in the pond water in microscopic or higher form.

No wonder that this "Perch" has been introduced into about 150 countries including U.S.A. This species is highly suitable to Jamaican conditions biologically, sociologically and economically, unlike species I hear mentioned from time to time, which if introduced here could cause ecological havoc under Jamaican conditions.

Although the sea fisheries of the world have tended to over-shadow Fish Farming, the world still gets about 4-5 million tons from fish cultivation. The Food and Agriculture Organization (FAO) believe that developing countries could double their fish production in 10 years and strongly advocates a dramatic increase in Fish Farming.

Jamaica is in a position to do this so long as we have the will. We have the right species of fish; we have vast areas of land unsuitable for agriculture and so we would not be competing with agriculture for the same resources.

From research conducted by the author in another capacity, it should be possible to use land now producing nothing but mosquitoes (because it is unsuitable for agriculture) to produce about 1,000 lbs. of fish per acre per year.

As time goes on this rate could be increased - even doubled under certain conditions - but if we were to put 5,000 acres under fish, this could yield about 5 million (5,000,000) lbs. of fish per year. The fish would be worth about J\$3,750,000.00 a year at moderate prices.

It would be possible to so organize the venture that regular employment would be provided for about 1,500 to 2,000 persons.

AGRO-INDUSTRIAL POTENTIAL

Centralized production of fish on the scale suggested or even at a lower level would provide the raw material for an appreciable agro-industrial complex in fish products.

The fish is capable of being presented in such a condition as to command the highest price usually paid for the best quality fish. In another form it could be made to cater to the lowest price at which fish is sold.

On the matter of employment resulting from fisheries development, Indonesia is one country which should be highlighted. Up to about 1960, the cultivation of fish in Indonesia had reached considerable proportions. 290,000 acres of ponds were cultivated in brackish water; about 50,000 acres in freshwater and 128,000 acres of ricefields were used to grow fish.

At that time it was estimated that about 15 million people (or 20% of the population) were engaged in the production of fish as their main means of subsistence or as an important sideline. Fish farming is of considerable importance in a large number of countries.

MALNUTRITION IN JAMAICA

From a report by the Medical Association of Jamaica, between 35,000 and 50,000 people in Jamaica are suffering from protein-calorie malnutrition, but if peripheral or marginal cases are taken into account the number could be 100,000. More than 2,000,000 people in Jamaica are pressing hard on the available resources of arable land yet we have more than 50,000 acres of land carrying the label "unusable" when these lands or a great deal of them could be put to highly productive purposes.

Never before has the necessity for intensifying food production been greater in Jamaica and if the challenge offered is ignored, we could reap the grim harvest of *FAMINE!*

SOLAR DRYING: A LOW-COST WAY OF CONSERVING FOODS

By Eileen Cox

From the Sunday Graphic, Guyana, 26 January 1975

How many consumers, or farmers, have thought of drying foods by solar drying, that is, by using boxes to hold the heat of the sun and keep out the rain?

Mr. James McDowell at one time FAO Food Scientist at the Caribbean Food and Nutrition Institute has produced a Manual¹

¹McDowell, J. "Solar drying of crops and foods in humid tropical climates." Caribbean Food and Nutrition Institute, 1973. (Out of print)

which describes simple and low-cost ways of conserving food and crops. He thinks that enclosed, convection, solar dryers will solve the problem of wastage through overproduction and refers to these dryers as part of "grass-roots food technology" since they can be made and used by people with little training or skills.

WATER VAPOUR

In the Manual, the principle of drying is described for us. It is the transfer of moisture in the form of water vapour from the material to be dried to the surrounding air. A moist substance in contact with air will tend to give up moisture until a point is reached where the moisture content of the substance is balanced by that of the surrounding air. At this point drying will cease.

Conversely, a dry material in contact with moist air will tend to absorb moisture from the air until a similar balance is reached.

For drying to be effective in humid areas, four conditions are required:

- (1) Both the material to be dried and the surrounding air should be heated.
- (2) There should be maximum possible movement of air over the surface of the material.
- (3) Barriers to evaporation, such as outer skin of foodstuff, should be removed where possible, and the material should be cut into smallest possible pieces.
- (4) The surface area of material exposed to the air should be as large as possible.

The solar dryers that are recommended can be constructed of such materials as wood, galvanized sheets, polythene. With a few tools they can be constructed by any would-be carpenter.

If your interest is awakened you will want to know what foods can be stored after drying. Mr. McDowell describes ways of storing sweet potatoes, yams, plantains, green bananas, breadfruit.

Cassava, he says may also be dried, but should first be treated by traditional methods so as to ensure removal of toxic cyanide compounds. Actually, it seems highly dangerous as cyanide gas may build up when the cassava is dried in enclosed dryers.

Other products that can be dried include okra, onions, and carrots. Copra can be dried rapidly in enclosed dryers with great improvement in quality over open-dried copra. Full directions are given in the Manual for drying all these substances.

Green vegetables, cabbage and green leafy plants, such as callaloo need to be blanched before drying.

Blanching is a simple operation. The material to be blanched is placed in a cloth bag and dipped into a pot of boiling water and kept there for a few minutes. This is to destroy the enzymes contained in all plant material.

The reason for destroying enzymes is that they cause changes in the plant material particularly in warm and moist conditions. The amount of boiling water used should be kept to a minimum.

So, now, here is a challenge to consumers. Who will venture to build some of these dryers and test the findings of Mr. McDowell?

You consumers in the towns and villages that are supplied with electricity, kerosene oil or gas, why not try drying those excess green leafy vegetables in an oven at 130-150 degrees. They should first be cut into strips and should not be dried for longer than necessary. Therefore, remove them when they are brittle and crisp.

They may then be powdered or retained as is, but should be put away immediately in airtight containers.

You may try growing mint in your garden and then dry the leaves. You will never again need to go hunting for tea bags - your mint tea will be right there on your kitchen shelf.

HYBRID SOYA BEING DEVELOPED

From The Jamaica Daily News, 6 June 1976

Soya bean hybrids which are suited to Jamaican conditions are being developed on an experimental plot at the University of the West Indies, says Dr. Charles Panton, Technical Director of Jamaica Nutrition Holdings Limited.

After taking Agriculture Minister A.U. Belinfanti and a party on a tour of the experimental one-acre plot, Dr. Panton explained that local strains of soya could be processed in the plant shortly to be established in Jamaica.

It was hoped that the strains developed would eventually be grown on a large enough scale to supply this factory with its requirements.

According to Dr. Panton, the most successful hybrid produced on the plot has been the one labelled 'UWI 1' planted on March 19. This hybrid, which is a cross between the 'Jupiter' species imported from Florida and a variety originating in Uganda, contains 38% protein and 22.3% oil.

Tests have shown that the 'UWI 1' hybrid is capable of producing 2,000 lbs. of soya beans per acre although Dr. Panton pointed out that this yield would decrease in more extensive areas of planting.

The plot contained species of soya bean grown under different conditions and planted at different times of the year so as to test their characteristics. Drought resistance, insect

resistance and low sensitivity to the number of daylight hours were among the favourable characteristics sought in the hybrids.

It is hoped that the more successful hybrids will be grown on a large scale so that farmers may get seeds for planting and supplying the soya bean processing plant being established in Old Harbour.

Soya bean is a highly nutritious food, containing a higher percentage of protein than any other plant food. It is a valuable source of vegetable oil and an important ingredient in human nutrition and livestock feeds.

The experiment was financed by Jamaica Nutrition Holdings, the Ministry of Agriculture and Sepro Limited. The University of the West Indies provided the land and other facilities.

The U.S. is buying 700,000 tonnes of protein-rich fish meal from Peru in Chile to enrich cattle and pig feed. This would supply enough protein to satisfy the needs of 15 million people per year.

Peter Collier

In "Ramparts", 1975.

REVIEW

A STUDY OF YARDS IN THE CITY OF KINGSTON

By Erna Brodber, I.S.E.R. Working Papers No. 9

This valuable study carried out in 1972, is immensely readable and should be of interest not only to social workers, for whom it is primarily intended, but also to all those involved in delivering health or education services to Jamaicans. Research, of whatever discipline, need not be served up in boring and pedantic language and although Brodber sticks to a formal presentation, she allows herself some marvelously wry remarks and keeps to a minimum the "jargon" that has infected so many of our professions.

The basis of this research is the realization that there are "curative agencies external to our own" (Social Work), and Brodber chooses the "yard" to see in what ways that they might be positive curative agents. Moving from perceptions of the yard through a historical perspective, she roughly divides the yards for closer study into two groups: yards which are Government owned and later sometimes called "Family yards", and yards which are "Tenant yards", owned by a landlord, and where appropriate referred to as "Communal yards".

Perceptions about Government yards were generally more positive, though both types of yards were perceived as being overcrowded, under-supplied with kitchen and sanitary facilities and having an unhealthy and undesirable environment. In terms of the socializing effects of the yard, the communal yards provide a good opportunity for those women at home with young babies to talk over their problems and share the childminding tasks. The men also use the yard for domino sessions or making music together. Brodber, nevertheless, states:

"...at the same time, we sensed an embarrassment: people seemed to feel that the yard community ought not to be their source of emotional and material succour. Their dependency on it discomfitted them; they felt that they were using the wrong forms".

The most intriguing thread running through this study are the comments and observations on the women. While other sociologists have only observed certain behavioural patterns Brodber goes further than perceiving the pattern. She sees quite clearly the fuller implications of this behaviour and the way it is continued in the upbringing of the young girls:

"Women and their daughters are caught in the paradox of the inevitability of sexual activity, its ability to vitiate their life goals and its ability to further these goals."

In her recommendations she suggests that social workers can help the yard dweller to guide her daughter into curbing the sex instinct naturally and into developing her other marketable services, thus giving women a greater control over their lives, their environment and the pace of their social mobility. Also worthy of note is her documentation concerning the socializing of children, the "dating" behaviour of young people, and, in particular, the expectations of parents in varying lifestyles, for their children.

It is interesting to note that while Patterson in his paper on Urban Poverty¹ came to some different conclusions, his recommendations combined with Brodber's, give important guidelines for new attitudes and new methods of delivering social services to yard dwellers. While Patterson did not so clearly define the situation of yard women he did see the alarming waste of human potential which these women represent. Patterson is having the opportunity to put some of his recommendations into practice: we

¹Unpublished document.

hope that Brodber will also have the opportunity of influencing all social service personnel towards new attitudes and, hopefully, new solutions.

Christine Craig
Women's Bureau
Jamaica

CAJANAQUOTE

"It is against the will of God, to eat delicate food hastily, to pass gorgeous views hurriedly, to express deep sentiments superficially, to pass a beautiful day steeped in food and drinks, and to enjoy your wealth steeped in luxuries."

Lin Yutang

From "The Importance of Living".

NEWS BRIEFS

The fourth course leading to the Diploma in Community Nutrition ended in April. The 24 students from 7 Caribbean countries (and one from Nigeria) wrote their final examinations in March and then returned to their home countries to spend one month implementing the ideas and plans outlined in their project dissertations.

The projects covered a variety of themes from Backyard gardening to Schoolmeals...diabetic counselling to a study of Rastafarian diets...and curriculum revision to a cassava campaign.

Results of this examination are expected to be published shortly.

St. Kitts was the venue of the most recent Maurice Pate Seminar "to assist and support the CARICOM countries in the implementation of the Strategy and Plan of Action to Combat Gastro-enteritis and Malnutrition in Children Under Two Years of Age (SPACGEM).

Dr. K. Antrobus of CFNI and Professor D. Picou of Tropical Metabolism Research Unit, U.W.I. conducted this 2-day Seminar at which there were about 35 persons mainly from the health services.

The Honourable Fitzroy Bryant, Minister of Education, Health and Social Affairs, gave the opening address in which he laid considerable emphasis on health education as a major component of any strategy in the field of health.

The 21st meeting of the Commonwealth Caribbean Medical Research Council was held in Trinidad in April. These meetings have become a highlight on the calendar of medical activities in the Region.

CAJANUS congratulates the Council on another very successful meeting and on "attaining its majority" so triumphantly.

Guidelines to Food and Dietary Services in the Contemporary Caribbean! That's the title of the most recent publication of the CFNI Printing Unit. Like "Guidelines to Young Child Feeding", it is based on the reports and opinions derived from a Technical Group Meeting held in 1970.

In these Guidelines there is a wealth of information especially for those who must organise food and dietary services for hospitals and other institutions. Of particular interest is the fact that the Food Service Supervisor, unknown in the Caribbean until that Meeting, has since become an established cadre in the institutional food services.

A meeting of the technical staff of CFNI and the other nutritionists in the PAHO Zone programme took place at CFNI on April 29 and 30. The main objective of the meeting was to prepare an integrated programme of work for the Caribbean up to the end of 1976.

It is expected that henceforward such meetings would take place at least twice a year.

FROM THE EDITOR

CARIBBEAN FOOD PLAN: ADD NUTRITION NOW!

In recent years there has been a noticeable shift in emphasis throughout the world towards national food and nutrition policies. The English-speaking Caribbean has been well in line with this trend, starting with Guyana's commendable goals "to feed, clothe and house ourselves" enunciated some five years ago.

Since then other Caribbean countries have either formulated their own national policy or are making progress towards this end. Even more recently, however, has come the development of the Caribbean Regional Food Plan which, it is hoped, will assume the more worthy title - Caribbean Regional Food and Nutrition Plan.

To devise a Regional Plan seems eminently logical, though intrinsically ambitious and probably fraught with the well-known hazards endemic in the regional concept. But the Plan must also be seen as a pragmatic exercise in which the physical and other attributes of the various territories, e.g. arable land, energy sources, communications, are complementary to each other and ought to be exploited to the advantage of the entire Region.

By now, there should be a sufficiently broad base of common problems and aspirations and a level of common understanding on major regional issues, coupled with the proof that important regional institutions like the Caribbean Community (CARICOM) and the University of the West Indies are workable, to create the necessary feeling of optimism about the future of the Food and Nutrition Plan.

The course is now set and the instruments for the operation of the Plan approved. Our plea is that, amidst the justifiable overwhelming concern for its economic aspects, due consideration

should be given at every stage in the development and implementation of the Plan to its nutrition component. Only then can we expect the type of dividends that will enhance the health and nutritional status of the people of the Caribbean.

THE EDITOR

THOUGHT FOR FOOD

In the Sahelian region of Africa, where drought and famine are rampant, thousands of the best acres and a large share of the scarce water resources are assigned by multi-national agribusiness corporations to the production not of foodstuffs for the native population but of raw materials and other products for marketing in the developing world.

*Geoffrey Barraclough,
reporting the findings
of the Transnational
Institute, New Yorker
Review, January 1975.*

TOPICS AND COMMENTS

POSITIVE SIDE OF CARICOM FOOD PLAN*

By Carute James

The launching of the Caribbean Food Corporation (CFC) is not without an element of historical importance.

Indeed, it could be justifiably said that with the Food Corporation, and with the plans for the schemes and programmes which the Corporation will administer, the Caribbean Community is at last beginning to come to grips with more of the basic economic problems facing the four-and-a-half million people of the Region.

For one with the accent on agriculture and the consumption of food produce within the Region, the efforts at economic integration have been shifted from the accent on all too often false industrialisation.

For the past three years the Community has been concentrating on the production and exchange of a range of manufactured consumer goods which were in keeping with the aspirations of "development" which the Region inherited.

The attempts at regional integration have been based on exchanging what are in effect goods with a production base which is extra-regional.

Such a situation allowed for the abuse of rules which allowed for preferential tariffs and also deterred the use of local raw materials where possible.

In short, the situation was more to the advantage of local agencies of the transnationals and the merchant middlemen than it was to the direct benefit of the people of the Caribbean.

The Caribbean Food Corporation represents, therefore, a change from the "smokestack" syndrome of development.

*From *The Jamaica Daily News*, 1 October 1976.

To this extent, its operations are likely to be opposed by elements within the Community who will be affected by the increased accent on agriculture.

This does not necessarily mean, of course, that the coming of this new venture in agriculture and agro-industry will be the panacea for the Region.

In fact, it is already apparent that as far as positively correcting the ills of the traditional agricultural production structure in the Commonwealth Caribbean the CFC will have little chance.

CARICOM Secretary-General Alister McIntyre has seen the Corporation and the Food Plan which it will administer, as giving the Region's small farmer a chance to appreciate that the Caribbean Community is not just another bureaucratic imposition.

Mr. McIntyre feels that the new organisation will give the hundreds of thousands of small farmers the chance to fully involve themselves in the productive machinery.

However, there must come a time when the question of how long the "small" farmers will remain "small", will have to be seriously examined.

In the medium-term, it makes no sense whatsoever to launch and direct something as ambitious and at the same time as rational as the Corporation and have it flounder because of the same problems which have afflicted the Region's agricultural production.

There is, therefore, the important area of agrarian reform which, if it does not precede something like the Corporation and the Food Plan should be made part and parcel of the effort.

However, one comes up here on the problem of regional as against national interests. There are very few countries within the community which would be willing to have a regional body even suggest how they should run their domestic affairs.

One of the more positive long-term prospects of the CFC, however, is the extent to which it will be attempting to improve the diet and the health of the people of the Community.

The figures on malnutrition, as provided recently by the Caribbean Food and Nutrition Institute are themselves frightening.

There are 6,000 CARICOM toddlers who are estimated by the Institute to be chronically malnourished and in imminent danger of death.

Between 60,000 and 90,000 others are classified by the Institute as being malnourished.

Anaemia is common among women and infants and about 50% of pregnant Caribbean women are anaemic.

The statistics tell the same story all over the Caribbean. To this extent, the new food venture is expected to improve the health of the Region.

There is also the fact that the livestock development programme which the Corporation will be administering will be occupying about one million acres of land, most of it presently unused.

Hundreds of thousands of acres more will be under direct cultivation with corn and soya in Guyana and Belize, and fruit and vegetables in the islands of the Eastern Caribbean.

The prospects for employment are not so bright. The 26,000 jobs which these plans will be providing is relatively small, and not significant enough to seriously improve the fortunes of the hundreds of thousands of jobless in the contributing countries.

Despite this, it would be foolhardy for anyone to underplay the potential of the Corporation and the regional plans for agriculture.

Unlike past efforts at production within the Community, the raw material input for the food venture is all regional.

Whatever is needed from outside the Region, the Corporation is in a position to purchase wisely, in bulk, on behalf of the contributing countries.

But even more significant, and more indicative of the positive footing on which the Caribbean Food Corporation is starting is the first major undertaking which the political heads of the Community have agreed to, without the usual arguments about who is benefitting at whose expense.

CAJANAQUOTE

"...one can't go in with a new seed...and bring in a scientist and revolutionise productivity. One has to come up with a whole package of practices and inputs - in institutions, in the village community - in order to make any solid progress."

E.M. Martin
U.S. Coordinator - World
Food Conference

Quoted in *New Scientist*,
No. 909, p. 342, 8 August,
1974.

CASSAVA RESEARCH BRINGS RESULTS*

Cassava is a tropical root crop that is a staple food for an estimated half-a-billion people in the developing countries of the world. However, partly because of its low protein content, and also because it is highly perishable once harvested, it has been largely neglected by researchers until recently.

In spite of these limitations, cassava does have enormous potential, not only as a food crop, but also as a source of cattle feed and for its starch content, for which it has long been exported. Over the past four years the IDRC¹ and the Canadian International Development Agency (CIDA) have provided close to \$4 million in support of an international cassava research programme - and the results as the programme enters its second phase are impressive. They include:

- identification in Colombia of varieties that yield more than three times the national average yield without greater inputs;
- control of bacterial blight;
- identification of strains resistant to many of the major insect pests;
- development of methods of rapid propagation;
- improved methods of processing and storage.

As part of the research programme, involving many countries of Africa, Asia, Latin America and the Caribbean, the IDRC organized a series of workshops bringing together scientists to study various aspects of cassava research. At one of these international workshops recently, participants urged that the capabilities of cassava producing countries (there are more than 80)

*From "IDRC News", No. 21/76.

¹International Development Research Center

be strengthened by increased training facilities for both research and production workers, and through improved support, technical guidance and coordination among national programmes.

The two cooperative research projects for Asia and for Latin America to which IDRC is contributing \$380,000 and \$379,000 respectively, were proposed as a direct response to these priorities. The overall objective will be to improve production systems, through new varieties, and utilization of cassava in many countries of the two regions, and to ensure that the useful results of further applied research are demonstrated and made available to the farmers of each region, through distribution of improved varieties.

Training facilities will be extended at both the professional level and in intensive production and utilization systems, and follow-up programmes will provide continuing guidance for trainees after they complete their studies.

"ARABICA AND ROBUSTA"

Two types of coffee are of commercial importance - arabica and robusta. Arabica coffee, which produces a flavourful aromatic beverage of high quality, commands a price premium over robusta. Most of the former's production is in Central and South America while almost all the latter is grown in Africa and Indonesia. Although coffee is produced in about 60 countries - all, with the exception of Hawaii, developing countries - the 10 major producers account for approximately 70% of total world production. Brazil alone produces on average a little over 30%.

PEANUTS - AN UNAPPRECIATED FOOD*

By Roslyn B. Alfin-Slater and Derrick B. Jelliffe

Like so many other foods, the peanut originated in tropical America and subsequently spread around the world. At present, the United States is one of the world's main producers, with large crops cultivated in the warm Southern states.

Despite its name, the peanut is not a nut but a legume, more akin to beans and peas than to walnuts, pecans and almonds. As indicated by its other name - groundnut - it has the unique feature of a pod that grows from the stalk back into the ground, where it then ripens.

LOW RATING

In the U.S. the peanut is used mainly as a source of edible oil, and the "presscake" left after this expulsion process forms a valuable source of protein for animal feeds. In Western countries the peanut is largely unappreciated as food for humans, being more a snack item eaten roasted, salted or in candy.

In other parts of the world, however, the peanut is a crucial item in the diet. A protein-rich sauce composed largely of boiled peanuts is eaten with a mainly carbohydrate staple, such as cassava or plantain, and dishes based on the peanut may even be national specialties.

RICH IN PROTEIN AND FAT

Peanuts are exceptionally concentrated foods, rich in both protein (about 28%) and fat (about 49%), with a consequent high level of calories. As with other legumes, although peanut protein

*Reproduced from Los Angeles Times Home magazine, 25 July 1976.

is incomplete in that it lacks adequate amounts of some essential amino acids, the other amino acids contained in their protein efficiently complements those of cereal grains, such as wheat, corn or rice.

Because of this, many low-cost weaning foods have been prepared in recent years for use in developing countries, using a peanut-flavour cereal-grain base. *Balahar*, based on peanut, chick-pea and wheat, has been widely distributed in India. Nearer home, a quite underappreciated protein "double mix" is the peanut butter sandwich, which is, in fact, an excellent combination of the plant proteins of the bread and the peanut.

NEEDS MORE PROMOTION

The peanut should be used more than current information indicates, especially as the prices of other protein foods have risen so steeply. The defatted roasted preparations can supply protein without a concurrent calorie load. More particularly, there could be increased promotion for the use of peanuts in such dishes as stews and sauces.

So far, however, the peanut industry does not seem to realize the potential of this additional use of their product. The tasty results would almost certainly have a wide appeal and be a nutritional bonus to many dishes.

From the point of view of world food shortages - particularly of protein-rich items - the present-day U.S. peanut stockpile of 800 million pounds of peanuts and 100 million pounds of oil is a typical modern paradox, similar to the "dried skim milk mountain" that has accumulated in Europe in recent years. Money seems to be the "instrument of command". The economics and politics of foods seem to be more important, while nutritional needs are usually secondary considerations.

FROM BARREN WASTELAND TO FOOD FARM*

By Henry Constantine

The agricultural cooperative organised and run by the South West St. Andrew Citizens' Association (SWSACA) is situated at the western end of the "Grasspiece" lands in Union Gardens, West Kingston. When one looks at this plot of fertile, food producing land that is cultivated in rows of lush green vegetation, one is at once delighted and astounded if one but knew of the barren waste that existed there before.

Recently I visited the farm for the first time and was awed by what I saw. I spoke with a number of farmers working on the project, with a prominent member of SWSACA and also an officer of Project Land Lease. My purpose: to learn of the farm proper, its background, and operations.

I learnt that the idea of transforming this barren wasteland into this beautifully cultivated food farm was triggered by the concern to engage the youths of the area in purposeful endeavours, and also by the fact that rural youths were deserting the farms and coming to the city. Hence it would be praiseworthy if urban youths could be cycled to the rural areas to take up where their counterparts left off.

With this in mind Government was petitioned for the Grass-piece lands to set up a cooperative food farm. A plot of 16 acres was granted to accommodate the project.

The role envisaged for this experimental cooperative, it was pointed out, was and still is:

- Motivating the youths of the area into participating in gainful endeavours.

*From *The Jamaica Daily News*, 21 March 1976.

- Training them in the skills of farming in the hope that with proper incentive they would be willing to migrate to the rural areas and engage in that pursuit.
- To teach techniques of cooperation through working together in unity.
- To train those who participate into becoming worthy Phase 3 Project Land Lease contenders.
- To instil in them the love for this happiest of pursuits - farming.
- To supply the community with agricultural produce.

At the time of my visit there were 12 farmers engaged in cultivating the farm. Their aim is to graduate to Phase 3 of Project Land Lease. Phase 3 is the point reached when a farmer is given a plot of seven acres, a house, farming equipment and a loan in order that he may live and cultivate this plot for the betterment of himself and Jamaica as a whole.

The initial cultivation of the farm got underway in February 1974. To finance it, credit was obtained through Project Land Lease for the purchasing of tools, seeds, sprays, fertilizers and other farming necessities to the tune of J\$9,000. To repay this loan it was agreed that 20% of each harvest was to be sold to the Agricultural Marketing Corporation (AMC) and of the monetary returns from this, 75% was to be paid to Project Land Lease.

The cultivation of the farm is done solely by members of the association. The crops cultivated are Irish potatoes, string beans, patchoi, lettuce, sweet peppers, calaloo, corn, okra, garden eggs, red peas, gungo peas, cucumber, tomato, pawpaw and carrots.

The selling of those crops is done through a number of outlets. In keeping with the Project Land Lease agreement, a portion is sold to the AMC and the remainder to members of the community, to depressed areas, higglers, etc. The system outlined, whereby farmers are remunerated, is as follows: After the harvesting and selling of each crop, from the returns received, a portion is used to repay installments on loans. The remainder is then accumulated and at given times farmers are paid a proportionate sum. The time factor involved in this system is anywhere between three to six months.

Many farmers accustomed to weekly returns, found this system quite burdensome and as a consequence became disillusioned. Some simply did not return, while others sought employment elsewhere. It was pointed out that moves were afoot to change this outdated system and introduce one whereby the farmer would be paid in a manner consistent with the trend of payments in the city.

The consensus of those with whom I spoke was that they had a good thing going, and that with continued hard work, outside assistance and a little blessing, the progress and security of the farm would be guaranteed; and that in the not too distant future it should be turning out the farmers of tomorrow.

SNAILS, ANYONE?

The Swiss eat so many snails that snail hunting has been banned for three years to save snails from extinction.

- The Daily Gleaner, Jamaica
1 October 1976

CARIBBEAN DIETETICS IN TRANSITION*

by

Manuelita Zephirin

Six years ago the Caribbean Food and Nutrition Institute convened a Technical Group Meeting to consider Food and Dietary Services in the Contemporary Caribbean. The main objective of this Meeting was to discuss the future development of dietetics in the Region. Participating in this Meeting were dietitians and nutritionists from the Bahamas, Barbados, Bermuda, Guyana, Jamaica and Trinidad & Tobago. It was at this Meeting that the Caribbean Association of Nutritionists and Dietitians was conceived.

Therefore, 1970 can be regarded as the beginning of a regional approach to nutrition and dietetics in the Commonwealth Caribbean. Since then, considerable progress has been made in dietetics in this Region. Whereas in 1970 only one country had a nutrition unit, today four countries have well established nutrition units all with fully qualified nutritionists. One country has as many as eleven nutritionists, all with M.Sc. level qualifications, plus eight professional dietitians. Dietitians have been appointed to two of the Lesser Developed Countries and two others have now budgeted for these positions.

TRAINING

Training programmes for Food Service Supervisors have been taking place in the Eastern Caribbean since 1972. These programmes have gained recognition from the American Dietetic Association.

*Based on a Keynote Address presented at the Annual Meeting of the Caribbean Association of Nutritionists and Dietitians, 7 July 1976. Miss Zephirin is the Public Health Nutritionist at the Caribbean Food and Nutrition Institute.

Four regional courses have now been conducted and over seventy persons from fourteen territories have successfully completed these courses. All these persons are now employed as Food Service Supervisors/Dietetic Assistants in all but one of the territories. In Jamaica, the training of dietetic assistants has for several years taken place in the Institutional Management Division of the College of Arts, Science and Technology, and it is estimated that approximately sixty-five dietetic assistants are employed in hospitals throughout Jamaica.

ORGANIZATION OF DIETARY SERVICES

A look at the organization of dietary services in the Region reveals that the practice of placing dietary departments under the direction of the nursing service prevailed in many countries for a long time. More recently, however, the responsibility for dietary departments is being assigned to professional dietitians and in some instances, to the Food Service Supervisor/Dietetic Assistant, with consultant advice available from a professional dietitian.

In many territories administrative reorganization has been accompanied by an improvement in physical facilities, a redefining of objectives and standards for dietary departments and the establishment of in-service training programmes for all levels of food service staff.

Policy and procedure manuals, diet manuals and training manuals have been completed in some territories and are being prepared in others.

In some countries priority is being given to the development of nutrition and diet therapy surveillance systems in the hospital and public health service.

The traditional pattern, in which there was a clear separation of function and personnel into hospital and community categories, is being replaced by an integration of nutrition and dietetics services. This integration will provide a balanced service to the community as part of the overall planning for comprehensive health care.

RESPONSIBILITY OF THE PROFESSION TO THE COMMUNITY

Protein-calorie malnutrition of early childhood and diabetes are the two most prevalent nutritional disorders in the Caribbean today. Mothers and children make up 65% of the population in the Caribbean countries. Morbidity and mortality rates among mothers are higher than they are in more developed countries. Anaemia is common among expectant mothers.

In the first two years of life the mortality rate among children is greater than it is in North American children. This is mainly due to combined protein-calorie malnutrition and gastroenteritis.

Breast-feeding has been abandoned in the face of unscrupulous advertising of imported artificial foods. There is little nutrition education in the schools or in the community.

We are all familiar with the special importance of diabetes mellitus of late onset in the Caribbean Region. Diabetes affects at least 100,000 West Indians and its detection and treatment are estimated to cost EC\$100 million. A large number of cases are not recognized until some major complications develop. Half of the diabetics in the Caribbean are not diagnosed and about half of those who have been diagnosed and under treatment, have defaulted and are not under control.

The dietitian and the nutritionist must involve themselves in the prevention of diabetes and its complications and in the prevention of protein-calorie malnutrition.

Despite the statistics, which reveal that many of the diseases occurring in the area are preventable, there has been little emphasis by dietitians on preventive health care. The practice of dietetics remains largely hospital based and concentrated on acute care services. No real contribution can be made to control these major health problems on the basis of the hospital alone. Much broader services are required to reduce the incidence of nutritional problems. The change from the restricted focus on hospital dietetics and therapeutic treatment is an important area of development for the profession.

NATIONAL FOOD AND NUTRITION POLICY DEVELOPMENT

In the 70's, 80's and 90's, feeding people will assume increasing significance in our social and economic development. The rapidly growing interest in the formulation of national food and nutrition policies in this Region has significant implications for the dietitian and nutritionist. Designing means of more equitable distribution of food to ensure adequate nutrition at all levels of society, reducing dependency on food imports, reducing significantly the prevalence of malnutrition in vulnerable groups are all a central component of the fundamental focus of national planners.

Those who belong to the field of nutrition and dietetics must have a role to play in the development of national food and nutrition policies. In dietetics, there is the unique opportunity to teach individuals of the community, as well as officials in the political and administrative ranks of Government, to understand, support and implement nutrition activities which result in the identification and development of sound national food and nutrition policies.

THE DIETITIAN AS A MEMBER OF THE HEALTH TEAM

The Caribbean dietitian of the 70's is a multivalent individual who very often must wear two separate hats simultaneously; one covering the professional working with the medical team for the maintenance of good health and the treatment of disease by diet; the other covering the competent administrator organizing, planning, directing and controlling the operation of a dietary department. Fortunately, a dietitian's academic training and internship provide the necessary foundation to perform both aspects of the job.

Dietitians in the Region have expressed concern about their "image" and there is much discussion about the lack of "status". The "image" of the member of the profession of dietetics directly reflects how effectively we have worked with others and the result of how we have applied ourselves on the job. Dietitians should seriously ask themselves the following questions:

- Do we show by example how the dietitian fits into the situation as a member of the health team?
- Have we ever tried to improve the public concept of a dietitian's work? Do we have an informative answer for people who when we mention that we are a dietitian comment: "Oh then you must be a good cook"?
- Are we able to tell the public what we, as dietitians, do? Do we identify ourselves with other organizations? Do we use such contacts to tell about our profession? Do we ever talk to groups about our work? Do we look for opportunities to speak?
- Do we make use of local newspapers to help educate the public about nutrition and dietetics?

Status must be earned by performance; it cannot be simply demanded. The chief prerequisite for attainment of an acceptable status by dietitians is doing a good job. Many dietitians are striving towards this goal but there are also many who would do well to examine their departments objectively and to consider whether they deserve the status they seek.

Certain emotional connotations of the word "dietitian" often present at a subconscious level makes many dietitians undervalue themselves. In cases where this situation exists, dietitians must themselves dispel their lowered image and take a more positive attitude towards their own functions and potential.

Dietitians have mentioned lack of time as a primary deterrent to ideal role performance. This can be resolved by the effective utilization of the Dietetic Assistant/Food Service Supervisor. This will permit the dietitian to fulfil her professional functions and to develop innovative services.

PROBLEMS AND SOLUTIONS

The most critical problems facing dietitians and nutritionists in the Commonwealth Caribbean are, first, lack of professional manpower and second, inadequate utilization of those who are currently available. As a long-term solution to the first, it has been recognized that there is a need to develop a local degree course in nutrition and dietetics. At the 1973 Annual Meeting of CANDI, a resolution was passed that a degree course be given priority by the Governments of the Region. This was forcefully reiterated in the 1974 *Human Resources Study in Nutrition, Dietetics and Home Economics in the Caribbean Region*, carried out by PAHO/WHO Consultants, Dr. Bertlyn Bosley and Miss Eunice Warner who recommended that: "The University of the West Indies give immediate and favourable consideration to the establishment of a

degree course in nutrition, dietetics and home economics to train professionals in these fields". It is hoped that this programme will soon be a reality.

While promoting the educational development of her own profession, the dietitian and nutritionist must assist in the professional education of other members of the health team. Nutritionists and dietitians are going to need to utilize the assistance of other professional and non-professional workers who can be trained to carry out programmes. This would enable the nutritionist and dietitian to direct the total nutrition service within a community and to take her place as a member of a team of specialists who are available as consultants to those who provide direct service to individuals.

The preparation of personnel of many different levels with different responsibilities, but with one primary goal - the health care of the countries to be served, has begun. The Regional Project for the Training of Allied Health Personnel is well established and is based on a network of educational institutions throughout the Commonwealth Caribbean. Five regional centres are located in the Bahamas, Barbados, Guyana, Jamaica and Trinidad & Tobago. Training is provided at the aide level and technician level. The Division of Health Sciences, Barbados Community College, has already started a programme at the aide level (Food Service Supervisor) and will shortly initiate a two-year Dietetic Technician Programme.

We can soon expect a varied group of technicians and aides in the field. The nutrition assistant, dietetic assistant, food service supervisor and dietetic technician can all assume some of the sub-professional functions and activities currently carried out by dietitians and nutritionists. In-service training of personnel already on the job should also not be overlooked. Indeed, it can be of great importance in gaining the support of all personnel in working to improve the nutritional aspects of patient care.

CONTINUING EDUCATION

The need for the continued education of those now practising in the profession of dietetics cannot be overemphasized. The only way for the profession to remain viable is for individual members to accept the responsibility for keeping abreast with change through continuing education. It is through continued study and learning that the professional meets the obligation of service, that is, to give the best service possible. It is by such means, that the dietitian learns how to realize her potentialities and to use her initiative in meeting the constant challenge of change.

ACCEPTING THE CHALLENGE

Dietetics in the Commonwealth Caribbean is in transition. It is a profession marked by expanding responsibility and increasing opportunity.

A challenge exists, the acceptance of which lies in the decisions reached by each dietitian and nutritionist. Any commitment made is serious and important for the level of nutritional health in the Caribbean. The boundaries of commitment, however, can no longer be confined to areas within hospital walls for the great majority of people needing health care are not in hospital. They are in the community.

We have to recognize the need for fundamental changes in our attitudes and in our systems if we are to serve adequately the people of the present-day Caribbean. It is not enough to respond to requests for services, we must initiate plans, implement and evaluate programmes and services and become intimately involved with the changes taking place in the delivery of health services and the provision of health care. Whether or not we are alert to these changes and to what extent we can contribute depends upon our personal commitment and willingness to free ourselves from stultifying traditions and to surmount the obstacles that will inevitably appear.

BREAST-FEEDING AND MATERNAL AND CHILD HEALTH*

by

Ron H. Gray

INTRODUCTION

In recent years breast-feeding has been increasingly displaced by artificial feeding, both in developed and developing countries. A number of authorities have expressed concern over this changing pattern of infant nutrition, since it is felt that artificial feeding constitutes a health hazard. However, the problems are complex, and in order to maintain a balanced perspective, it is necessary to consider the factors underlying the change in infant feeding practices, the medical advantages of breast milk compared with artificial substitutes, the demands of lactation on the nutritional reserves of nursing mothers, and the need for postpartum contraception. The following account is intended merely as a summary of the main points.

SOCIO-ECONOMIC FACTORS AND THE CHANGING PATTERNS OF INFANT FEEDING

The trend towards artificial feeding arises from a combination of poorly understood social and economic factors. Breast-feeding is universal in traditional cultures, but the process of "modernization" lends to new social norms whereby artificial feeding is identified with an image of sophistication, convenience and aesthetic cleanliness. These new norms have sometimes been reinforced by medical practice and opinion, and by the skilful

*Reproduced from the "IPPF Medical Bulletin, Vol. 9, No. 6, 1975. The author is from the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT, England.

advertising produced by manufacturers of baby foods. The form and content of commercial advertising material can be grossly misleading and, on occasion, even unethical.

Economic pressures have reinforced these social processes, as an increasing number of women now seek employment outside the home and cannot combine work with prolonged breast-feeding. Although female employment may interfere with nursing, a woman's income may be an essential component of the household budget; so the economic benefits to the welfare of the whole family can, under some circumstances, outweigh the costs and disadvantages of artificial feeding. However, the dilemma of the working mother will only be resolved by improvements in paid maternity leave, which allow her to reconcile nursing with employment.

The drift towards bottle-feeding engendered by the pressures of socio-economic change has been most pronounced, and is potentially most dangerous among the urban poor in the rapidly growing cities of the Third World. The urban slum dwellers are a disadvantaged group in which cultural dislocation and poverty interact to erode traditional breast-feeding practices, and to increase the hazards of artificial feeding.

THE MEDICAL ADVANTAGES OF BREAST-FEEDING

Human breast milk fully satisfies the nutritional requirements of the growing infant up to the age of approximately six months. Studies have shown that breast-fed babies lose less weight after birth than do artificially-fed infants, and subsequent growth patterns suggest that breast-fed children have a reduced risk of both undernutrition and overnutrition. Lactation in effect provides a natural homeostatic mechanism. Also, human breast milk contains the optimum combination of nutrients, whereas many artificial feeds are "unphysiological", and require dilution or other modification. For example, cow's milk contains excessive quantities of solutes such as sodium, potassium, calcium,

magnesium and phosphorus, which may be detrimental to the health of infants. The high butter-fat content of cow's milk has been associated with infantile obesity, and the "foreign" protein of cow's milk or cereals may lead to infantile allergies and even intestinal obstruction.

Artificial preparations can be adequate for infant nutrition, but in poor societies ignorance and economic constraints may induce the mother to use inappropriate or insufficient artificial feeds which do not meet the needs of the growing child. Commercial feeds can cost as much as 40% to 60% of the minimum wage in some countries. So it is not surprising that women often resort to cheap, largely carbohydrate-containing foodstuffs such as gruels, which may resemble milk in colour and consistency, but not in nutritional value. Furthermore, the high cost of commercial feeds may force mothers to use excessively diluted amounts of the more expensive preparations. Thus, artificial feeding is vulnerable to socio-economic pressures, and this vulnerability constitutes a threat to infant nutrition in poor communities.

Breast-feeding has an important role in the prevention of infection. The colostrum produced during the early stages of lactation provides maternal antibodies which protect the infant from a broad spectrum of diseases. Also, human milk makes the infant's stools more acidic and this inhibits the growth of pathogenic intestinal organisms. However, the most significant protective factor associated with breast milk is the reduced risk of bacterial contamination. Although human milk may not be entirely sterile, it seldom contains pathogenic organisms, whereas artificial feeds are frequently contaminated during preparation and storage.

Even in affluent societies, it can be difficult to maintain the high standards of hygiene required for safe artificial feeding, but in poor societies the combination of inadequate hygiene, lack of facilities, and ignorance makes the maintenance of sterile feeds

an impossibility. There is clear evidence that dangerous gastrointestinal infections are less frequent and less severe among fully breast-fed infants than among children receiving an artificial diet, and even the introduction of supplements to a largely breast-fed baby significantly increases the risk of infection by contamination. Moreover, the occurrence and severity of a variety of fevers and respiratory and ear infections are lower in the breast-fed.

During the course of weaning, breast-fed infants encounter an increased risk of diarrhoeal disease, but this risk is lower if weaning is delayed to an older age, and deaths from diarrhoea associated with weaning are markedly reduced if the child is breast-fed for 18 months or more.

There is a complex interaction between nutrition and infection. Poor nutrition increases the susceptibility to infection, and infection severely undermines nutrition, setting up a vicious circle of ill health which frequently culminates in fatal protein-calorie malnutrition (PCM). Breast-feeding mitigates this process, and the mortality of breast-fed infants is frequently much lower than that of those artificially fed.

In summary, breast-feeding has overwhelming medical advantages over artificial feeding in terms of the balance of the "physiological" constituents, nutritional value and protection from infection. Therefore, breast-feeding should be actively encouraged as a public health measure, especially in poorer societies. However, one cannot universally condemn artificial feeding, since there may be circumstances where economic considerations and suitable hygienic standards make artificial feeding comparable to, if not preferable to, breast-feeding.

LACTATION AND MATERNAL NUTRITION

Lactation, of necessity, makes demands upon maternal nutritional reserves and, conversely, the nutritional status of the mother may influence the quality and quantity of the milk produced. Therefore, in reviewing breast-feeding and maternal and child health, one cannot ignore the complex problem of maternal nutrition during lactation, and indeed during the preceding pregnancy.

It is difficult to arrive at precise estimates of maternal nutritional requirements during lactation, since these vary with the duration of lactation, the nutritional status of the woman, and the energy demands associated with physical activity. Furthermore, it is technically difficult to estimate the efficiency of the metabolic processes required to convert dietary constituents into breast milk. For example, the transformation of dietary carbohydrates into breast milk appears to be very efficient, but protein transformation may be relatively inefficient. Despite these measurement problems, recent studies suggest that during the first six months of lactation women require an additional intake of approximately 550 kcal and 17 grams of high-quality protein per day. There is also an increased need for other nutrients such as iron, calcium, vitamin A, vitamin D, niacin, riboflavin, folic acid and thiamine.

In affluent societies most women have an adequate diet and sufficient nutritional stores to compensate for the increased demands of breast-feeding, but in poorer societies this is often not the case. In developing countries, women are subjected to a variety of nutritional stresses caused by (1) inadequate diets, (2) the demands of recurrent pregnancy and lactation associated with high fertility, (3) the energy requirements of hard physical work, (4) the adverse nutritional effects of infection and parasitic diseases, and (5) traditional customs which proscribe certain foods or lead to an unequal distribution of food within

the family. All these factors interact and produce a "continuous, cumulative nutritional drain", which has been described as the "maternal depletion syndrome". Lactation plays an important role in the genesis of this chronic maternal undernutrition, and in extreme cases lactation may even precipitate frank malnutrition. Furthermore, these poorly nourished mothers tend to have low birthweight infants who suffer from an increased risk of morbidity and mortality. Therefore, breast-feeding women should be considered a high-risk group in the community and special attention should be paid to their diets.

The effects of maternal nutrition on the adequacy of breast milk is poorly understood, as the relationship varies with the different chemical constituents of the milk, the status of the woman's nutritional stores, and her current dietary intake. Although mothers on relatively poor diets seem able to provide sufficient milk for their children, this may have debilitating long-term consequences for the woman, as she is forced to consume her own body reserves. For example, in India lactating women were found to have an average deficit of two grams of protein per day.

Women with very inadequate diets or frank malnutrition, have a reduced milk volume, and the energy content of the milk may be lowered by a decline in the lipid constituents. The protein and carbohydrate components of the milk appear to be relatively unaffected, even in extreme cases, though the concentrations of some vitamins may be significantly decreased. The poor milk supply associated with maternal malnutrition can in turn lead to unsatisfactory infant nutrition, especially among the low-birth-weight babies who need to compensate for inadequate intrauterine growth. There is, therefore, a link between maternal malnutrition and subsequent malnutrition in the offspring.

A number of studies in poor societies suggest that maternal dietary supplements may improve the milk supply and composition, and enhance the mother's nutritional stores. Further investigations are required to determine the nature and quantity of the optimum dietary supplement, but meanwhile, lactating mothers should be considered a high-priority group for additional nutritional care, in order to protect the health of both the woman and her child.

LACTATION, CONCEPTION AND CONTRACEPTION

The fertility of breast-feeding women is significantly lower than that of non-breast-feeding women, as the suppression of ovulation and the amenorrhoea associated with lactation provide a contraceptive effect. Traditionally, breast-feeding was used as a method of birth spacing, and the recent trend towards artificial feeding may result in reduced birth intervals and an unwanted increase in fertility. However, the contraceptive protection afforded by breast-feeding is only partial; it diminishes with the longer duration of lactation and with the introduction of supplementary feeds. It is therefore important to provide modern post-partum contraception for nursing mothers. Such protection is vital, since a supervening pregnancy will decrease lactation and may lead to premature or precipitate weaning. One study in Senegal showed that, during the second year of life, children who were weaned when the mother was pregnant had twice the mortality of children who were weaned when the mother was not pregnant.

There is an urgent need for postpartum contraception in both lactating and non-lactating mothers. However, the choice of the most appropriate contraceptive for breast-feeding women is a more problematical issue.

There have been numerous studies to assess the effect of oral contraceptives on lactation, but there is some confusion in the literature owing to the wide variety of drugs used, differences

in the methods of measuring lactation, and differences in the length of observation. The majority of studies show that combined oral contraceptives diminish lactation, and the most frequent adverse findings are a decrease in milk volume, and increased need for supplementary feeds, and, less frequently, the premature cessation of lactation. There may also be a detrimental change in milk composition, but the data are inconclusive.

The adverse effects of combined oral contraceptives appear to be related to the dose of oestrogen, though even the low-dose preparations may decrease lactation. It is noteworthy that these findings have been reported frequently in developing countries where the prevalence of breast-feeding is high, and the hazards of artificial feeding most acute.

The decline in milk production associated with oral contraceptives can be sufficient to impair infant growth, and the early introduction of supplementary foods increases the risk of infection. Furthermore, the reduced milk supply may induce mothers to discontinue contraception, and if women attribute inadequate lactation to oral contraceptives, it may engender negative rumours which undermine the acceptance of family planning in general.

There are, therefore, significant drawbacks to the prescription of combined oral contraceptives for breast-feeding women, and as yet there is no consensus on when oral contraceptives can be safely introduced during lactation. Two reviewers suggest that the low-dose oestrogen-containing Pill can be prescribed when "lactation is fully established", or six weeks to three months postpartum. However, some investigators from developing countries feel that oestrogen-containing oral contraceptives may not be suitable for breast-feeding women in the Third World.

Studies of women using the IUD, continuous oral progestagens, or injections of long-acting progestagens, have shown no deleterious effects on lactation. There is even some

evidence to suggest that lactation is enhanced by the progestagenic methods. Therefore, in my opinion, these non-oestrogen-containing contraceptives should be considered the methods of choice for breast-feeding women. Combined oral contraceptives should not be prescribed for nursing mothers, unless alternative methods are unavailable or unacceptable to the woman. Furthermore, if combined oral contraceptives are used, special care is required to ensure that adequate lactation is maintained; if lactation declines, the drug should be discontinued and the woman provided with alternative contraception. This may seem to be a counsel of excellence, but until further research establishes a safe dosage and timing for combined oral contraceptives, caution should be exercised in their use by breast-feeding women.

JAWS - Russian style!

The Russians claim to have developed a super-trout, a fish that is not only seven or eight times the normal size but has changed its nature from a peaceful herbivorous animal to an aggressive predator that will swallow anything that will go down its throat. The fish are being bred in the highland lake, Issyk-Kul in central Asia, where it naturally occurs weighing about 2 lb. The new-style fish now weighs 30-35 lb. but it has also developed large teeth and jaws that "resemble sharp-pointed saws."

- The Sunday Times
5 June 1976

THE DAIRY COW - AN EFFICIENT "RECYCLING MACHINE"??*

The impending World Food Crisis has sparked much debate over future food needs and methods of production.

It was stated in 1967 that food production would have to be doubled by the year 2000 to maintain the level of food supply at that time and that it had taken almost 10,000 years to reach the 1967 level. Whether extended application of current agricultural methods will be sufficient in the future is one subject in need of immediate attention. This has prompted not only the scientific but also the lay community to pose the following question: "Isn't it wrong to feed grain to animals when many people are starving in the world today?"

Animal production has persisted historically for several reasons:

- (1) Animals served as a reserve food supply, especially important if it had been a poor year for crops.
- (2) No preservation was necessary to maintain food in the form of livestock, a significant factor today where refrigeration is lacking.
- (3) Animal products are highly desired and improve the overall quality of the diet.
- (4) Most important of all, ruminant animals have provided man with an efficient method of utilizing fiber or forage which would serve no useful purpose otherwise.

*Reproduced from the Dairy Council Digest, Vol. 47, No. 1, 1976, published by the National Dairy Council, U.S.A.

It is often stated that animals compete with man for limited food supplies. Considering the maximum potential food value of plant products eaten by both humans and livestock, this may be true in certain instances. For example, the maximum human food value of products from grain-fed animals may be less - by virtue of the needs for animal maintenance as well as energy and excretion losses - than is the case when grains are eaten directly by humans. Also, ruminants are less efficient converters of dietary energy in the production of animal products for human consumption than are monogastric* animals. When comparing efficiencies of dietary energy utilization for various animals, we sometimes forget that man is by no means 100% efficient in this regard either.

However, ruminants can utilize roughage to meet their entire energy requirement if need be and would not compete for cereal grains that could be consumed directly by humans. A comparison of the efficiencies of several types of domestic livestock classes in converting feed nutrients to edible products shows that egg production and dairy cattle rate the highest in efficiency of converting feed energy and feed protein into edible products.

First, by utilizing non-protein nitrogen (NPN) sources such as urea, ruminants can exceed 100% efficiency in converting feed protein to high-quality protein for human consumption. Micro-organisms in the dairy cow's rumen can utilize the nitrogen supplied by urea in making milk protein. Hence, although the cow is not entirely dependent on dietary protein sources, it can potentially yield more protein in milk than is supplied in the feed.

*having one stomach

Second, the seemingly low efficiencies of conversion of feed protein to crude animal protein are not as wasteful as it first appears, because much of the feed protein is derived from feedstuffs that can be bountiful and which cannot be consumed directly by humans.

Also, crop residues such as corncobs and stalks, straw, etc. can be harvested and fed to ruminants. Ruminants can even convert to energy unlikely sources of cellulose such as cardboard boxes. It has been stated that if only 5% of the total waste cellulosic materials could be collected and processed economically, this would provide enough dietary energy to produce the world's current protein needs through ruminant animals. Thus, it becomes obvious that ruminants like the dairy cow are an essential link in the human food chain.

The typical dairy cow ration is approximately $\frac{2}{3}$ roughage and $\frac{1}{4}$ grain; the remainder is protein supplement. Stated another way, the dairy cattle utilize approximately 11.7% of all grains, 16.6% of all protein supplements, and almost 20% of all roughage consumed in the U.S. About 70% of the average dairy cow's protein needs in the U.S. is provided by grazed and harvested forages which humans could not utilize otherwise. Indeed, the dairy cow is one of the most efficient "recycling machines" in existence today.

In assessing whether animals are truly competing with human's in today's food production system, criticism is sometimes levelled at the way land is being used. Should forage-producing land which supports ruminants be converted to grain-producing land instead? Two factors need to be evaluated in answer to this question:

- (1) Animal and plant agricultures are truly complementary. Crop rotation systems utilizing forage-producing nitrogen-fixing legumes can also be grazed by livestock in some parts of the country. Forages help contribute to erosion control, soil fertility (via nitrogen fixation and manure from grazing animals), and the control of soil-borne diseases through periodic removal of host plants and animals.
- (2) Economics is a major factor in determining how land will be utilized. For example, when grain prices are sufficiently high, farmers may realize better returns through grain production, thereby stimulating the conversion of some land from forage production to grain production. However, it may be economically sound and in the interest of good land management at the same time to use moderately productive land for producing forage for dairy cattle.

Finally, an assessment of whether animals are truly competing with man should consider how much, if any, grain should be used for livestock. To argue that livestock production should be eliminated implies that plant and animal products are nutritional equivalents and that domestic animals and man are indeed competing directly for plant products. Even now in the U.S., there is no real competition between man and livestock because grain production is far in excess of human consumption needs; i.e., only approximately 2% of the U.S. soybean crop and 3% of the U.S. corn crop are directly consumed by humans. *However, this certainly is not true worldwide and people who question the use of grain for*

*feeding livestock raise a valid point when considering the global picture.** For example, it can be argued that grain can be safely and economically transported for human consumption and, hence, nations capable of exporting grain should do so. There exists, however, the very real problem of who is going to pay for the philanthropy, i.e., the planting, care, production, harvesting, transportation, and distribution of cereal grains. It is wise to consider whether supplying needy nations with U.S. grain will simply encourage them to remain dependent on outside sources and thereby slow progress in solving local food-producing and population-control problems. *Governments of needy nations should be encouraged to give internal food production sufficient priority so as to lessen their dependence on outside sources of grain.**

**Italic's are Editor's.*

A full list of references can be supplied on request.

RASTAFARIAN* FOOD HABITS

*by**Jacqueline Landman-Bogues***

It is important for health personnel to keep abreast of the changing food habits of increasingly large numbers of Jamaican people, whose influence is spreading far and wide. We also need to be aware of the implications of those food consumption patterns for the dietary patterns of the whole community. In this speculative article, some of the food habits of the Rastafarians will be described and briefly discussed, in the hope that they will stimulate comment and further research.

Recently, many approaches to food and diets have arisen among Rastafarians. Pork is a food widely excluded from the diet, not only by Rastafarians, but by many other groups and individuals, not necessarily because of religious affiliation. The risk of intestinal parasitic infestation of pork is commonly known, but though beef and mutton may be similarly infested, these meats are not prohibited. Health reasons are, therefore, an unlikely explanation. The food habits of scavenging pigs makes their flesh unpalatable. The recent decline in pork consumption in Jamaica was attributed to a newspaper report that pigs were eating bodies in the Kingston morgue. The fault was not the pigs' but their owners'. Pig farmers who provide pork for our tables, do not permit scavenging. Instead their pigs' diets are carefully controlled.

*A religio-political cult which originated in the 1930's in Jamaica and now claims many adherents chiefly dispossessed or disenchanting youths, largely of African origin. Members are popularly termed "Rastas".

**Mrs. Bogues was recently an Assistant Lecturer at the Tropical Metabolism Research Unit of the University of the West Indies.

As in earlier times¹ this prohibition is a means of group identification, in this case, among "locksmen" from the Jamaican "roots" culture.

Meat products and meat-containing snacks, such as "patties", are avoided because they may contain pork. Some Rastas eat otherwise ordinary Jamaican foods, but many eat, what they term, *ital** food. Familiar foods are invested with new names - callaloo and banana for example, become '*illaloo*' and '*inana*' respectively. These foods are prepared highly seasoned, but usually are cooked without added salt.

Freshly harvested vegetables or freshly caught fish are preferred to those products which are purchased from regular commercial outlets. As a result many rely on the "organic" produce of their own kitchen gardens or plots. Coconut oil is home prepared; brown sugar and honey replace granulated sugar; processed or canned foods are avoided. There are some beliefs, peculiar to the Rastafarian, about common canned fish: canned mackerel may be mistaken for snake and canned sardines for lizards. These are familiar foods in the Jamaican context so these beliefs are strange to the majority of Jamaicans. Rastas will also not eat seafood that does not have the essential 'fishy' characteristics (fins and scales), therefore shellfish may be prohibited.

Among members of the cult, who are largely vegetarians, the there are strict *vegans* as well as *lacto-ovo-vegetarians*. Vegans exclude all animal foods from their diets, also processed, mass-produced foods, so they have to make their own wholemeal wheat products, homemade cornmeal, etc. Some even exclude breast milk from their babies' diets and since they cannot use commercial soya-based infant formulae, this creates problems because incorrectly prepared soya will retain many anti-nutrients such as

*Leafy green vegetables cooked without salt and served with vegetable oil.

goitrogenicity, antitrypsin activity, phytates, and anti-vitamin activity. Soya 'milk' is not a traditional feature of the Jamaican diet. One explanation for the exclusion of cow's milk from the infant's diet is that it may be contaminated with sow's milk, but since sows are able to withhold their milk and so have never been a source of milk, unlike other domesticated animals,² this is extremely unlikely. There is also the misconception that in Africa, cow's milk is not consumed. In fact, there are many pastoral peoples such as the *Masai*, *Pokot*, and *Karamojong* of East Africa who subsist on milk. Many more use milk products, for example, the *Nguni* of Southern Africa, and moreover, cheese was first discovered in Africa.³

A more acceptable alternative to cow's milk among the Rastafarians, is coconut milk, a nutritionally poor substitute which is an inadequate source of both vitamins and minerals. Porridges of the same calorie content are very different in protein quality and quantity. A cornmeal, sugar and coconut milk mixture has a protein score of 5.6% and protein-calorie value of 6.0%, whereas, cornmeal and condensed milk protein have values of 10.2% and 10% respectively. Cornmeal porridge made with coconut milk only is, therefore, inadequate for young children.

Dried fruits such as raisins, prunes, and nuts may be regular features of the Rastafarian diet. Juices such as carrot, beetroot and soursop also assume greater importance, but vegans leave out the condensed milk in the traditional recipe for carrot and soursop drinks. Those who exclude salt may also exclude leavening so that substitutes for bread and "johnny cakes"* are made without baking powder.

Yet another group does not eat foods that grow underground. They eat only *airfoods*, leafy vegetables and fruits. A further variation is the consumption of raw foods only, as evidenced in a

*A fried flour dumpling.

strong reliance on fruits and raw peanuts. In this diet it seems that the desire to conserve nutrients lost in processing or cooking, is taken to extreme lengths.

In addition to the emphasis on fresh foods, and the total or partial avoidance of salt in cooking, Rastafarian women, in an attempt to adhere to the Bible, may not be allowed to handle, prepare or cook food, during menstruation. At this time they are obliged to withdraw from the society of their men. Another social implication of these new foodways is the greater burden of procuring, preparation, and cooking of food that falls largely on the women, in contrast to the trend to greater use of convenience foods. Teas prepared from a wide variety of bushes, herbs and roots are widely used, including of course, ganga* tea. Some Rastas also fast but details of this practice and its incidence remain to be discovered.

It is clear that there is a trend to asceticism among Rastafarians which may become extreme in some cases. Although there are also variations in religious beliefs among Rastafarians, these apparently do not distinguish the food habits of their adherents. However, those Rastas who have been in contact with the *Essene* cult are most likely to be vegans and to eat raw foods. Secular influences are also likely, such as contact with the *Zen macrobiotic* cult and organic food enthusiasts in the Western world who, while their ideologies may be different, have similar food practices.

There are positive aspects of these new food habits. The insistence upon fresh food, uncontaminated by pesticides or fertilizer residues, without the nutrient losses that processing and preservation cause, is praiseworthy, especially since the food currently retailed all too often is stale, or in worse

**Marijuana*

condition. Consumer pressures geared to the improvement of nutritional quality should be encouraged as the entire community will benefit if the nutritional and aesthetic quality of food is improved. Modern canning and freezing conserve nutrients. However, eggs and meat from intensively reared animals do contain fewer vitamins than those from 'free-range' reared animals.⁴ Whole cereal grains are more nutritious both in terms of nutrient and fibre content than highly milled cereals and their products. Excluding salt is also a beneficial custom especially among those suffering from hypertension.

Those diets, however, which restrict variety, are likely to cause problems. The problem of availability and cost of foods to satisfy these unusual diets may cause certain items to be restricted and therefore, calorie intake may be reduced. The greater the variety in the diet, the less likely are energy and other nutrient deficiencies. Many raw vegetable foods contain a variety of natural toxins or anti-nutrients. A vegetarian diet contains high phytate levels, which reduces the availability of minerals such as Ca, Fe and Zn. Vegans are most at risk of B₁₂ deficiency since animal foods are the sole sources of this vitamin.⁵ Among Zen Macrobiotics in the USA, low calorie, iron, calcium and riboflavin intakes have been reported.^{6,7} Frank vitamin deficiencies⁸ and PCM⁹ have also been reported. Vegetarians and vegans weigh less than omnivores and, while this may reduce the risk of obesity, diabetes and coronary vascular disease in young children, pregnant and lactating women, these abstemious diets may cause undernutrition. For the pregnant women poor nutritional status reduces the birthweights and nutrient stores of their babies. In Jamaica, where these groups are already 'at risk' of malnutrition, these dietary practices deserve concern.

These food customs can cause practical problems since the dietary management of Rastafarians with these unusual, perhaps largely unknown or misunderstood food habits is difficult for the

already overburdened dietitian. The demand for *ital* food is a recurring dilemma in the prisons. Is it possible to adapt the institutional kitchen to the very special and variable needs and demands of the Rastafarian? The answer must be yes, but an essential prerequisite is the recognition of that need. Although the existence of these new food habits has been verified by diverse sources, how many people adhere to them is still unknown. Sociologists and anthropologists need to systematically investigate the food habits, not only of Rastafarians, but also of other Jamaicans, so that we may understand the "origin, development and strengths of the various dietary aversions".¹ Doctors, nurses, nutritionists and dietitians need to know how to adapt their nutritional advice and to look for signs of undernutrition among Rastafarians¹ and other sects. We must respect these religious beliefs while assisting Rastafarians to choose balanced diets. Misconceptions, particularly those which result from ignorance, can be clarified by increasing the level of nutritional awareness and knowledge among the general population. Greater use of the mass media should be considered a priority to achieve this end. Another excellent way of reaching the grassroots, from whom these foodways stem, would be to include nutrition in the national literacy syllabus and all community-oriented programmes.

REFERENCES

1. Grivetti, L.E. and Pangborn, R.M. (1974). "Origin of selected Old Testament dietary prohibitions." *J. Am. Diet. Assoc.* 65: 634.
2. Kon, S.K. (1970). "Milk and milk products in human nutrition." 2nd Ed. (FAO Nutr. Studies No. 27.)
3. Lowenberg, M.E., Todhunter, E.N., Wilson, E.D., Feeney, M.C. and Savage, J.R. (1968). "Food and man." Wiley, N.Y.

4. Hubbard, A.W. (1973). In "Nutritional problems in a changing world." Pg. 239, edited by D. Hollingsworth and M. Russell, Halsted Press.
5. Ellis, F.R. and Montegriffo, V.M.E. (1970). "Veganism, clinical findings and investigations." *Am. J. Clin. Nutr.* 23: 249.
6. Brown, P.T. and Bergan, J.C. (1975). "The dietary status of practising Macrobiotics: A preliminary communication." *Ecology of Food and Nutrition.* 4: 103.
7. Brown, P.T. and Bergan, J.G. (1973). "The dietary status of 'new' vegetarians." *J. Am. Diet. Assoc.* 67: 455.
8. Sherlock, P. and Rothschild, E. "Scurvy produced by a Zen Macrobiotic diet." *J.A.M.A.* 199: 795.
9. Robson, J.R.K., Konlande, J.E., Larkin, F.A., O'Connor, P.A. and Liu, H.Y. (1974). "Zen Macrobiotic dietary problems in infancy." *Pediatrics.* 53: 326.

...GHANA'S FISH MAMMIES

In Ghana's fisheries, the men handle the catch but the women handle the cash.

The "fish mammies" always have been the core of the fish-handling and distribution system. Except for a very small quantity of fish sold directly to consumers, the entire country's catch passes through their hands. They do an annual business worth about \$24 million.

- The IDRC Reports, Vol. 2,
No. 5, December 1973.

"GENERAL CRITERIA AND METHODS
IN THE EVALUATION OF AUDIO-VISUAL
COMMUNICATION MATERIALS"*

by

B. Andrea Okwesa

Today, public acceptance and awareness of audio-visual methods, combined with the growth in communication technology, have been responsible for the increasing use of modern audio-visual media as an integral part of the communication process. Communicators see in these developments vast possibilities for enabling a wide range of people to learn faster, better and more easily. They recognize in materials such as the flannelboard, models, slides, filmstrips, videotape and film, the potential for promoting more meaningful learning experiences by increasing the reality or immediacy of a situation, and for motivating people to accept new ideas.

One of the problems involved in the increasing use of audio-visual communication media is the need for performance specifications, both of equipment and materials. In the larger developed countries these aids are being produced and purchased daily but there is seldom sufficient information about what is required of a device or a set of materials, or about its ability to assist learning.

The dilemma facing communicators, both within the formal educational system and in the extension field is that, while they wish to take full advantage of new media development, they do not

*Based on an address given at the CANDI 4th Annual General Meeting, St. Croix, U.S. Virgin Islands, July 7-10, 1976. Mrs. Okwesa is the Media Officer/Editor at the Caribbean Food and Nutrition Institute.

want to waste money on ineffective or dysfunctional tools. They are aware of the potential of the media, but lack adequate guidelines on which to base their selections and purchase decisions. They purchase materials enthusiastically only to discover that they lack the necessary resources to develop and test these materials and to staff, maintain and operate the equipment effectively.

At each stage of planning and producing audio-visual communication media and in their use, some kind of evaluation should take place. Wide cultural, social, psychological and economic differences among audiences in their approaches to messages and to learning situations underlines the importance of pre-testing communication techniques, methods and materials under representative conditions and with sample audiences before they are put into production and widely adopted. Early objective assessment of the strengths and limitations of audio-visuals can enable alterations to be made quickly and cheaply without permanently damaging repercussions for the audience or time wasted for the producer. This kind of evaluation - pre-testing - does not measure the results of a programme or medium but rather, increases the possibility of success by eliminating hazards which could occur.

Evaluation may range from asking a few simple questions of the audience or intended audience to the scientific collection of facts and valid evidence gained from the personal interview survey. This is a practical and highly-controlled scientific device for measuring the success of the teaching effort and also for evaluating the relative effectiveness of different methods used. Other methods include conducting tests of comprehension, perception and retention and carrying out simple random checks among the audience.

However, regardless of the simplicity or complexity of the evaluative procedures employed, certain evaluative criteria must be satisfied. The first criterion is whether the aid fulfilled

the objective which was specifically stated at the start of the project. This objective is expressed in relation to identified audience needs which may be for either knowledge, a skill or a change of attitude. The job of the communicator is to make people more widely aware of those needs which are not satisfied by present customs and behaviour, and to put the means of fulfilling these needs within the reach of the people. It is his awareness of these needs which will shape the objective of a programme or audio-visual aid.

If audio-visual communication aids are to be optimally effective and, therefore, contribute to the achievement of the stated objective, they must be specially selected or produced and properly used. Technical form, or in other words, the organization and presentation of the content enables us to determine how efficiently the aid accomplished its objectives compared with other methods, in terms of expenditure of time and effort. The size and type of illustrations and the extent to which they contribute to the message will greatly influence the acceptability of a poster, chart or booklet, flip chart series, or flannelboard presentation. Colourful eye-catching illustrations and book covers will immediately attract attention even from a distance. Words, concepts and graphics presented in a simple, clear style will help to prevent ambiguity and enable the message to be immediately understood. The logical, orderly layout of ideas has also been shown to aid understanding of concepts and retention of facts.

The effectiveness of an audio-visual aid is also determined by how fully it has been integrated into the total communication strategy. Audio-visual media are only one of the means towards the end goal (objective) and their use will be determined by "feed-forward" about the audience - a knowledge of audience characteristics which tells which communication inputs would be most useful in a particular communication exercise. The suitability of the medium chosen and the potential of each medium used in combination

with other communication channels, will be assessed, also its ability to reach people not easily reached by other methods. Increasingly, the communication channels considered most effective are those which facilitate active participation by the audience and are of motivational rather than informational impact. The extent to which the medium promotes audience involvement will, therefore, also be a factor in evaluation.

The success of an audio-visual communication aid and its message largely depends upon whether the audience understands and ultimately accepts the change proposed. This acceptance, in turn, will be based upon whether or not the change is valid, realistic, culturally acceptable, physically, technically and economically possible or ethically permissible. It will also depend on whether or not the message adequately appeals to the audience's felt needs. It must be also presented in a manner which the public can understand. Many cultures and societies have perceptual difficulties and literacy problems which can impede the success of a message or a communication campaign. So, in evaluating communication aids, problems in visual perception and language must be considered. Successive evaluations of visual media with people in remote villages, out of contact with the more developed world and accustomed to viewing experience from a peculiarly non-Western standpoint, have identified some very interesting obstacles which people can encounter when viewing visuals:

- A viewer may not be able to identify the subject of a flat object (like a photograph) whereas he might be able to identify the actual (three-dimensional) object.
- Drawings may seem to be truer representations of reality than photographs because drawings are simplified and concentrate on important elements. Illustrations which are larger or smaller than life-size may be confusing.

- Cutaway drawings or models may be interpreted literally.
- The symbolic significance of certain visual forms may override the intended significance, e.g. a fat person denotes prosperity in some societies.
- Actions portrayed may be interpreted as applying to only one sex, e.g. woman shown receiving injection on poster ∴ no men attend clinic.

Change agents can anticipate and eliminate these distracting elements in the communication process by ensuring the cultural compatibility and acceptability of the message, care in the use of the language or idiom, and presentation of concepts in a manner that engenders credibility. A knowledge of the cultural, social, and psychological variables which affect the rate at which knowledge is understood and acted upon will prevent embarrassment, offense, misplaced humour or misunderstandings from occurring and ensure that the audience will react in the expected way.

Evaluation will also reveal attitudes of the audience towards the subject, attitudes to change and innovation and to particular communication media, which will determine the success of that particular approach. Before launching a communication enterprise or using a particular medium, extension workers should notice what kinds of visual or audio-visual media are commonplace among the the audience, or with which kinds they are most familiar. For example, local art forms such as cartoons and puppets, a fondness for drama, mime or storytelling can provide vital clues as to the kinds of media which would have an impact on the community.

Many audio-visual communication aids fail to have optimum reach and penetration because of inadequate production and distribution techniques. Evaluation should determine whether various

production possibilities were taken into account, in view of the quantity and quality of the materials needed and the estimated production costs. For example, if professional printing quality is not essential and no duplication of photographs required, a cyclostyle or mimeograph process (which can also reproduce simple illustrations) would be adequate. If, on the other hand, high-quality reproduction is considered important to the success of the programme and if photographs need to be reproduced, or large quantities are required, then offset or letterpress printing should be employed.

The type of distribution will also govern the most convenient size and shape of the medium. Different specifications are necessary for aids which will be handed out, carried, put into pocket or briefcase, or displayed on a bulletin board. A booklet or other visual aid which has to be mailed should not be bulky since this will necessitate excessive mailing costs. This is an important, and often-overlooked factor in evaluation.

The application of evaluative criteria can greatly enhance the effectiveness of audio-visual media. It must be stressed that these aids should not be considered as ends in themselves but as part of an integrated communication effort involving all available channels. Audio-visual media by themselves can stimulate action but only when the change proposed is simple and easy - like vaccinating people against smallpox. Where the suggested change is of a more complex kind and involves the people in making fundamental and deep-rooted modifications in their personal behaviour or life style, a much more personal approach is needed. Success depends, in the final analysis, on the communicator - on his personality, the relationship he has established with his audience, on his ability to resolve doubts and difficulties, to explain and answer questions and to motivate people from interest to action. It depends also on his actively seeking and integrating into the total programme of development the ideas and efforts of the people themselves.

NEWSPAPER CLIPPINGS

FOOD SOURCES

From The Sunday Gleaner, Jamaica, 19 September 1976

The late scare about world starvation seems to have died down, partly, no doubt, on account of better grain harvests (though drought continued to plague many areas) and also due to the recovery by many countries from the recession of 1974-75.

That there is little real fear of starvation is pointed out by an article in the Economist which says: "If existing agricultural resources were used efficiently, they could feed a world population about 15 times greater than the present 4 billion. Yet, in practice, one billion people suffer from malnutrition. Some 750 million of these are near the brink of starvation", and "only about a tenth of the earth's land surface is cultivated..."

Man is his own worst enemy in this respect. Either he will not, or cannot, produce enough food for his own use or he allows an enormous proportion ($\frac{1}{3}$ is the estimate) to go to waste through rat and insect infestation, including inefficient storage provision.

Uneven distribution of food products among nations is one reason for the existence of starvation or undernourishment in certain areas. The developed countries, on the whole, produce enough food for their own use and also export to others in need, either through commercial channels or in the form of aid. However, much of their own grain stocks - that is, in the U.S., Canada and Australia - are used in the feeding of animals, and though meat contains good protein and calories this is considered an uneconomic way of using grain of which poorer countries are in need.

The dependence of developing countries on the industrial nations for food, especially grain, is often deplored, but tropical countries, at least, cannot grow wheat, which is considered to be

more nutritious than either rice or maize (corn), which they do produce. They also exchange their own variety of raw material, be it sugar, rubber, bauxite or fruits in return for imports of grain or flour, machinery and fuels, but the exchange is an uneven one, due either to disadvantageous terms of trade or the fact that raw materials lack the added values put into manufactured goods.

Developed countries have had the advantage of capital and technical knowledge to arrive at a built-in efficiency in agriculture which includes intensive cultivation, whereas the poorer countries are obliged to live a more hand-to-mouth existence. Though aid in the form of capital, technical knowledge and fertiliser has been forthcoming from the richer nations the help is spread very thin over a needy world. Shortage of capital, expensive equipment and fertilisers, and sometimes lack of confidence have conspired to hinder the development of efficient agriculture among poorer countries.

The exploitation of the seabed, to which some now look forward as a source of enormously increased wealth may not compensate for the shameful destruction and wasteful use of the fish resources of the oceans, which has been carried on too long by the trawlers of powerful nations.

One thing is certain: any such mineral resources of the seabed will need finally to be converted into food, for mankind must eat, and eat in a more equal fashion than at present. That millions need to eat for better than they now do is a reproach to the intelligence and capabilities of the human race.

MEETING THE NUTRIENT NEEDS OF THE CARIBBEAN

From The Advocate-News, Barbados, 19 June 1976

In the Commonwealth Caribbean, as elsewhere it isn't how much, but what you eat that really matters.

This is one of the points stressed by nutritionists with regard to what should form priority areas in the massive food production plan to span the next 10 years.

The experts are concerned over the high incidence of malnutrition in the region, and they maintain that its eradication must be a principal objective of the plan.

Replacing foreign imports is all to the good, they agree. Putting more food generally on Caribbean tables is praiseworthy, too. But it is essential that it be of the right kinds.

Malnutrition has been shown by surveys to be widespread, and recently when United Nations Secretary General Dr. Kurt Waldheim announced the chilling statistic that 10,000 persons globally die every day from its effects, many worthy Caribbean lives were counted among the lot.

The area's political leadership have accepted from their technicians proposals for a regional agricultural strategy in order to upturn a bill-dollar annual bill on foreign imports which, if unchecked, would reach more ridiculous proportions in the next five years.

National programmes in CARICOM countries have already begun to reflect this new thrust.

Obviously pivotal to the plan are the great land space of Guyana and Belize, the petro-wealth of Trinidad and Tobago, and the manpower and other capabilities of CARICOM colleagues, apparently on the principle of "from each according to his own resources".

Preliminary studies by the Caribbean Food and Nutrition Institute have formed an important input for programmes and projects under the plan.

The clear advice of the scientists from the Institute is that any attempts to improve food supply should go beyond the economic and trade implications and relate to the nutritional needs of the Caribbean people.

And there is good reasoning behind the vigour with which Institute personnel have been articulating the nutritional aspect in forums and seminars themed on the regional self-sufficiency drive.

According to available figures, malnutrition in the Caribbean is something of a horror, with the grimest toll being among the very young.

For instance five times as many West Indians aged 1-4 years die from its effects than is the case in North America. The ratio of deaths among children less than a year old is said to be two-to-one.

Between 6,000 CARICOM toddlers are estimated by the Institute to be severely underweight and in imminent danger of death, while about 60,000 to 90,000 are classified as moderately malnourished.

Noticeable stunting of growth in children aged five to 15 years is held to be the aftermath of malnutrition in early childhood, aggravated by chronic malnourishment in later years.

Anaemia is common among women and infants, and the point has been made that because nearly 50% of pregnant Caribbean women are anaemic, the result could be complications for both mother and child at the time of birth and afterwards.

The statistics tell a distressing story about the nutrient deficiencies in the daily diet of the Caribbean working class.

Manual labour in agriculture, the Region's single biggest group of workers, is the case in point. For both sexes there is deficient energy intake, and to a lesser extent protein.

Across the broad population, the Institute speaks too, of significant shortfalls in intake of calories, iron, bone-strengthening calcium and essential vitamins.

Close study of consumption patterns within CARICOM shows that high-priced meat and fish, fresh vegetables and fruit essential to the daily dietary requirements are largely out of reach of the poor man's pocket.

The consequence is low resistance and diseases, ranging from what the Guyanese call white-corner (fissures at the corner of the mouth) to skin, nervous, muscular and other ailments.

Undoubtedly, the Caribbean has the soil and climate for supplying much of what its people require for good health and enhanced productivity.

For "Vitamin A" the need is dark green and yellow produce, foods like spinach, pakchoy, callaloo, eddoe and dasheen leaves, pumpkin, carrot and yellow fruit.

"Vitamin B" (including thiamine and riboflavin) such substances as liver and yeast.

"Vitamin C" (Ascorbic acid) from the highly-valued Caribbean cherry, other fresh fruits and vegetables, particularly tomatoes and citrus fruit.

Caribbean housewives who tend to cook the quality of their food away are cautioned that "Vitamin C" is easily destroyed especially at higher temperatures as in cooking and canning procedures.

A table showing the composition of almost every significant local food and giving "acceptable indications" of those important in diet is the Institute's guide to good Caribbean cooking.

The Institute also makes suggestions to the actual planners (and decision-makers) for special consideration in implementing the food plan:

- It is of primary importance that the caloric intake of low-income groups be increased.
- Meeting the nutrient needs, especially calories and protein, of young children vulnerable to malnutrition should be considered a priority, with more extensive use of cereals, legumes, and green vegetables.

"The feasibility of large-scale production of an inexpensive cereal-based weaning food for regional use in the fight against childhood malnutrition should receive urgent consideration."

- Effective fortification of suitable foods such as flour with iron and selected vitamins should be developed as one practical approach to reduce the prevalence and severity of anaemia and other nutrient deficiencies.
- "Any plans for the greater production of meat and meat products should be weighed against increasing the production of cereals; pulses, nuts and oilseeds, for it is critically important that these be made available at prices within the reach of the low-income groups.

Suggestions have come also for ensuring the supporting services that are crucial to the sort of large-scale development envisaged in the Regional Food Plan.

There would be need for extension workers and teachers with competence in home economics and nutrition "if food patterns are to be modified or use of special foods intensified as part of the development strategy". And training of such must be provided at university and other levels side by side with the food expansion programmes.

The Institute feels also that its monitoring of the nutrient-cost of foods should be seen as an integral part of the food policy, particularly in relation to intra-Caribbean importation and price controls of foods.

Those measures have been incorporated in the food and nutrition policies so far prepared for implementation in individual CARICOM states, and in the Institute's view it was therefore logical that they should find a place in regional food and nutrition planning.

GUYANA HOLDS AGRICULTURE MONTH

From The Sunday Gleaner, Jamaica, 12 September 1976

September was declared 'Agriculture Month' in Guyana and was launched with a nation-wide broadcast by the Minister of Agriculture Gavin Kennard. The theme for the observance of the month is: 'Grow More Food'.

The month's activities will focus attention on the contribution Agriculture has made and could continue to make to the development of the country. Special emphasis will be placed on Farm Development, while arrangements have been made for a national tree planting day for which the Ministry has distributed free planting material. Several field demonstrations will also be held and a number of livestock projects launched.

The Government's Agricultural Policy is to feed and clothe the nation and to conserve foreign exchange by reducing imports and increasing exports.

The immediate targets of the agricultural sector, according to the Chief Agricultural Officers, are to increase production of sugar and rice which are traditional export crops, so as to boost exchange earnings.

Other targets are the increased production of locally utilised commodities so as to reduce imports and achieve the stage of export; improvement in levels of distribution of income by efficient cooperative production systems; accelerated development in the regions by establishment of primary and secondary production opportunities and emphasis on the production of cotton to a total of 6,000 acres annually.

In the field of production, the Government was utilising resources that were easily available - people and land, while for productivity it was using yield improvement methods.

Farming systems were being operated on a large-scale by Government or semi-Government organisations like the Guyana National Service, the Guyana Agricultural Products Corporation, the Livestock Development Company and the Guyana Defence Force.

CHANGES IN PRODUCTION POLICY ESSENTIAL

From the Public Opinion, Jamaica, 1 October 1976

With the increasing awareness of the changes that are being made in our political and social life, there is the growing consciousness of the need to change our economic structure. This has to be done in two ways: first, so that it produces greater returns for the workers and, second, that we make positive changes away from a system in which we produced for export and imported

necessities as well as luxuries of life, and start producing for ourselves.

The workers in Westmoreland who recently asked that their cooperative produce rice instead of cane had the right idea. It is a dangerous business to export so as to be able to import what we need.

EXCHANGE PROBLEM

We would not be so short of foreign exchange right now if the economy instead had been producing food for the population to purchase in the local markets. We would have been able to cut down on our imports without so much difficulty and without endangering health and life.

Throughout our history, Jamaicans have always had to be working for someone else - local or foreign - and never for ourselves. In the days when sugar was king, foreign owners used slave labour to produce sugar and rum for Europe. With Emancipation, the turn was to coffee, pimento, spices and cattle which were produced in the uplands of Manchester, St. Ann and St. Andrew, and the same pattern persisted of crops for export, except for beef cattle which were reared for the benefit of those who could afford to buy beef weekly. While there was more food grown for local consumption, the land for this was restricted to mountain land and such land on the plains that the estates did not have use for.

At the turn of the century, the banana trade brought the opportunity of another export crop, so to sugar barons and pen-keepers were added banana planters, and St. Mary, Portland and St. James became prominent. And right up to today the pattern has been continued with the addition of the tourist and bauxite industries.

THE DIVISION

So we have Jamaica divided up between land barons producing for export and a large army of cultivators producing for local markets and for export as well (and doing quite well at it) but we are still importing a volume of food for local consumption. This is the pattern which has left many thousands unemployed and landless and which has made us defenceless against rising overseas prices with our foreign exchange resources entirely dependent on foreign loans and investment. The increase of an old farthing value on the import duty on sugar by the USA sets our whole economy shaking!

NUTRITION

This pattern has completely ignored the nutritional needs of the mass of the population: no milk, cheese, vegetables and so on for them and their nutrition not regarded as important. The rich and those with steady incomes large enough to live with some sort of security could afford to buy imported quality items or obtain them from restricted local activity (such as butter making and fresh milk distribution) at prices which the general population could not afford.

NO MENTAL MOVE

I think it is true that while we are moving away from an acceptance of a society which permits these gross inequalities to exist, we have not yet made the mental move away from the plantation economy in which we are producing things to export to other countries so as to be able to buy the food and other things we need - the indelible stamp of the colonial slave economy.

COSTLY IMPORTS

The tragic yet amusing part is that while we export products and have to send abroad to try to obtain a little more for sugar and bananas, we have to purchase whatever these countries send us in return at whatever price they demand - and the cost of their exports to us is always getting more expensive than the cost of our exports to them. So it is constantly a losing game.

What we need is a system of land distribution and agricultural activity which will produce the best results for the Jamaican people.

We have to face it, however, that the plantation system of using labour to grow crops to send abroad is an easier matter (hard as it may seem) than growing crops for our own use and benefit. To have a successful dairy business, cows have to be milked at 3.00 in the morning, and again in the afternoon, with all the attendant duties of keeping cows healthy, looking after calves and so on.

Also, those who plant vegetables have to be prepared to spend time and effort in spraying and otherwise checking the depredations of insects and the menaces of floods or drought. It is not going to be a matter of old time slave work, weeding cane or mulching bananas.

BREW AND BAKE

Let us first get rid of the idea that food farming (however great its prospects) is a matter of plantation tactics: employing labourers to bring a return on someone else's investment. In one case, the trade union may see that the labourer is worthy of his

hire but, in the other case, for anything as demanding as dairy and vegetables, the labourer will ask that "as he brews, so shall he bake" in terms of the old proverb, meaning that the dairy and the vegetables must be his or his and his partners in cooperation. If nurses can operate a shift system, taking it in turns to do night duty, there is no reason why farmers cannot do the same to organise their activities.

QUESTION OF STATUS

Also, some ideas of status will have to be revised. There is more prestige to the occupation of pasturing cows for sale as beef than there is in tending goats. Yet we do not have sufficient land in Jamaica to supply dietary requirements for the entire population if beef is to be the main source of protein, to produce which, expensive grain is needed.

We have to depend on small stock as well and particularly goats because goats-flesh is already much loved by Jamaican stomachs.

There are many hillsides which, because they are in dry areas and are stony, are not suitable for cultivation but would be ideal for goat farms. All these areas need is good secure fencing and the goat population will soon raise our nutrition standards and cut out much of our imports.

So let us ask our Government to give as much encouragement and help to dairy, vegetable growing and small stock as they are giving to sugar and bananas and put the young farmers on the land, and we shall be on our way.

NEWS BRIEFS

TECHNICAL GROUP MEETING ON "NUTRITION AND THE MASS MEDIA"

During the week of 13-17 September regional mass media representatives and nutritionists, assisted by technical advisers and resource personnel, met to discuss and critically examine the actual and potential role of mass media in food and nutrition activities and programmes. Lectures and presentations were made by both regional and foreign experts in the relevant fields of nutrition, communication strategy and food promotion. Multi-disciplinary committees were also formed to develop a series of practical recommendations for the more efficient utilization of mass media facilities for food and nutrition purposes in the CARICOM Region.

The final recommendations, after evaluation and approval, will be put at the disposal of relevant and competent authorities concerned with food and nutrition and communication in all the member countries of CFNI.

Part I of Workshop No. 2 on Food Economics and Food and Nutrition Policy will be held in Barbados from 8-19 November. Participants, drawn from Antigua, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, St. Kitts, St. Vincent, and Trinidad & Tobago, will include agricultural economists, nutritionists/dietitians and personnel from related fields. The purpose of these Workshops is to add to the skills of senior technical personnel in the service of the Governments of the English-speaking Caribbean, the fundamentals of food economics, and nutrition, with a view to developing effective food and nutrition policies in all the countries concerned.

The Maurice Pate Travelling Seminars initiated in December 1975, have now been held in eight of the Lesser Developed Countries (LDC's) of the Caribbean. The most recent were those held in Tortola (British Virgin Islands) and Montserrat during the week 27 September - 1 October. The visiting team comprised Professor K.L. Standard of the Department of Social and Preventive Medicine and Dr. D. Picou of the Tropical Metabolism Research Unit, both of the UWI, and Dr. A.C.K. Antrobus, Acting Director of CFNI. In conjunction with local health personnel they carried out a complete review of the implementation stage of the Strategy and Plan of Action to Combat Gastroenteritis and Malnutrition (SPACGEM).

CFNI DCN GRADUATE

One of the female students at the Jamaica School of Agriculture (JSA) was Miss Edie Gidden who was awarded the 1st scholarship to JSA by the Jamaica 4-H Club. During her three years at JSA, Miss Gidden pursued a Home Economics Course, which included Food and Nutrition, Home Management, Design and Equipment, Clothing and Textiles, Child Care, Economics and Sociology.

On graduating in 1971 Miss Gidden joined the Extension Service of the Ministry of Agriculture as an Area Extension Officer, specialising in Home Economics. In 1972, she went to the U.S.A. on a Farm Youth Exchange programme for five months, courtesy of the Jamaica 4-H Club. On returning she was sponsored by the Ministry of Agriculture to pursue a Social Welfare Course at the University of the West Indies.

Recently, she successfully completed a Diploma Course in Community Nutrition, a training programme conducted by the Caribbean Food and Nutrition Institute in conjunction with the UWI,

for persons actively engaged in agriculture, education, community development, health and related fields.

Her job now involves briefing community groups on food, nutrition and family life education. She maintains contact with members of the public through the Land Authority in the Parish and conducts home visits, trains girls attached to 4-H Clubs, and, from time to time, offers help to the Social Welfare Commission.

Mr. Michael Morgan, a senior postgraduate student in Human Nutrition at the London School of Hygiene and Tropical Medicine is currently visiting CFNI on a research fellowship. Mr. Morgan will be largely based in St. Kitts where he will be assisting senior staff members of CFNI in data collection and analysis, in relation to food and nutrition policy development, and in establishing a nutritional surveillance system in conjunction with the Government of that country.

Recent visitors to CFNI included Dr. Osei, Dr. Osei-Tutu, Dr. Safe and Dr. Nimo, Ghanaian doctors attached to the School of Public Health, University of California, Los Angeles. While at CFNI they participated in a study programme which included field visits to the Nutrition Department, Ministry of Health, the Scientific Research Council, TMRU and other local food and nutrition-related agencies.

Dr. Jacob Finkelman, Chief of the Department of Public Health Research, in the Mexican Institute of Social Security and a PAHO Short-Term Consultant in epidemiology visited CFNI on 4-5 October in order to review nutrition and gastroenteritis surveillance in the Region. His assignment involved holding discussions with epidemiologists at the University of the West Indies and with senior staff members of CFNI who are involved in Food and Nutrition surveillance.

Dr. M.S. Read, Regional Adviser in Nutrition Research, PAHO/WHO, visited CFNI on 4-8 October to discuss Food and Nutrition Research Programmes. During the week he consulted with CFNI senior staff members on their activities and programme of work in these areas and held discussions with staff at the Tropical Metabolism Research Unit, the Nutrition Unit and the Scientific Research Council.

At the Fourth Annual General Meeting of the Caribbean Association of Nutritionists and Dietitians (CANDI) held in St. Croix, U.S. Virgin Islands, from 7-9 July, Miss Eunice Warner, Nutritionist, Ministry of Education, Trinidad and Tobago, was elected President for the forthcoming year. Mrs. Sadie Campbell was outgoing President.

The major thrust of the Association during this year will be the production of a Diabetic Booklet for the Caribbean, the preliminary draft of which was submitted to the Meeting. A system

of associate membership has been designed in order to enable dietetic technicians and other categories of para-medical personnel to be considered for membership of CANDI. During the year it is also planned to complete work on the dietary aspects of the treatment of diabetes in the Caribbean.

CAJANAQUOTE

"There is now a vicious, self-reinforcing circle between sophisticated product, sophisticated technology, unequal income distribution resulting from the technology and - resulting from this distribution - demand for the sophisticated product. To break through this circle, trade between poor countries could establish a 'virtuous' circle of simple products catering for basic needs, simple (but efficient) technology, equal income distribution and a demand generated by that distribution for the products produced by these methods."

Paul Streeten

*Quoted in ILO Information,
12: 2, 1976.*

FROM THE EDITOR

NUTRITION AND MASS MEDIA: A GLIMMER OF HOPE?

Our current Bi-monthly is a "jumbo" issue, combining the two final numbers of Volume 9, 1976. It is also a special issue in that it highlights CFNI's recent Technical Group Meeting on "Nutrition and the Mass Media", featuring five of the main papers presented at this Meeting and other topics related to the theme.

If any justification was needed for the convening of such a Meeting, the keenness of the participation and discussion, the high quality of the presentations and the consciousness of a mutual "shake-up" of both nutrition and media personnel provided it in ample measure.

Faced with the critical problems centred on the state of food production and availability, and constantly struggling against the burdensome affliction of childhood malnutrition, the Caribbean can ill-afford to perpetuate any lack of understanding or disharmony of goals between two such important groups of professionals. At this Technical Group Meeting some confrontation between these groups was inevitable but also necessary, and this was welcomed especially since no ugly or bitter aftermath marred the spirit of genuine communication which had emerged. What is even more significant is that seeds of understanding and cooperation have now been sown.

The way in which the results of this successful Meeting will become manifest is as yet uncertain, but the auguries are good. The nutritionists, the advertisers, and the producers and distributors of food seem to be more confident that they can help each other and, in at least one instance, have already taken steps to pool their talents and goodwill.

The consumer - particularly the radio listener, the television viewer, the newspaper and magazine reader - needs a larger dose of "the whole truth" as his food purchasing and eating habits undergo media manipulation. It would be premature to say that this will now be guaranteed. Rather, one might take heart from these beginnings and persuade consumers that they too, have a major role to play alongside the media and nutrition personnel.

Dare we hope that the impetus provided by the Technical Group Meeting will find the necessary momentum for continued forward movement? Our nutritionists and consumers have lived with their fears and frustrations for far too long. Hope alone will never be enough, but first we must dare to hope.

THE EDITOR

Ever heard of arkhi?

It has something in common with tareg and besleg...

They are all derived from cow's milk

Believe it or not it's VODKA!

(Obtainable in Mongolia).

TOPICS AND COMMENTS

"NUTRITION MAKES NEWS"

An editorial was recently published in one of Jamaica's daily newspapers, highlighting a minor controversy on a nutrition issue which had been aired during the previous two months in another local daily. We were gratified and heartened by the keen interest in food and nutrition shown by the editors of both newspapers, and are encouraged that we now approach an era of more active participation by the media in the business of nutritional improvement, which must be viewed as one of the major objectives of social and economic development in our Region.

For our readers' benefit, we publish this editorial, and excerpts from the letter to which it refers, which refuted an article on infant feeding published on 24 June 1976.

[Editor's Note]

MYTHS AND FACTS*

A recent controversy of a very mild sort on the important subject of early childhood nutrition should not be allowed to pass unnoticed, since it was symptomatic of so many of our problems. The debate concerned the types of food recommended for a weaned child in Jamaica.

A published article had recommended the use of strained soup and the powdered yolk of an egg as ideal foods for youngsters. A distinguished committee of medical people quickly replied to the effect that the recommendation was wrong, pointing out that the whole soup should be served as well as the whole egg. They also pointed out that a baby should start eating from the adult table from as early as six months, providing the food is

*From "The Daily Gleaner", Jamaica, 26 August 1976.

crushed to allow the baby to eat without benefit of teeth. The fact that the medical profession should still have to be stressing these simple facts in 1976 means that there is still a vast amount of misunderstanding about nutrition in the country.

Our continued belief that babies can eat adult food only after reaching two years is the most baseless of these superstitions, since poor people often spend large amounts of money which they cannot afford on other expensive foods prepared specially for babies, while the adult family is bursting with health eating rice and peas, with pumpkin, or sardines and fried eggs and bananas, and other such power packed nutritious combinations.

The results are tragic in that a large proportion of the under three-year olds remain malnourished and may suffer brain damage of an irreversible sort, and all this while their parents strain the nourishment out of their soup and give them only the yolk of expensive eggs.

Perhaps the information should be incorporated into the primary school reading programme, or there could be billboards such as JAMAL and the Family Planning programme use, but something must be done.

LETTER TO THE EDITOR, "THE JAMAICA DAILY NEWS", 23 JULY 1976

Dear Sir:

"...Improved infant feeding practices could save lives of Jamaican babies so it is important that we all give consistent and correct advice to mothers...

"...Weaning on to semi-solid foods can begin at 4 months... After 4 months the baby can receive the fresh fruit or vegetables in season, that the family eats. Breast milk provides enough vitamins for the first 5 months so to start fruit juice at one week is quite unnecessary and potentially harmful..."

"...The whole of the egg, both the yolk and the white, is a good food. The protein in the whole egg is good and since the iron in egg yolk is not well absorbed, the yolk has no advantages over the whole egg. To give one teaspoonful of yolk three times per day is impractical, being both costly and wasteful. Egg once per day is quite enough. If the baby cannot eat a whole egg, let the mother or another child share the egg..."

"...Strained soup contains very little nourishment if the meat and vegetables, etc. have been taken out as "trash". It is better to crush or sieve the food with the soup so that the baby gets the nourishment as well as the flavour..."

"...The most important point to make in regard to weaning is that after 6 months the baby can and should get the food the family eats, provided it is prepared soft and smooth by sieving or crushing with a fork...Many Jamaican babies are not given callaloo or peas although they are popular foods for the rest of the family. These are very good nourishing foods and their use should be encouraged, especially as they are cheaper than the meat, fish and eggs...recommended."

*A working mother is entitled to 45 days leave
with full pay before and 56 days after delivery
(in Mongolia).*

- *Mongolia: a leap
across the Centuries
Lalit Thapalyal
In "World Health",
April 1976.*

ADVERTISING STANDARDS FOR FOOD PRODUCTS RECOMMENDED*

By Jennifer Ffrench

A number of Jamaicans and the Caribbean people at large, seem to be very concerned about the advertising and marketing methods used to sell food in the Region, if the discussions among participants at the recent Caribbean Food and Nutrition Institute (CFNI) Technical Group Meeting can be used as a measuring stick.

During the week the advertisers' techniques used in selling food items came in for careful consideration, and a great deal of criticism. The participants, who were drawn from CARICOM nutritionists, and mass media personnel, were very concerned about what they regarded as half-truths, which were the fact that when a product claims to supply the consumer with certain things it does not, in fact, supply them.

A number of calls were made for a Standards Authority to vet the advertising and marketing methods being used, and the question now is who is going to take the initiative and set some standards for advertisers to follow - and see to it that they follow them.

The advertisers generally are not likely to be the first to do this. Past experience lends authority to this view, and history tells us that some time ago a move was made in Jamaica to set up a committee to perform this function. Indications are that it did not get further than a long list of names and organisations.

If the view of an Advertising Managing Director that "no advertiser is going to relinquish his opportunity to establish his brand in favour of carrying a good nutrition message", is general among the advertising agents, then it seems unlikely that they will make the first move either.

*From "The Jamaica Daily News", 28 September 1976.

The National Consumer's League, on the other hand, might be the best bet to get things started. The League's representative at the meeting was very critical of the advertising techniques, and if her feeling is the general feeling of the NCL, it should not be too difficult for them to harness all the strong feeling that seems to be about, into a dynamic organisation for change.

A suggestion was made at the Meeting that a start could be made by making an example of one product, which does not stand up to its claims. It is more than likely that this would prompt the advertisers of other products to be more careful when making product claims.

Following this, the organisation or council could set down certain standards, so that when a product asserts that it is giving energy and vitality, or whatever it really does, it in fact has all the nutrients it claims to have. The advertiser will come to realise that he can indeed include and carry a "good nutrition" message without relinquishing his opportunity to establish his brand. Although "advertising time and space is expensive", a client with a product to advertise can incorporate a "good nutrition" message within his limited time and space, without it necessarily being to the disadvantage of the sales message, or indeed, the product.

Set standards would also convince advertisers that they can do a selling and an educating job at the same time. After all, there are very brilliant people in the advertising and marketing business and they can come up with effective 'good ads' in the same way that they have come up with other very effective commercials.

If their aim is to sell and educate at once, the advertisers can do it because they have the expertise - and with enough motivation they will discover that they can do it too.

For a more regionally based effort, the Caribbean Food and Nutrition Institute does have a role to play. It is a Caribbean-oriented organisation and could help in forming a regionally based Standards Authority and since food and nutrition are its business, it would make a valuable contribution towards the promotion of correct nutritional information in commercials.

A move in this direction is important, because day by day the level of literacy goes up and our people are getting more critical; eventually they are going to start seeing through 'half-truths', 'incomplete information', 'claims which are not nutritionally based' and all the other techniques and methods.

If we are concerned we should start things moving. For if people feel as strongly as they talk, and if there is strength behind the beliefs - they should do something about it.

A MANUFACTURER'S RECIPE FOR LEMON CREAM PIE

Here is a pie you can make with the same ingredients that the manufacturer uses and lists on the box. ...wheat flour, sugar, shortening, dextrose, grain flour, sorghum flour, salt, sodium bicarbonate, ammonium bicarbonate, artificial flavouring, water, corn syrup, whey solids, food starch modified, sodium caseinate, gelatin, whole milk solids, monosodium and diglyceride, vinegar, polysorbate number sixty...vanilla...a little more flavouring...monosodium phosphate...and...artificial colour....You may wonder what kind of pie we've made...A modern lemon cream pie...Factory-fresh, factory-approved. No lemons, no eggs, no cream. Just pie."

N.L. Fyson

Quoted in "World Food"

Batsford, 1972

JAMAICA'S SCHOOL FEEDING PROGRAMME: HELPING TO FIGHT MALNUTRITION*

One of the major aims of the Food and Nutrition Policy for Jamaica prepared in 1974 is the eradication of malnutrition from among the nation's children. Nutrition Products Ltd. (NPL), a Government-owned company which falls within the sphere of the Ministry of Marketing and Commerce, has a key role to play in the implementation of this target. It presently feeds 60,000 out of an estimated 120,000 children in Corporate Area Government schools.

Ever since the School Feeding Programme was introduced in 1973, teachers have noticed encouraging signs of change in their students. The children are far more active and attentive during classes. Attendance is better. For example, more children are coming to school on Fridays which has always been a day of low attendance. One complaint which, more than any other remark, pleased the people behind the School Feeding Programme, was this: "We just can't manage the children any more. They are so lively."

The Programme provides for school lunches which consist of one solid, usually a patty or banana cake, and a half-pint of milk. And there is every indication that this satisfies the children.

According to NPL's Production Manager, the ingredients used daily for patties are: 1,000 lbs. of mince, 650 lbs. of carrots, 2,000 lbs. of potatoes, 300 lbs. of onions, 400 lbs. of tomatoes, 3,000 lbs. of soy fortified flour and 1,600 lbs. of soy shortening. Each patty contains 800 calories and each half-pint of milk, 130 calories.

*From "The Jamaica Daily News", 6 October 1976.

The patty-making process is very interesting. The raw potatoes and carrots are poured into machines which peel and then dice them. Frozen mince is cut up by a meat saw, and then braised. When it is partially cooked, the vegetables and seasoning are added.



- Credit, API Photo

Rich in protein, carbohydrates, vitamins and minerals, patties provide at least one-third of each child's daily dietary requirements. The banana cake which has recently been added to the menu, replaces the patty sometimes for variety. The cakes have less protein but are still very nourishing.

'Nice'n Nuff' is the name given to the milk produced by NPL. It is a recombined milk made up of skimmed milk powder, soya oil and a

little vanilla or almond flavouring. The milk plant began production in April 1973 with a daily production of 3,000 half-pints of milk. Present production figures are 60,000 half-pints daily.

NPL has recently received another milk machine which will allow them to double the daily output of 120,000 half-pints. This machine is yet to be installed and new staff will have to be hired

and trained. The Managing Director, says that bearing all this in mind, he expects the new machines to be on-stream between January and April 1977.

In October 1974, NPL began to make plantain tarts but this was unpopular with the children so in May of this year, they substituted banana cakes.

At this time, NPL supplies 66 primary, all-age and Government infant schools; 45 basic schools and 8 day care centres. During the summer holidays, they run a service for the Ministry of Education's summer project and the Social Development Commission's day camps. This year, they added orange juice to their menu and, as a special treat for the thousands of children who took part in the Carifesta Grand Gala, they served cherry-flavoured milk.

NPL's Quality Control Officer displays a keen interest in satisfying the children whom she helps to feed daily. Every day, she inspects the entire milk, patty and cake-making operations to ensure that all food is being prepared under the most hygienic conditions. Clean uniforms are issued daily to factory workers. A sanitation crew is responsible for cleaning up all factory areas except the warehouse and dairy. Public Health Inspectors as well as officers from the Storage and Infestation Division of the Ministry of Marketing and Commerce visit the plant regularly.

Part of her time is spent doing lab tests on finished products and raw material to determine bacteria count. Whenever the bacteria count goes up, even slightly, this is her signal to launch an all-out drive against possible insanitary practices.

In the entire island, there are about 700,000 children who could benefit greatly from the nutritious meals being served by NPL. With only 60,000 of these children being fed so far, the Programme still has some way to go. A feasibility study has been completed for a plant in St. James but, at this time, money is the main problem hindering expansion. However, big steps have been

taken in the right direction and the will and know-how are there. It will not be too long before the clear benefits received by the 60,000 Corporate Area children from Government's Nutrition Programme, will be spread to all Jamaican children.

WHAT A WASTE!

Whether free or sold at 50¢ a meal, a survey of Des Moines City schools found about 25% of the food in federally funded lunch programmes is scraped down the drain.

School menu planners know what pupils like, but often must load their trays with food they won't eat. Among the things that come back uneaten are most vegetables, fruits and salads. Cabbage, broccoli and spinach lead the list. At one elementary school, 10 gallons of milk were poured down the drain following a single lunch hour.

- The Jamaica Daily News
15 December 1975



During the interview on "Barriers to Communication" conducted by Dr. Everold Hosein.



Members of the panel on "Advertising and Marketing Methods" compare notes.

Photo by Max Senior

© CFNI

REPORT ON TECHNICAL GROUP MEETING ON "NUTRITION AND THE MASS MEDIA"

More effective communication programmes for food and nutrition, the establishment and implementation of advertising standards for food products in harmony with nutritional objectives, and more active coordination between nutritionists and the media, were issues highlighted during the recent Technical Group Meeting on "Nutrition and the Mass Media" convened by the Caribbean Food and Nutrition Institute.

During the week of 13-17 September, regional mass media representatives and nutritionists, assisted by technical advisers and resource personnel, met to discuss and critically examine the actual and potential role of mass media in food and nutrition activities and programmes.

The main objectives were to create among mass media communicators, an awareness of food and nutrition issues in the Region, and among food and nutrition workers, an awareness of the potential of the mass media and other communication channels in the solution of food and nutrition problems.

The subject matter of the meeting included the effect of current nutritional knowledge on food habits and nutritional status, the impact of commercial food promotion on, and the relevance of, advertising techniques to nutrition education, communication strategies for nutritional improvement, potential of mass media in food and nutrition development in the community and the mobilization and integration of regional mass media resources.

Lectures and presentations were made by both regional and foreign experts in the relevant fields of nutrition, communication strategy and food promotion.

Multi-disciplinary committees were formed to develop a series of practical recommendations for the more efficient utilization of mass media facilities for food and nutrition purposes in

the CARICOM Region. Five specific subject areas were reviewed and identified for future action, these included planning and organizing food and nutrition communication programmes, media strategy, message design, research/evaluation and training needs. The final recommendations will be put at the disposal of relevant and competent authorities concerned with food and nutrition and communication in all the member countries of CFNI. It is expected that they will help to facilitate the more efficient use of regional mass media resources to achieve food and nutrition goals, wherever this is practicable and possible.

A basic misconception in thinking of communication and change...is the lack of understanding of communication as a social process and mistaking it for transmission towers, documentary films, etc.

*Dr. K.E. Eapen
Bangalore University*

FOOD AND NUTRITION CONTENT
AND APPROACHES IN CARICOM MEDIA*

by

Hutton G. Archer

"The reasons for training a teacher before putting him/her on the job are widely appreciated. However it needs to be recognised that the production of meaningful material on food and nutrition - and related fields - demands a certain degree of expertise, an ability to transmit possibly boring information in an interesting manner."

The information utilised in this paper has been obtained from a study of relevant literature published in regional newspapers during the four-month period April-July 1976. The following newspapers have been examined:

Trinidad	-	The Trinidad Guardian
	-	The Express
Guyana	-	The Chronicle
Jamaica	-	The Jamaica Daily News
	-	The Daily Gleaner
Barbados	-	The Advocate

The material on Food and Nutrition has been presented and analysed with the aim of determining whether there is an underlying, motivating strategy and if there is, to establish the nature of this strategy. It must be emphasised that the approach adopted for Food and Nutrition will determine the nature of the content of

*This paper was presented in connection with the Technical Group Meeting on "Nutrition and the Mass Media". Mr. Archer is Deputy Chief Information Officer, Guyana.

articles on this subject; this paper treats 'content' and 'approach' as complementary elements of the same structure. It also provides a critical assessment of the quality of the content of articles on food and nutrition, the presentation of content, the frequency of articles on food and nutrition, and the approach motivating the content.

APPROACH AND CONTENT

The emphasis on greater productivity in agriculture, live-stock and fisheries, and the stressing of the need for a redistribution of wealth in the Region are clearly related to Food and Nutrition. The perspective can easily be broadened. There is a common approach underlying the relevant literature and we shall examine its various dimensions.

A large number of articles exploit different ways of encouraging people to become involved in agriculture. Many newspapers quoted the following statistics for the Region released by the CARICOM Secretariat in July 1976.

Year	Exports	Imports
1965	\$404M (E.C.)	\$320M (E.C.)
1972	\$507M (E.C.)	\$609M (E.C.)

These figures show a deficit of \$102M (E.C.) for 1972. The fact is that during the last 10 years, the CARICOM Region has moved from being an Agricultural Surplus Area to being an Agricultural Deficit Area. Agricultural imports are showing a 9% annual increase. Over the period 1960-70, there has been a 33% drop in employment figures in the Agricultural sector. In 1974, the Food Import Bill was \$1,000M (E.C.) and this is a modest figure when one considers that 44% of the regional population consumes a minimum level of protein, and 56% consumes less than the minimum calorie requirements.

By exposing the darker side of the Agricultural situation, the articles reveal the need for increased participation in agriculture. The "Daily Gleaner" (14 July) described a plan to rescue the Jamaican economy: \$1.2M was put aside to finance the building of homes for farmers, \$6.6M was to be used in an expansion programme designed to lease more than 5,000 farmers, and \$1.5M was made available to the Agricultural Credit Board. This article will convince many readers not only that farmers have an important role to play in national development but also that farming can be financially rewarding. Many - if not all - Caribbean countries have similar schemes for allocating land to farmers and offering them financial assistance.

Regional newspapers give useful advice on sowing seeds, dealing with pests, choice of fertilisers, etc. The "Chronicle" (31 May) described how to grow eschallots under the following headings:

- (1) Functions of the crop.
- (2) Preparing the ground and planting the crop.
- (3) Use of fertilisers.
- (4) Possible insect pests and ways of controlling them.

The "Chronicle" (28 June) discussed the importance of soil testing for higher yields and described how and when to test soils. Further, agricultural seminars, 4-H clubs and praiseworthy individual performances on the farm are given wide publicity.

At least once per week, some regional newspaper - especially the "Daily Gleaner" in its Food Supplement Section - helps the housewife to purchase her food requirements at the best prices to be had. Many newspapers - with the notable exception of the "Advocate" - publicise a wide range of recipes for food, homemade drinks and pastry. Useful hints on cooking, for example, how to boil or roast a chicken or thaw fish, are given. However some

newspapers often go a step further to provide a deeper treatment of the relationship between Food and Nutrition. The "Sunday Gleaner" (13 May) concentrated on carrots and pointed out that carrots were a good source of vitamin A. Recipes involving carrots were suggested, e.g. carrot drink and Steamed Carrot Pudding. The "Daily Gleaner" Food Supplement (13 May) pointed out that fish was a source of protein; housewives were advised on how to keep fish and how to let it thaw before preparing it; and recipes based on fish were presented.

Newspaper articles sometimes advise on the preparation of meals which have the necessary food values. The "Daily Gleaner" Food Supplement (22 April) pointed out that vegetarian diets must be properly planned and must include, as a basis, a variety of plant foods supplemented by dairy products and eggs. It was suggested that legumes, especially soya bean, are high in protein, iron, B vitamins and fibre and should be used in vegetarian diets. Vegetable oils, especially corn, have a high content of fat-soluble vitamins which should be useful to the vegetarian. Cereal grains have a high content of thiamin, iron and trace minerals. An issue of the "Chronicle" (18 July), discussing the food values of white and brown rice, reveals:

	Units*	Protein Content	Fat Content
White rice	363	6.7	0.4
Brown rice	369	7.4	0.3

*A unit being a measure of energy.

The nutritional value of white rice can be supplemented by other types of foodstuffs. And vegetarian diets must be supported by fruits which are sources of many vitamins and minerals; for example, lemon is good for diphtheria, rheumatism and fever; it is

also very effective against typhoid and cholera, however, it must not be used with sugar. Eileen Cox, in a number of articles in the "Chronicle", makes a strong case for increased vegetarianism. In the 11 April issue of the "Chronicle", she quotes from a report by the U.N. World Food Assessment Group (1974):

"Today we annually feed our livestock as much grain as all the people in China and India eat in a year."

She refers to the OXFAM report which points out that there is one acre per person in the world for food production. A meat eater needs more than twice that of a vegetarian to support him and so takes more than his fair share.

Miss Cox quotes a list of sources of protein in the "Chronicle" (11 April):

Sources of protein	Amount	Grams of protein your body can use
Cottage Cheese	6 tbsp.	13
Milk	1 cup	7
Sesame Seeds	3 tbsp.	3
Kidney Beans	$\frac{1}{2}$ cup	5

Miss Cox's stress on vegetarianism, 'no killing for eating', is important in the Caribbean context since meat and meat products which are traditional sources of protein are often beyond the financial reach of the small man.

A few articles give much-needed hints on how to make full benefit of foodstuffs. The "Daily Gleaner" Food Supplement (13 May) reveals that:

- Throwing out water left from soaking legumes or cooking vegetables, fruits, rice, macaroni, etc., can mean pouring nutrition down the drain. For example, soaking peas for 10 minutes in water can dissolve up to 35% of the vitamin C content and up to 40% of the vitamin B₁ content.
- Vitamins and all minerals except calcium dissolve in approximately the same proportion when vegetables are soaked.
- Vitamin B₂ is destroyed in the presence of light; two hours of exposure to sunlight may rob milk of approximately 80% of its nutrients.
- When cooking meat, the health promoting value of protein is lost due to high temperatures.
- The calcium content of meat sauce or gravy can be enriched by adding a little acid such as vinegar or tomatoes.

In the same tradition, Lelord Kordel writing in the "Express" (4 April), advises:

- To avoid combining high proteins, red meats, fish, chicken, cheese, milk, with high starches, rice, macaroni, spaghetti.
- To avoid combining pure fats with high starches in any meal. For example, bacon - about 100% fat - combines with fried potatoes, cream, white sugar and white bread to form a common breakfast; this should be avoided.
- An average meal should have a majority protein or carbohydrate content.

- A meal should start with fruit, a cup of vegetable soup, bouillon or broth.
- Vegetables, fruits, starchy foods must be thoroughly chewed.
- Protein foods require little chewing for good digestion.

CONTENT OF ARTICLES DEALING WITH FOOD AND NUTRITION

A number of comments can be made on the quality of the articles on Food and Nutrition. While newspapers put out a large number of recipes, the reader is seldom informed of the nutritional content of the recipe; to indicate that a meal is 'nutritious' is not much in the way of information.

Further, no newspaper has tried to suggest a weekly menu rather than a number of recipes. Many of these recipes are obviously not for the benefit of the small man who can hardly afford Mexican or Greek ingredients, or Indian Curried Mutton, or roast beef, or noodles and cheese casserole, etc. It must be pointed out that recipes are only important if they can help the housewife to plan a 'normal' menu rather than a menu for special occasions when guests are invited.

Useful bits of information are overlooked; how many housewives are aware that seeds are sources of energy, protein, fat and calcium? Or that squash and cucumber, both fetching high prices on the market, contain little else but water? Many people still feel that split peas and rice is a poor meal; the fact is that split peas (Dahl), rice and a fruit form a balanced diet. Dahl and Roti or Dahl-Puri can be the basis for a cheap lunch snack. The leaves of eddoe, dasheen or sweet potato plants can be used as substitutes for callaloo but few have tried them.

Much of the literature on Food and Nutrition consists of recipes, shopping tips, cooking hints, etc. There is relatively less attention paid to the importance of human nutrition, nutritional requirements of the body, nutritional value of foods, etc. Giving recipes does not demand much knowledge. However, giving shopping tips and cooking hints does call for some expertise, and newspaper staffs seem to lack individuals with the necessary qualifications.

The "Trinidad Guardian" (16 May), in an article entitled, 'Do your part - grow more food' attempted to instruct the farmer on the preparation of soil, the choice and use of fertilisers, etc. No specific crop was mentioned or no specific fertiliser or crop pests. The article said nothing in many words. While the importance of livestock is widely proclaimed, there is no attempt to give information on livestock diseases and animal husbandry.

THE PRESENTATION OF CONTENT

The presentation of articles on Food and Nutrition leaves much room for improvement. Foreign newspapers and magazines, etc., use attractive methods of photography to display the dish of food product advertised; a few merry children, or a contented family at table, may be shown sampling it with obvious relish. Many children, even adults, are so impressed that they paste these photographs on walls, cupboards, etc. CARICOM newspapers give bald recipe lists without any attempt to encourage the reader's attention. Instructions on how to grow a certain crop are given without any explanatory diagrams; a list of precise orders seems to be enough. Much important information fails to get to the reader because of the artless manner in which it is presented; one has the impression that the writer copied it from some severely academic book without bothering to breathe a little life into the words. Many writers still persist in ignoring the quality of the reading public and indulge in verbal tournaments executed in such perfect

English that the 'man in the street' is reduced to a mere bystander; he cannot participate actively in the informing process designed to reach him. For him, proteins, vitamins, etc., are abstract concepts and if these are represented in concrete terms by diagrams of meat-products, fruits, etc., he is more likely to understand. The possibilities of little sketches, crossword puzzles, cartoons, etc., as means of conveying information on Food and Nutrition are largely unexplored.

Perhaps the reason that few people are attracted to farming is because the image of the farmer presented in the news media is not very flattering; he is either the solid, gloomy, dependable, not-in-the-least romantic figure on whose shoulders the economy rests, or the reluctant man who is to be goaded into agriculture by teasing him with loans and other financial incentives. The image of the farmer as a pioneer, an explorer, a romantic man who knows no constraints and is prepared to endure hardships because he is a man bent on subduing the hostile environment remains to be exploited. The financial aspect of any job is important but it must also be something for the ego. Cane cutters earn more and work shorter hours than many clerks but the latter will hardly think of exchanging places with the farmer.

The reasons for training a teacher before putting him/her on the job are widely appreciated. However, it needs to be recognized that the production of meaningful material on Food and Nutrition, and related fields, demands a certain degree of expertise, an ability to transmit possibly boring information in an interesting manner. Much of the material examined during the preparation of this paper indicated that the writers not only lacked the expertise but were poorly qualified to plan a coherent programme and present it in stages in the newspapers; the result was a random assortment

of articles which were, mercifully, related to Food and Nutrition in some way. Evidently, there is a need for more cooperation between the Nutrition Units or Divisions and the staffs of newspapers.

FREQUENCY OF ARTICLES ON FOOD AND NUTRITION

The effectiveness of any attempt to make the public aware of Food and Nutrition must depend on the frequency of articles dealing with this subject. I have earlier explained the relationship between agriculture, fisheries, etc., and Food and Nutrition; below are charts which give some idea of the frequency of relevant articles.

The following newspapers have special sections which are devoted to Food, Agriculture, Nutrition:

Newspaper	Name of section	Date of publication	Month
Chronicle	Forward	5, 12, 19, 26	April
Trinidad Guardian	Market News Service	4, 10, 14, 24, 29	
	In the Garden	3, 10, 24	
Daily Gleaner	Farmer's Weekly	3, 17, 24	
	Food Supplement	1, 8, 14, 22, 29	
Chronicle	Forward	3, 17, 25, 31	May
Trinidad Guardian	-	-	
Daily Gleaner	Farmer's Weekly	1, 15, 22, 29	
	Food Supplement	13, 20, 27	

Newspaper	Name of section	Date of publication	Month
Chronicle	Forward	14, 17, 21, 28	June
Trinidad Guardian	-	-	
Daily Gleaner	Farmer's Weekly Food Supplement	5, 26 10, 15, 17, 24	
Chronicle	Forward	6, 12, 26	July
Trinidad Guardian	Market News Service	17	
	In the Garden	-	
Daily Gleaner	Farmer's Weekly Food Supplement	- 8, 15	

The following chart measures the frequency of articles which are found outside the specific sections examined in the preceding chart:

Newspaper	No. of relevant articles			
	April	May	June	July
Chronicle	7	5	4	17
Jamaica Daily News	1	6	4	-
Daily Gleaner	1	1	3	9
Trinidad Guardian	-	1	1	5
Express	1	3	5	1

Some general comments can now be made:

- (1) There is negligible emphasis on Food and Nutrition in the "Advocate".
- (2) The articles in the "Express" are few and the period spanning articles is too long.
- (3) The relevant section in the "Trinidad Guardian" did not appear in May, June and most of July.
- (4) Very little emphasis was placed on Food, Nutrition, etc., in all newspapers published on 5 July, with the exception of the "Chronicle".
- (5) With the exception of the "Daily Gleaner" and the "Chronicle", more space was given to Sports, especially the Montreal Olympics, than to Food, Nutrition, or related fields.
- (6) Such treatment of a crucial issue does not impress the reading public with the gravity of the issue.

QUALITY OF APPROACH

The traditional nutritionist believes that his/her job involves the planning of balanced diets, advising on various aspects of home economics, environmental sanitation, etc. However, the 'problem' of Food and Nutrition does not end here; it even involves, ultimately, political action. The 5 July issue of the "Chronicle" quoted Mr. A. McIntyre* as saying:

*Secretary-General of the Caribbean Community Secretariat.

"We would remind CARICOM planners that gross production figures can often distract attention from the serious problem of badly distributed food consumption as between different social groups in the community."

This is why it is erroneous to divide the total amount of food available (food imported and food produced locally) by the total population to determine if the minimum food requirement is met.

The following data (1970) gives a clear idea of the extent of under-nourishment in Guyana: 30% preschool children and undertermined number of schoolchildren do not receive sufficient dietary energy and protein; 30% families suffer from calorie deficiency; 30% families fail to meet adequate protein requirements; 30% families lack sufficient iron; and more than 50% are deficient in B-vitamins. In the CARICOM Reigon, the unemployment rate is about 25%-30% underlying under-nutrition is the problem of economic poverty. Recent research undertaken in Guyana, revealed that it would cost \$1.90/day to give an adult the minimum food requirements. An average family; mother, father, 3 children, would need about \$60.00 per week to purchase food. How many workers earn that kind of money? In such a situation, Health Education alone is of very small importance.

Increased production alone will not solve the problem. The income of the small man must increase also. Further, farmers must concentrate on producing for a market in which the majority of buyers have a limited spending power.

Often, increased food production means that those people who have capital invest in agriculture; the rich, become richer, etc., the class system of the society remains unchanged and those who used to starve still starve, although those who used to have enough now have more than enough. The small man must be encouraged to participate in cooperative agricultural schemes so that national progress becomes an indication of the improved condition of the mass of the people.

Many shops operate on the principle that 'scarce' items are only sold in significant quantities to purchasers who buy a certain amount of foodstuffs. Some buyers spend a lot of money and obtain large quantities of scarce items; the poor housewife with a big family and limited spending power cannot buy enough of these scarce items.

A system of rationing is needed to remedy this situation. Often, too, supermarkets, etc., do not have a specific item but black market vendors at street corners sell the item at notorious prices. It is difficult not to suspect that the established selling agencies have sold these items to the black marketeers at high prices, so the latter can carry on the exploitation process.

Consumers often find themselves paying more for a locally produced commodity than for the imported equivalent. The authorities encourage the consumer to support local produce and so help to keep his fellow workers employed. This is a reasonable demand, within limits. What is the good of producing locally if local produce are sold at prices far beyond the small man's capabilities. In Guyana sweet potato and cassava are now in this category, although they are easy to grow back yard crops. There is need for efficient government agencies to be responsible for buying local produce at reasonable prices and retailing the produce to the consumer at prices he can pay. Also, the high cost of local produce is largely due to excessive expenditure caused by inefficiency and it is the consumer who feels the burden.

There is an acute need for research in this field. Many CARICOM countries can spend fantastic sums on sports, etc., but cannot provide finance for research projects; it is simply a question of getting priorities in the correct perspective. A research project to determine the various uses to which cassava can be put is a crying necessity. In a paper entitled 'Edible oils and fats from non-conventional sources', Mr. Debideen claimed that the

Caribbean was not giving serious attention to oils and fats potential. He advocated increased growth of cucurrit seeds and pumpkin but stressed that no research on the use of pumpkin seeds as by-products had yet been undertaken.

CARICOM newspapers need to give their readers a full picture of regional attempts to deal with Food and Nutrition. With the exception of the "Chronicle", we have not seen sufficient attention developed to the CARICOM Food Plan in CARICOM newspapers. More than that, newspapers need to view regional projects in this field objectively and to suggest improvements when necessary. This lack of initiative, this failure to place emphasis on a crucial problem can only convince the reading public that Food and Nutrition is not as important as occasional 'voices in the wilderness' proclaim.

The narrow view of the role of the nutritionist and of the scope of Food and Nutrition is reflected in the limited approach to the problem; Food and Nutrition articles are little more than recipes, shopping tips, etc. An indication of the real scope of the field is revealed in this quotation from the "Chronicle" (13 June), from a news release of the Caribbean Food and Nutrition Institute:

"Linked with any plans to improve the food supply of the CARICOM Region should be strategies for the elimination of poverty, improved environmental sanitation and personal hygiene, the control and prevention of infectious diseases, together with a comprehensive change in food attitudes and practices. These measures must fit into national and regional plans aimed at a general improvement of the quality of the human resource potential of the Region."

THE MASS MEDIA COMPONENT OF A FOOD AND NUTRITION POLICY*

by

Louis Marriott

The linking of "Nutrition" and the "Mass Media" in this discussion presupposes that the mass media have a role to play in national nutrition education.

This is a reasonable expectation, as the general role of the mass media is most commonly defined as "to educate, to inform and to entertain".

My own observation of the Jamaican situation in 20 years as a journalist both within and outside Jamaica convinces me that the educational role of the mass media here exists only in theory.

Many of our working journalists and broadcasters in the mass media take a close institutional interest in freedom of the press but regard that freedom as an absolute right and a natural right. They are much less enthusiastic about the responsibility of the media to promote the interests of the public or to their role as communicators in the social system.

A search of one year's issues of the "Daily Gleaner", published between October 1975 and September 1976, revealed ten articles, including editorials, columns and reports of speeches by the principal executives of the Press Association of Jamaica asserting the sanctity of freedom of the press.

*This paper was presented to the Technical Group Meeting on "Nutrition and the Mass Media". Mr. Marriott is a journalist/broadcaster and Director of Publications at the Agency for Public Information which he represents on the Nutrition Advisory Council (Jamaica).

But the search revealed no utterance from the "Daily Gleaner", its columnists or executives of the Press Association on the social responsibilities of the press.

The indifference of the mass media towards the great human problems of the day is a serious handicap to anyone undertaking a programme that involves public education through the mass media. Food and Nutrition is no exception.

In the Food and Nutrition Policy for Jamaica, formulated in 1974 and approved by Parliament in 1975, three targets were set out to list the nutritional status of the population. These targets were:

- (1) To ensure availability by 1980 of sufficient food; i.e., adequate quantities of essential commodities, to maintain good nutrition and dietary well-being of all segments of the population.
- (2) To ensure annual increases in the proportions of energy and protein requirements supplied from local production.
- (3) To eliminate malnutrition in vulnerable groups of the population, in particular:
 - (a) serious protein-calorie malnutrition and anemia in children up to five years of age; and
 - (b) nutritional deficiencies in pregnant and lactating women.

The third target, relating entirely to Nutrition, seems to have been revised downwards. The Second Population Project which the Government of Jamaica is about to launch, with assistance from the World Bank, has, as one of its two immediate objectives, the reduction of serious protein-calorie malnutrition in all children

from 0-4 years of age by 50%, and the elimination of anemia of pregnant and lactating women, by 1980.

The broad policy, then, regardless of precise quantities, is to increase food production and reduce malnutrition and to make the first aim serve the second.

Naturally, the communication function is critical to any programme designed to implement such a policy. The most successful communication approach will be one which involves a mixture of mass media and interpersonal communication, not only in judicious proportions, but also in a skilfully orchestrated way.

The communicators, working as an aggregation, will have to move the society along a continuum starting with an awareness of the problems, and moving through awareness of possible solutions, to experimentation, satisfaction, and, finally, changed behaviour.

While all media will need to be employed throughout, the mass media will have a particularly crucial role to play early in the campaign, in making the society aware of the problems and of the possible solutions.

Where food production is concerned, the task of the communicator is relatively uncomplicated. Because our bodies need certain nutrients, and these are derived from food, we need food supplies. If we buy food from abroad we must find foreign exchange for it. Foreign exchange is very difficult to find. At the same time we have spare capacity in the economy - especially in land and labour - and therefore we should produce our own food.

Hardly anyone will argue against that simple proposition or have cause to oppose its ultimate goal. In terms of potential resistance, there are only the traders in imported foodstuffs to consider and they should be able to switch easily enough to local produce when it becomes available. Indeed the Government's much publicised food production drive has not aroused hostility from any sector of the population or any special-interest group.

So a mass media campaign to promote national food production is likely to attract universal support; and the media would be able to embark upon such a campaign with a straightforward message.

In the case of Nutrition, however, there is a serious complication. A great deal of resources will have to be used, from the inception of the mass media campaign, to counteract commercial messages that the mass media themselves have carried in the past. And unless there is a speedy resolution of the problem of advertising standards, in effect, large proportions of public expenditure on nutrition education will be continuously siphoned off into this kind of wasteful counteraction.

The impact of advertising is noted by the Nutrition Advisory Council. Under the heading "Knowledge, Attitudes and Beliefs" the Council's policy document reads:

- *"There is inadequate knowledge of the nutritional value of various foods at all levels from physician to consumer.*
- *"Advice on the care of children given by uninformed but influential persons often does more harm than good.*
- *"Some consumers have aversions because of religious or cultural beliefs to the use of certain very nutritious foods, e.g. liver and pork.*
- *"Many foods, drinks and dietary supplements, particularly 'tonic foods', are falsely or misleadingly advertised as to their nutritional content on radio and TV and in the press.*
- *"Undue emphasis is given to the promotion of infant formulae in place of breast-feeding, a practice which can result in both gastroenteritis and malnutrition.*
- *"The advertising of highly processed, imported, and relatively costly foods is excessive as compared to that of locally produced fruits and vegetables.*

- *"The value of a food is often judged to be in proportion to the cost by middle and upper income groups and similar judgement is exercised by the less well off. Welfare or subsidised foods are often viewed with suspicion."*

The first and most formidable task that will confront the nutrition educator is to counteract the misinformation and miseducation propagated by commercial interests, particularly in the food and pharmaceutical trades.

That misinformation and miseducation is compounded by myths and superstitions about Nutrition, which form a substantial part of the folklore of our society, and by what the Food and Nutrition Policy document calls "inadequate knowledge of the nutritional value of various foods at all levels from physician to consumer."

The accompanying reference to "the care of children given by uninformed but influential persons" also merits repetition.

Because of the volume of misinformation about Nutrition that prevails in our society, the nutrition educator has to clarify and sharpen his/her messages and proceed swiftly towards the standardisation of nutrition teaching by public agencies concerned with the subject.

Any confusion or deviation in doctrine will erode the impact of the messages that will be transmitted in the communication campaign of the National Nutrition Programme.

The nutrition educators will necessarily have to confront commercial interests which enjoy the advantages of far greater resources, seductive techniques and a tremendous headstart in the propagation of their messages.

It is conceivable, and should not be overlooked, that the mass media might be subjected by pressure, to be unsupportive of a campaign that would be inimical to the commercial interests of firms that have been financial pillars of the media.

Of the two daily newspapers in Jamaica, one is jointly owned by a firm of bakers and a firm of beverage manufacturers. One of the partners in that firm bottles a stout that we are told "puts it back".

In the case of the other daily newspaper interlocking directorships result in that paper's boardroom being occupied by persons with interests not only in food and drink but also in pharmaceuticals.

It is perhaps not surprising that recent discussions among the media, advertising agencies and regulatory government bodies to establish a voluntary advertising code were suddenly frustrated at the very end of the road when all that remained to be done was to affix the signatures to the agreement.

We are, therefore, left with the great irony that while our Standards laws ensure absolute integrity in the labelling of some foods, the labelling regulations are rendered ineffective by the licence advertisers who enjoy to make the most outrageously deceptive claims about their products.

Thus, for example, exaggerated claims are made for food preparations on radio and television and in the press; and audiences are told that one food distributor takes special care in the selection of its vegetables and a particular brand of carrot juice is thicker than others - so thick that you can dilute it. The truth is that the products advertised are indistinguishable from five or six others packaged by contract packers for the distributors, who merely supply their own distinctive labels.

The problem that the nutrition educator has in working through the mass media is clearly seen in terms of the objectives to which a nutrition education programme will relate:

- (1) To inform the population about nutrition and promote an awareness of nutrition problems.

- (2) To inform the population about balanced diets and desirable dietary practices.
- (3) To motivate the public to make the right choices to improve their diets and persuade people, where necessary, to modify their diets.
- (4) To influence the state to help in the solution of the problem by rationalising our food laws, legislating in the area of advertising standards, and taking other necessary action to help lift the nutritional status of the population.
- (5) To create a climate for the ready acceptance of low-cost nutritive foods.

With regard to food production there is the need, first to raise the level of national output; second, to relate production more closely to the nutritional needs of the population, and third, to promote individual self-reliance as a means of maximising production and improving the nutritional intake of families.

All mass media will need to be involved in the National Food and Nutrition Programme not in an uninterested, half-hearted or mercenary spirit but showing a moral and professional commitment to a programme affecting the health and welfare of a large percentage of the population.

This means that the mass media should see the question of food and nutrition as press copy and programme material. The media should not only respond to public policy, as in the past. They should begin to initiate. They should play an investigatory role in identifying and illuminating the problems in the area of food and nutrition and the possible solutions to those problems. They should play a leading role in motivating the society to make the changes necessary to improve food production and the nutritional

status of the population. They should turn the spotlight on nutrient value and cost to guide and assist the consumer in making the right choices.

They should expose those who would deceive and misinform the society for commercial gain. They should build up pressure on the decision-makers to legislate against false and deceptive advertising and to upgrade and expand Standards laws relating to food.

The food and nutrition educators themselves will need to study the operations of the media; their relative advantages and disadvantages; the correlations between poverty and nutrition and illiteracy and nutrition and the implications for a mass media strategy; the factors that effectively motivate the society or significant sectors of it; the cost-effectiveness of the various available mass media; cultural variations in the society as they affect the response to messages; and the reach and penetration of various mass media.

In terms of their mass media strategy, the educators will need to define the problems of food and nutrition for specific population groups, for example, babies, children, schoolchildren, pregnant and nursing women, working men, the unemployed and the aged. They will need to develop a segmentation approach to mass media communication, as each segment of the population requires specific solutions and separate action programmes.

They will need to develop specific action-oriented messages so that the population receiving them will have full information on which to act.

They will need to communicate in language to which the population will relate and will need to exploit all available cultural forms (for example reggae music, drama and comic strip). They will need constantly to innovate to find the most effective and impactful vehicles for motivating people.

To be successful, a mass media campaign on food and nutrition needs to achieve dimensions that have not previously been experienced in Jamaica. The campaign will need to operate on the level of the customary paid advertising and public relations. But, more importantly perhaps, it needs the total moral involvement and commitment of the mass media; and this will require nothing short of a breakthrough by which the mass media will see themselves in their best light - as the "fourth estate" of the realm, the public-interest pressure group and citizens' defender.

"The amount of time children spend watching [TV] commercials, the frequency with which they appear, and the amount of money spent by the manufacturers to air their commercials are impressive statistics. Taken together, they are a strong indication of the relationship between advertising and eating habits."

Peggy Charren and
Evelyn Sarson.

J. Nutr. Ed., 5 (No. 3),
1973

THE MINISTRY OF HEALTH/CATHOLIC
RELIEF SERVICES COMMUNITY STUDIES PROJECT*
(A - IN HANOVER)

by

Helen Fox

Health care in Jamaica is provided through hospitals and Health Care Centres which care for the sick, with antenatal and Child Welfare Clinics giving preventive medical care. Unfortunately, only approximately 50% of the mothers and 30% of young children take advantage of these services.

Prior to 1970 Nutrition Education by the Ministry of Health to vulnerable target groups was largely confined to individual counselling by Public Health Nurses in clinics and occasional group teaching sessions which were often thwarted by inadequate or inappropriate teaching materials. Very little was done in the way of demonstration and group participation in preparing locally available foods in nutritious, low-cost combinations to meet the needs of the more vulnerable family members. This would seem important in view of the fact that tangibility has been shown to be an important factor for change - that seeing, preparing and tasting a food appears to be far more potent in instituting it into everyday use than merely hearing about it.

Unfortunately, it is often difficult to get members of the community to understand and carry out instructions given by health personnel, teachers, social workers, etc., apparently, because not

*This paper was presented to the Technical Group Meeting on "Nutrition and the Mass Media", as part of the Symposium "Community Involvement in Food and Nutrition Programmes". Miss Fox is a Technical Officer/Nutritionist at the Ministry of Health and Environmental Control (Jamaica) and is Head of the Nutrition Department.

enough is known about people's beliefs and values to enable communication that really animates people to alter their behaviour.

THE PROGRAMME

Prompted by a history of little or no success in reducing the prevalence of malnutrition by existing Nutrition Education methods and materials, the Ministry of Health and Environmental Control, in conjunction with the Catholic Relief Services, instituted a programme aimed at reducing infant malnutrition by identifying effective techniques for the "Animation of Parents and Communities for Improving the Health Status of Young Children".

Salt Spring, a community in the midst of a depressed sugar-cane area in Western Hanover was chosen as the initial site for this programme. The incidence of malnutrition and gastroenteritis in this area was reported by health personnel to be high. Hospital admittances and re-admittances were frequent. The economic resources of Salt Spring were limited and it was felt that if this community could be animated to improve the nutritional status of its young children, health and extension personnel from other areas would be motivated to employ similar techniques in their own communities. It would be necessary, therefore, to keep expenses and outside resources at a minimum.

In as much as one of the primary objectives of this programme was the involvement of the community in recognizing and helping to solve its own problems, members of the Salt Spring community were invited to attend a meeting to discuss what they felt to be the major problems confronting them. A group of over 20 members of the community (the majority were men and all were from the low economic strata representative of the area) met with the programme workers to discuss these problems and exchange ideas as to possible remedies. Discussion was lively and the community leaders were anxious for community improvement.

Problems discussed at this meeting ranged from the very difficult to solve, i.e., availability of land, jobs, etc., to those with more immediate solutions, i.e., worm infestation, mosquitoes, etc. In an effort to gain the confidence of the community, direct moves were made to assist its members to confront some of the problems concerning them, e.g., mosquito spraying of the area was begun with a promise in return from the community members to do their part by cleaning up old bottles and tin cans that were collecting water and breeding mosquitoes.

During the first few months of the programme in Salt Spring while staff was being recruited, a US Peace Corps Volunteer spent a great deal of time talking to families and casually discussing with mothers and fathers problems they were having with feeding their families. Many home visits were paid to homes with severely malnourished babies. She helped to pave the way for the more intensive programme which was to follow by gaining the confidence of influential community members with whom contact had already been made. Baseline data was collected through a socio-economic survey, an assessment of nutritional status by anthropometry, a descriptive household dietary survey and a 24-hour food consumption recall survey among normal and malnourished children. When the information on nutritional status was available an attempt was made to identify any correlation between it and the socio-economic indicators. It was felt that the knowledge of such factors could produce a base for attacking the problems of malnutrition.

The success of the community aspect was judged on the basis of parental involvement and changes in nutritional status. Although no further meetings were held with all community leaders, frequent discussions were had with individual leaders. Some of these persons also made regular enquiries about the progress of the project and gave active support. Unfortunately, the services of a social psychologist to assist with the development of innovative attitude testing techniques was not made available until after

there was sufficient educational input into the area to bias the results of attitude testing. There was also delay in the development and production of new nutrition education materials for use and testing in the programme. The decision was therefore made to carry out these aspects in Prenatal and Child Welfare Clinics in the parishes of Portland and St. Thomas, at the eastern end of the Island.

Involvement of the Community

Shortly after the programme commenced a large bamboo enclosed room adjoining a small shop in lower Salt Spring was obtained for weekly meetings with parents. An active programme of interaction between community members and the programme field worker and her colleague, a district midwife, commenced. Later on, one of the community leaders secured the use of a church in upper Salt Spring and weekly meetings were held in these two areas. All children under three years of age were registered and weighed at each meeting. Parents were given a weight chart (based on the Gomez standard) on which their child's weight was regularly plotted. This card was carried to each meeting and used to explain the child's progress to the parent. A second weight chart together with other information on the child was kept on file by the local field worker.

Although all parents were invited to attend the weekly meetings, special emphasis was placed on encouraging mothers of low-weight babies to participate. If a mother in this category was not a regular attender, visits were made to her home.

Many topics relating to mother and young child nutrition were discussed at the weekly meetings, including:

Importance of breast feeding

Use of thick, rather than thin, porridge

Preparation of nutritious, low-cost weaning foods

Diet for pregnant and lactating mother
Proper sanitation and food handling

Parents were encouraged to share their experiences in trying out new things learned at the weekly meetings.

Community and Parental Motivation

It was possible to identify several factors that were at least partially successful in motivating community members to take an active part in the programme.

- (1) A lot of emphasis was placed on the *men* in the community. Certain areas such as infant feeding have been traditionally labelled as "woman's business" and many health and extension workers have neglected approaching the male population. It was noted that if a husband or baby's father was suspicious or doubtful of the programme his woman was reluctant to participate. Conversely, if a man was involved with the programme from the beginning or if he had had discussions with one or more of the programme workers he often actively encouraged his wife's participation. This was also true of the grandmother's influence but to a lesser extent and usually if the mother was quite young.

The very first pamphlet to be distributed in the area was directed to the fathers and not the mothers. A thoughtful father on the cover asks, "Will baby Bob grow strong like me?"

The Peace Corps Volunteer distributing these pamphlets found that the men who didn't receive one were approaching her and asking if they could have a copy of the pamphlet too. No nutrition message had ever been written for them before.

- (2) The community was asked and not told what their most serious problems were. A concerted effort was made to alleviate some of these problems even though they were not directly related to nutrition.
- (3) Project personnel spent time making friends with persons in the community before the project was initiated. After many private discussions with community members the desire to learn more about child feeding was created. This desire did not exist before because:
 - (a) the mothers were quite happy with the way they were feeding their children;
 - (b) mothers with malnourished children did not relate this condition to an inadequate diet.

Only after the mothers expressed an interest in learning more about child feeding were weekly meetings begun.

- (4) Parents were given a great deal of verbal encouragement and praise. An abundance of praise was freely given for even the slightest improvement in a child's weight. All mothers were given weight charts on which their children's weights were plotted.

The weight curve was explained to them and it was easy for them to see whether or not a child was growing as he should. The weight charts were kept by the mothers in a small plastic bag. The plastic bags soon found better uses - but not a single weight chart was ever lost.

- (5) Meetings were conducted in a casual atmosphere. Unless slides were being shown benches were usually placed to form a square. After the first few meetings the midwife and local field worker decided to wear everyday dresses instead of white uniforms. Every effort was made to create a casual situation unlike that of a classroom or a clinic where the teacher or the nurse does the speaking and the audience is expected to listen. It took time for the mothers to be able to discuss their own experiences, their problems and their ideas freely. Eventually it did happen. The women felt relaxed and looked forward to the meetings more as a social gathering than as an instruction session. The use of puppets made from poncianna pods helped the women to overcome their shyness.
- (6) Food demonstrations were a part of every meeting. These demonstrations served several purposes. They provided an incentive to attend meetings. All of the children shared in the prepared foods and even the mothers usually got to finish eating what was left in the pot.

The mothers gained confidence in their ability to prepare the foods by repeated opportunities to do so. The mothers were also given the opportunity to see their babies enjoy and eat the food when offered.

It was to be expected, however, that it would take a much greater length of time before mothers would prepare these infant weaning mixtures in their own homes. It was probably home visits and much persistence and support from the local field worker that finally motivated many mothers to do so.

- (7) Attempts were made to add variety and interest to meetings and to find out what the mothers wanted to do so as to maintain continued interest in the programme. After the first year, attendance began to decrease at one of the meeting centres and it was obvious that the women felt that they had learned enough about feeding their children. Furthermore, cane cutting had begun and many of the women participated in this activity. Meetings were therefore discontinued in that area but continued in the second centre which was established at a later date at the request of community personnel in that section of the village.
- (8) In spite of elaborate preparation for each survey including advance notice by illustrated circulars, notices in shops and word of mouth, there was some suspicion in the area during the five-day 24-hour food consumption recall survey.

Rumours were circulating as to why the Government wanted to know what the people were eating. It is interesting to note that this did not occur with the other surveys where the entire community was involved. The people who were involved in this study were very cooperative but the people who were not involved were upset.

There is a great need for research and massive education of the populace on proper nutrition. Assistance should be provided in this direction by the \$100 billion-plus food industry. Just in terms of practicality, it's not profitable to kill off the consumers!

Ralph Nader
"The Chemical Feast"
speech delivered May, 1970

THE MINISTRY OF HEALTH/CATHOLIC
RELIEF SERVICES COMMUNITY STUDIES PROJECT*
(B - IN PORTLAND AND ST. THOMAS)

by

Gabrielle Peat

At antenatal and Child Welfare Clinics in St. Thomas and Portland women were given a preliminary test to measure their knowledge of each of four nutrition topics viz. Breast-feeding, Your Child's Needs, Baby's Meals for a Day, and Mixed Meals for Baby from the Family Pot. Lessons on each topic were then taught by different methods and the test was again administered to a separate set of women from the same clinic to measure comprehension of the lesson and acceptance of the concepts taught. The methods of teaching used named according to their suitability to the subject matter, and included:

- (1) Slide presentation
- (2) Flannelboard presentation
- (3) Handouts or booklets
- (4) Practical demonstrations

The teachers were community officers of the Social Development Commission, National Youth Service volunteers, and occasionally, nurses. Scripts were provided and teachers were asked to follow them closely in order to ensure uniform presentations. There was no significant difference nor even a trend between the teachers.

*This paper was presented to the Technical Group Meeting on "Nutrition and the Mass Media", as part of the Symposium "Community Involvement in Food and Nutrition Programmes". Mrs. Peat is a Nutritionist based in St. Thomas, Jamaica, who has been associated with the Community Studies Project since its inception.

The questionnaires were used not only to test knowledge but also to bring out the women's opinions and attitudes. The questions were either direct, multiple choice, or true/false and reasons for answers were asked both in the preliminary and final test. The impact of a lesson was measured by the improvement in score of the final over the preliminary test. The scores were also used to assess the effectiveness of the various methods of teaching.

We were trying in these four lessons to communicate certain ideas to the mothers. We used the written word, the spoken word, pictures and questions to reach them. In this study, the written scripts were vital to getting the lessons across by any method, and care was taken in their preparation. Yet, one important fact was overlooked in the writing, that is, that the script was intended to be *spoken* and not *read*. In Lesson I, Breast-feeding, there was a sentence which read, "A breast-fed baby, who is never given a bottle, *rarely* gets loose bowels, vomiting, etc." When spoken by the teachers, what was heard was, "A breast-fed baby, who is never given a bottle, *really* gets loose bowels, vomiting, etc." Fortunately, this was detected in the teachers' training sessions and that word "rarely" was changed to "seldom" or "hardly ever". Let me give another example. In the lesson on Baby's Meals, this phrase appeared in the script, "Your 6-9 month old baby's meal." This is a tongue twister. It is important that a script should be written for the person who is going to speak it; the writer should know the purpose of his writing because the language of the script must be the language of the person speaking it. I mean by this that the phrases must come naturally to the speaker so that the right inflection is given to the words. Otherwise the script sounds artificial and stilted. I noticed during the presentation of the lessons that so often the words of the script failed to "come alive" for this very reason.

It goes without saying that the words used must be intelligible to the persons for whom they are intended. In our scripts, care was taken to avoid difficult words, high-sounding phrases and scientific terms. Yet there are two *simple* words, used frequently in our lessons (and indeed in all nutrition teaching) that had different connotations to some of the women. One is the word "food". The other is the word "feed".

To many Jamaican mothers the word "food" means primarily starchy roots like yams, cocoes, sweet potatoes; and may be extended to include other starchy fruits like green bananas and plantains. To a mother who has this restricted meaning of the word "food", how ridiculous must our lessons seem! A baby at the breast was said to be getting the best *food* for a healthy start in life. Breast milk was described as all the *food* baby needs for the first four months of his life. In the Questionnaire to Lesson IV, there was this question - "Name three foods that come from animals." No wonder the testers noted either smiles or puzzled repetition "foods from animals?" In that same Lesson IV which dealt with Multi-mixes, after careful explanations, the question was asked, "What are two foods that could be mixed together to make a good meal for baby?" From those who think of "food" as starchy roots, came the answer, "Yam and Irish Potato". The next question was, "What are three foods that could be mixed together to make a better meal for baby?" and this group replied, "Yam, Irish and Green Banana". The last question was, "What are four foods that could be mixed together to make the best meal for baby?" Answer: "Yam, Irish, Green Banana and Coco". This meaning of the word "food" made nonsense of our carefully planned lessons!

And let's take the word "feed". There was a question, "What is the best feed for a young baby?" In the Control group, 13% of those questioned think of "feed" as something from a tin to be fed to baby from a bottle. So this question brought out a list of every known (almost!) proprietary infant formula.

Even after the lessons by two methods 8% still held on to this meaning of the word "feed".

In such a study, each question must be worded in such a way that there is no room for ambiguity; and it must be so designed as to produce an answer that is really informative. There is an art to designing such questions. Some of our questions seemed to confuse the women because they were worded in academic phraseology. For example, "What are some of the steps that a mother should take to make sure that her baby's meals are clean?" Some mothers were quite bewildered by this and could only repeat "steps?". The question had to be rephrased before they were able to answer. Another example of this "examination phraseology" was "What are some of the things you would look for in a healthy baby?" Very puzzling to simple people! This one had to be rephrased also. This sort of language was not understood by the mothers.

The word "you" in certain questions was taken literally. "What fruits do you juice for baby?" brought the answer, "I only give orange juice but I now know I can give pawpaw and other fruits." And the question, "At what age do you start to give porridge to baby?" brought one answer, "He won't drink it". In other words, the mother was giving her own practice although she may have known the theoretical answer. (This is a hopeful sign).

Some health workers or extension workers are inclined to be facetious, to be sarcastic, to use fanciful speech or to make ridiculous comparisons in teaching situations. This is not a good idea. There is likely to be serious misunderstanding. Mothers take at face value whatever is said by people who are teaching the them. They do not expect jokes from such people.

From our experience in this study I will give a few examples of the confusion caused by facetiousness and tricky questions. There was a question that went like this - "Bottle feeding is cleaner than breast-feeding because you can boil the bottle but you

can't boil the breast. True or not true?" It was surprising how many mothers took the "boiling of the breast" seriously. Some women winced and involuntarily put their hands up to their own breasts, some comments went like this, "That would hurt", or "Boil your breasts?", "I never heard of that" or "You can't do that".

Another confusing question went like this, "A child who sleeps in class does this because he is rude. True or not true?" The purpose behind the question was to have mothers link sleeping in class with the lack of Energy Foods and to reject the suggestion that sleeping in class was due to a behavioural problem.

The Slides Group had seen a picture of a *girl* sleeping in class and the Handout Group had seen in the booklet a *boy* sleeping in class to illustrate the point that if a child does not get sufficient of the Energy Foods he would be tired and lazy and sleep in class. If the question had been "A child who sleeps in class does this because he does not get sufficient energy food. True or not true?", it is quite likely that all the mothers would have got the correct answer. But introducing the word "rude" confused the women and drew their thinking away from food.

One woman from the Slides Group answered, "Not true" which is correct but her reasoning was, "Something must be wrong why *she* is sleeping. Maybe she is expecting a baby or so." A mother in the Handouts Group answered, "True. He was rude, they beat him and he had to sleep." Notice that the Slides mother recalled the sleeping girl and the Handouts mother the sleeping boy.

Pictures assisted comprehension, especially when the mothers could identify something in their own experience with the message of the picture. A picture was used to show how complex bottle feeding is in contrast to breast-feeding. The teachers pointed out the danger to baby and toddler in this situation where mother has to use a kettle of boiling water to mix the feed. The point was well taken. The majority could answer correctly to the question,

"Bottle feeding is easier than breast-feeding. True or not true?" and many gave similar reasons to this for their answer, "When you breast-feed, you don't have to encounter with the kettle and boiling water." So this was a good picture that made its point.

But if the message of the picture is too subtle, it may be missed altogether. One of the points made in the lesson on breast-feeding is that breast-feeding does not make a mother's breasts long. An expectant mother's breasts become heavy and may sag if not supported by a good fitting bra. A picture of a suitable bra was shown. The teacher also explained that a woman's breasts sag as a natural result of the ageing process. This picture was shown of the same at various stages of her life, in youth, in middle age and in old age. This picture needed explanation which was not given and so its message was not received.

I can give you an example of how the women were misled by a picture. There was a question, "For baby to be properly fed on tinned feed how many tins would the mother need to buy every month? Two tins? Five tins? Ten tins?" The tester showed a picture of each choice of answer; but it was not noticed that the artist had lost perspective in his drawings. Tins were intended to be the same size but they were not. So some mothers rejected ten tins and chose instead, "those two big ones!" Care must be taken to see that the picture really gives the message that is intended!

Mothers brought a fresh eye to these lessons. In one question we asked mothers to name some dark green leafy and yellow vegetables. They named the dark green leafy ones but quite a number hesitated over the yellow. Some named ripe banana, orange and even butter. At the end of the quiz, when reminded of carrots or pumpkin, they insisted that these are not yellow but red!

The whole concept of sickness and its connection with food is not understood. Even after a lesson which taught the Protective foods, some mothers insisted that no food could prevent a child

from getting sick. As one mother put it, "A child who is to sick will sick!"

There were some concepts already known and accepted by the women but not practised because other concepts which affected the practice were not fully accepted. This was particularly noticeable in the area of breast-feeding. Concepts fully accepted by at least 90% of the mothers were:

- (1) Breast milk is better than tinned milk.
- (2) Breast-feeding is the best feed for baby.
- (3) Breast milk helps keep baby healthy.

Concepts not accepted were:

- (1) Breast milk alone is sufficient for baby during the first four months.
- (2) Breast-feeding does not cause breast to sag if a good support is worn during pregnancy and lactation.
- (3) It is not expensive to feed the nursing mother.

The argument of most women as shown by reasons given for answers to the test questions is:

"Yes, mother's milk is best if mother is well fed. To be well fed a nursing woman must get plenty of meat, eggs, fish, milk and vegetables. These things cost money. If mother is not well fed and she gives breast-feed alone, baby will drag her down and her breasts will sag. Also milk will not be rich enough for baby because 'whatever mother eats baby sucks it back'."

The conclusion therefore is:

"We, mothers, can't give breast milk alone for four months. We must supplement with cornmeal porridge or 'tin feed' (commercial formula) or both because we don't have the money to buy the special foods for ourselves."

Finally, concepts which relate to the physiological functions of food, i.e., for growth, energy, etc. and food groupings, are not understood. Their perception of the internal operations of the human body is little known by "teachers" but must be elucidated in order to find a common point from which to begin to teach.

The results showed that the lessons contained too many concepts for the level of audience being taught. Some concepts were also too complex and needed to be broken down for teaching in clinics where women's listening potential is not at its highest. One or at the most two simple concepts should be used in a lesson and illustrated with adequate but not too many teaching aids.

It was found that some of the language and expressions used both in the lessons and the questions were not understood by the women, particularly where expressions were facetious, sarcastic or subtle. They were not acceptable in a teaching situation and academic phraseology such as "steps to take" and "what to look for" were not intelligible to the mothers.

For the same reason true/false questions caused some confusion particularly where the false concept did not relate to food, e.g. "a child who sleeps in class does so because he is rude."

Although there was no statistically significant difference between the four methods of teaching due to the if variance for a small number of independent variables, the slide presentations achieved the highest and booklets the lowest scores in the three lessons where they were used. The flannelboard was not used after the first lesson as it proved difficult to put the pictures on the

board while referring to a script and to keep them on the board in the breezy clinic waiting rooms. A comparison of scores by lessons and teaching methods is given below:

	BREAST-FEEDING		YOUR CHILD'S NEEDS		BABY'S MEALS		MIXED MEALS	
	No. Women	Mean Score	No. Women	Mean Score	No. Women	Mean Score	No. Women	Mean Score
Control	225	4.7	195	6.9	199	3.6	191	12.4
Slides	94	7.9	89	7.7	105	4.7	105	13.0
Flannelboard	82	7.4	-	-	-	-	-	-
Booklets	96	6.9	94	7.0	101	3.7	-	-
Demonstrations	-	-	-	-	-	-	101	13.6

Labels on food packages read just like labels on proprietary medicines. You may not have the slightest idea what it means, but with all that small, scientific-looking print and decimal points it sure must be good for you.

Alan Watts

"Murder in the Kitchen"

Does it Matter?, 1970

INNOVATIVE USES OF MASS MEDIA FOR FOOD AND NUTRITION PROMOTION*

by

Richard K. Manoff

The use of the mass media for education is, itself, an innovative idea, and it is unfortunate that wider use is not being made of these media. Of these, by far the most important is radio because it has become the universal medium in all parts of the world. Radio lends itself to many uses and to variegated formats. I should like to address myself to this question of how to make the most innovative use of radio for the purposes of nutrition education by telling you the story of Manoff International's current experience in the Philippines.¹

Once upon a time in the Philippines there was a group of nutritionists deeply concerned with the general underweight condition of the children. For years they had been trying to teach village mothers to enrich the *lugow* they feed their infants starting at 6 months. But progress had been very slow because of the difficulties in reaching enough mothers on a continuing basis to implant the idea. "What we must do," they concluded, "is find a more effective way to reach mothers."

Now, *lugow* - a kind of watery rice porridge - is not bad as a supplement to breast-feeding. But it is not good enough - not in calories, not in protein, not in vitamins and minerals.

**This is a slightly abridged version of the paper presented to the Technical Group Meeting on "Nutrition and the Mass Media". Mr. Manoff, President of Manoff International, a New York and Washington-based Advertising, Marketing and Public Relations Agency, has conducted a number of Nutrition Education Projects in developing countries under the sponsorship of US AID.*

"We must teach the mothers to add to the lugow a little oil for calories, some chopped vegetables for minerals and vitamins, and mashed dried fish for protein," the nutritionists decided. And they were pleased with this idea because all these additional foods were generally locally available in this nation of verdant islands. But they knew it wouldn't be easy. They weren't even sure it would be possible.

This was when I first heard about it. I was in New York when the call came through.

"Would you come to Manila and confer with us on this programme? We know of your experiences with innovative use of the mass media in India and Ecuador and other countries. We offer you a chance to try your ideas out in our country."

I went. And from the first day I arrived, when we went out into the villages to explore the idea with mothers, we met with little encouragement. Very few mothers liked the idea of adding oil, and vegetables and fish to the lugow even when it was carefully explained.

"It's not our custom," they said over and over again. To the nutritionists, it began to sound like a refrain of doom for their idea. It wasn't that these foods weren't available locally. And it wasn't that they weren't eaten by the people. It was simply that it was not the custom to feed them so early to the children. But here and there was a sign hopeful enough to inspire us not to give up.

"Yes," some mothers said warily. "I have heard of putting fish in the lugow for a 6-month old baby. But I don't do it."

"Yes," some scattered few said, "I put vegetables in the lugow." Still one or two others even admitted they added oil. The excitement began to mount over the possibility that even the most engrained customs could be made to give way before new and better ideas.

After all, the nutritionists asked themselves, is every custom eternal? Is every known custom the original - the one and only since the beginning of time? They knew this could not be, that before this precedent there must have been an older, different one, and an even older different one before that - like links in an unbroken chain reaching all the way back into the dim unrecorded history of human survival. "We will add yet another link in the chain of custom," the Philippine nutritionists vowed "because there is a need to do so for the improved survival of our children."

We had no idea how long it would take. Five years, ten or twenty? and could they find the peoplepower, the money to carry out this task? How could they possibly know until they set about to find out? I quietly urged them to pick a place for an experiment.

START OF THE PROGRAMME

Iloilo province on the island of Panay looked like a good place to start. Here was a rural population of 840,000 people, about 170,000 families.

"We will see what we can accomplish with the mothers of Iloilo," they agreed, "and then we will know."

With this step they had already made the most important decision for the success of this venture in nutrition education. First, they had selected one problem: the underweight condition of children. Second, it was a problem for which there already existed a singularly simple, but proved, effective solution: the enrichment of lugow.

They knew there were other important nutritional concerns but they left them to the routine of other ongoing programmes. For this special effort they had decided to attack the one they knew was most urgent. Thus, through the principle of priority, they had preserved their time, their energies and their money for a major goal. They were also assured that the same would be true of

the mothers they wanted to reach. They, too, would not be overwhelmed with more new ideas than they would absorb at one time.

SURVEY

The project got underway with a well organized series of steps. First, was a survey among a carefully selected sample of mothers in the Iloilo countryside. We wanted to quantify on a reliable sampling basis the preliminary insights we had gathered on our earlier, personal random village interviews.

The nutritionists needed to know, for example, how many had ever heard of putting oil in a 6-month old baby's lugow? The answer was not too many, only 3%. And when all of them were informed as to why it was necessary to do so, 85% of them remained unimpressed. Only 15% thought it was a good idea. When they were asked if they had ever done so, only 1% reported that they had.²

RESULTS

Where only 1% of the mothers had added oil to the lugow before the programme, now 18% of them did. Almost one mother in five.

Where 9% had added vegetables, now 20% did. More than one mother in five.

Where 15% had added fish, now 26% did. That's one mother in four.

More mothers were bound to be converted in the future - if the education would continue because 69% now knew about adding oil instead of 3%.

Sixty percent knew about adding vegetables instead of 18%.

Sixty-five percent knew about adding fish instead of 18%.

The date was May 1976. The programme had been started in September 1975.

Only eight months had elapsed. Only eight months for this remarkable achievement! And they had worried about years. Already in Iloilo over 30,000 mothers had been convinced to change an old custom about lugow. And it had taken only eight months.

A miracle? Hardly. Unless you still consider the radio a miracle of our time. For, the miracle of Iloilo is, in reality, a demonstration of the power of radio to educate, and to change behaviour when it is thoughtfully used with the disciplines of innovative marketing communications techniques. And the project is not over. We have another five months to go before the final study and then we shall know the full results. We now know that 95% of the homes have a radio.

But how long would it have taken to reach these mothers and to change their behaviour with only the traditional educational techniques at our command? And how many people would have been required?

DESIGN AND DEVELOPMENT OF THE MESSAGES

We had six simple short messages and the full cooperation of the local radio stations. Our messages were professionally designed and tested. I won't play it for you because it is in Illongo, but I can describe it in English and explain how it was designed and why.

LITA: Mama, what are you putting in my baby's lugow?

MOTHER: A drop of oil, some chopped green vegetables and fish.

LITA: Where did you get this strange idea?

MOTHER: From the doctor on the radio. Listen!

DOCTOR: (Filter) After 6 months a baby needs lugow as well as breast milk, but lugow must be mixed with fish that gives protein for muscles and brain. Green vegetables for vitamins. Oil for more weight on his body.

LITA: But mama a 6-month old baby can't digest such foods.

MOTHER: Sh-h. Listen to the doctor on the radio.

DOCTOR: A 6-month old baby can digest these foods. Just wash the salt from the dried fish, chop the vegetables and cook them well, add a little oil and mash with the lugow.

LITA: But, mama, you didn't feed me like that.

MOTHER: How could I know? I didn't even own a radio. Times change. You live and learn.

LITA: Mama, you must be sad that all the old ways are changing.

MOTHER: Not all the old ways are changing. But only a fool remains with an old way when there is a new, better way.

DOCTOR: (Off filter) For help with your baby, see the home management technician or community worker, or the local doctor.

Now the key element in a communications programme is the message. Nothing is more important than its design. Innovative use of the mass media depends on deliberately conceived message elements. For that reason I should like to analyze this little message to demonstrate the manner in which it was fastidiously constructed to serve its purpose. Let me begin with the selection of the doctor as the authority.

SELECTION OF DOCTOR AS AUTHORITY

In many parts of the developing world, the doctor is not the practical resource in either health care or illness. For one thing, doctors end up as city creatures even if, in rare instances, they originate in the countryside. They are the health ministers

of the middle class. We all know about this problem of doctor distribution in our countries.

While he may not be resorted to unless serious illness strikes or death threatens he is regarded as the *ultimate authority*. Even in countries in which folk medicine and folk doctors are still formidable institutions, the *authority*, if not the practice, of the formally trained and licensed medical establishment has penetrated into the countryside. Furthermore, the doctor is a *dialectic* authority - representing a tradition in which knowledge accumulates, is changed by its accumulation and to which human behaviour is in constant adaptation. The choice of the doctor figure in our message for Iloilo is a deliberate cultural decision based on the strategic objective to change a post-weaning food practice. The doctor is also a symbol of the kind of change that health authorities are eager to see take place in the countryside. It would reinforce the importance of the local health clinics and the MCH centers and the new education and care they dispense.

This is why we selected the doctor instead of some other established village health entity who may be the custodian of local custom but not necessarily command greater *perceived* authority. Moreover, he is linked to some traditional practices whose validity may have been eroded by inveterate change.

SELECTION OF THE MINI-DRAMA AS FORMAT

Why did we choose the mini-drama as our format? For one thing, the "novella" or soap opera is an extremely popular form of entertainment. For another, it provides an excellent format for the presentation and resolution of the conflict that is always provoked by a new idea. The interplay between the characters gives us a chance to have the idea offered by one and challenged by the other. This replicates reality. It gives us a chance to air the

arguments *against* the idea revealed by our research and to refute them.

The confrontation of the "novella" also gives us a chance to "hear" certain psychological truths: mother's concern for her child, mother's unwillingness to accept the new idea, her emotional retreat before the inevitable, her guilt for not knowing what was right and the reassurance that feelings of guilt should be dissolved by willingness to learn.

REVERSAL OF TRADITIONAL ROLES

Our aim was to bend the rigidity of custom: we had to help our target mother to loosen the grip of custom her mother had clamped on her, and her mother's mother before her. The obvious way was a typical confrontation between "modern daughter" and "traditional mother" in which the daughter tries to explain why she is making the lugow differently from the way her mother had done it. This was not psychologically acceptable: for the radio audience it would simply have duplicated actual experience and proved nothing. If anything, it might have reinforced the old custom by arousing feelings of hostility toward the daughter for opposing her mother. Sympathy for the new idea would have been destroyed. The danger with this approach, therefore, is that it requires struggles to win one. Sympathy for the idea requires sympathy for the one proposing it. This is a basic principle in message design.

So, we turned the conflict totally around. We made the grandmother the proposer for the idea and her daughter, the opposer.

This technique of role reversal releases the radio audience from pre-established positions of partisanship. Everybody becomes a free agent. The job, however, is to bring credibility to the situation in which all roles are reversed.

Something unusual must happen to make the reversal of roles plausible. That something is the "doctor on the radio" within this radio message. The grandmother confesses that she heard this new idea "from the doctor on the radio" and she invites her daughter to hear it for herself - which means, for the radio audience to hear it for itself, as well.

We have thus turned the conflict around and set the stage for the triumph of the idea. After all, the grandmother is the proposer - the guardian of tradition is the sponsor of change. The daughter is incredulous - and here she is really speaking for the radio audience which, we must anticipate, is taken aback by this idea.

Now, we have the audience in sympathy with the "modern daughter" and wondering as she does "what's got into the old woman?" This is to be preferred to the alternative dramatic situation: sympathy for the grandmother and hostility toward the mother on two grounds:

- (1) For opposing her mother so disrespectfully (and in a 60-second mini-drama mere brevity alone would have insured a curt, brusque disrespect).
- (2) For coming up with an outlandish "modern" idea that is "not the custom".

But in our situation the "old woman" is quickly seen to be perfectly sane. She is redeemed in our estimation by the doctor on the radio. Now, this element in our message provides us with additional benefits. First, it associates the "old woman" with modernity - age is not synonymous with cultural antiquity. Old people can also keep learning new ideas. Second, it helps to lend authority to our medium - particularly our use of it. Third, it helps to reinforce the authority of the doctor and the health centers in which he can be found.

So all our elements in our little mini-drama are relevant components. We need them for our purposes but we also use them in such a way as to make their purposes even more important. This is a form of symbiosis in communications that rejects irrelevant elements and distracting devices in order to permit our audience to become emotionally and intellectually involved in the central issue of our message and finally to accept the overriding wisdom of its idea.

A good message stands this test: *every element is essential*, every line (and word, as well), every device, every exchange, every sound.

CENTRAL POINT OF THE MESSAGE

But back to our message where we left Lita and her mother as her mother said "listen to the doctor on the radio". Now we are ready to hear the doctor give the essence of our message. You will notice that the way our message is designed this has got to be the high point. So often we hear messages that contain all the essential elements but lack deliberate design to emphasize the message's central point. The result is the message may be delivered but it simply isn't heard or, if heard, is not listened to for what it was intended to say.

In our message Lita's mother focuses the audience's attention on the doctor because he holds the key to the little dramatic conflict between mother and daughter. This is how we use the drama to serve the purpose of our message: not merely for interest or convenience, but for underscoring our point. So, now on comes the doctor.

When our doctor's part is done we return to mother and daughter. Here our next task is to resolve the conflict between the two, obviously in favour of Lita's mother because she is the sponsor of our idea. We have to be believable and the only

believable thing a daughter can say to her mother under these circumstances is to say: "O.K. I believe this doctor but why didn't you know enough to feed me this way when I was a baby?" And this gives us the opportunity to reinforce the subordinate notion that knowledge is a dialectic process - that one always goes on learning.

So Lita's mother says it in the most believable way considering the circumstance of the "doctor on the radio". She says, "How could I know? I didn't even own a radio. Times change. You live and learn."

AUDIENCE RESPONSE

Now, the audience response to this has got to be affirming. They know the radio is a recent phenomenon and that you hear of new ideas from the radio.

Thus, Lita's mother's explanation is plausible and understandable.

Before our message is done, we have at least one other emotional task: to take note of custom's change and to sanction the change by alleviating any sense of guilt that might attach to Lita or her mother or the doctor.

We must also relieve our audience of any such imputation lest they end up rejecting the good advice because of their emotional inability callously to betray tradition.

So it is Lita who says to her mother: "Mama, you must be sad that all the old ways are changing." And with this question, Lita concedes that the new way is now acceptable. She has now shifted from the struggle with her mother to concern for the emotional price her mother may have to pay for winning the argument. Good communications design never overlooks the need to balance the emotional budget.

Lita is here, our agent for provoking audience sympathy for Lita's mother. After all, changing custom is a burden we all bear and resist. Who cannot feel sorry for her? At the same time, the audience is subtly encouraged to feel kindly toward Lita for expressing compassion for her mother. Thus, in this one simple, honest question three important things take place:

- (1) The issue is resolved with Lita accepting her mother's (the doctor's) new idea.
- (2) Lita articulates the anxiety her mother could be experiencing and, in so doing, is really giving expression to the same concern that many in the audience may be feeling.
- (3) It brings the audience into sympathy with Lita's mother and with Lita and creates an inviting emotional environment for the audience also to accept this new idea.

But now that the question has been asked - the question that is lurking in the minds of the audience, what will Lita's mother's response be? After all, some will be wondering: "How can such a traditional mother be so easily accepting of change? It just isn't believable."

So Lita's mother's answer must be painstakingly thought out. She isn't really so eager to see change take place. So she says, "Not all the old ways are changing" - which is to say: "Hold on there. Who says all the old ways are changing?" And, of course, they are not. The audience must be reassured by this. "Aha! So you see Lita's mother is no empty head - accepting any silly idea that comes her way. No. Not at all. She is obviously a sensible person."

And Lita's mother continues: "But only a fool would remain with an old way when there is a new, better way." And who can deny that. Because even the most tradition-bound individual knows change is inevitable when its value is clearly indicated.

So Lita's mother is a credible soul. She has done what any sound, sensible person would do under such circumstances.

All of what I have just described to you - the statement of the new way to prepare the baby's porridge; the reasons that it is necessary; the authority of the doctor; the confrontation with custom; the delicacy of the relationship between the generations in a traditional society; the need to articulate the anxiety that change in custom is bound to arouse and then satisfactorily to alleviate that anxiety; establishing the credibility of the protagonists to give the audience a willingness to accept what is being said; and to reassure the audience that such change does not mean the end of the world as they know it, but merely one of those occasional improvements they have the capability to accommodate - all of this has been composed in a message that is only 60 seconds long, including a standard opening and closing in which we identify the campaign with a theme that is used in all versions of this message. In all, there were six messages all on the same subject but with variations in the dialogue for message variety and changing emphasis.

The pretest research revealed that the target mothers accepted Lita, her mother, the doctor, their relationship and what they had to say. In interviews they wanted to hear more about Lita and even ventured to say they would like a mother like hers because she gave good advice. The fact that it actually worked has been demonstrated by our first tracking study eight months from the start. I gave you those data earlier.

THE REACH-AND-FREQUENCY TECHNIQUE

By now you have recognized the media nature of this campaign - a *reach-and-frequency* format so commonly identified with the advertising technique of the world of consumer products and so indispensable to the marketing of processed food products.

Why was this technique chosen in preference to programme formats like a daily novella, or a school-of-the-air, or a forum, or a lecture series, or any other conceivable type of programme?

The answer is to be found in the nature of the problem. It had been decided to concentrate on teaching mothers to enrich infants' porridge in *one* very specific way. The objective was to reach as many mothers as possible, and *to change their traditional behaviour with respect to infant feeding.*

Such a *change requires frequency* of contact with these mothers to match, if possible, the frequency of any other educational stimuli reaching her.

Given such a singular item of education we knew that it could be skillfully designed in a one-minute message and our media format decision was inevitable. For no other use of radio or television that can match its *reach of audience and frequency of contact.*

Its key element is the brief message - a minute, 30 seconds, or even less. It seeks out programmes with the target audience we want. It interrupts these programmes briefly and repetitively.

CHOICE OF FORMATS

Now, how does the nutrition educator decide which format to employ - a reach-and-frequency campaign or an interview, a one-time programme, or a panel programme?

The professional communicator knows the differences among these formats. You must appreciate them, too.

To put it plainly, 30 one-minute announcements or 60 thirty-second announcements in the course of one broadcast week have a reach-and-frequency that far exceeds the half-hour programme.

Of course, a 30-minute programme covers more ground and sometimes a given subject requires that much elaboration. But much of what we need to teach are one-idea-at-a-time items, not requiring 30 minutes of explanation. We need to transmit a *single* idea at a time - with enough frequency to ensure that the message (properly designed, of course,) receives insistence and impact.

Even when subject matter is more complicated, the professional communicator knows how to break it down into its component elements - its individual ideas - so that these may be transmitted as individual short message units. It is helpful to conceive of the communications design task as made up of individual minimum length - maximum comprehension units. Much of health and nutrition education lends itself to such treatment.

In the Philippines we have the opportunity of trying this theory out in mass media campaigns for nutrition. We have also done so elsewhere.

OTHER CAMPAIGNS

We were recently associated with a mass media nutrition education campaign³ in Ecuador whose individual messages were designed to instill the following instructions:

- (1) Use iodized salt (because of extensive goiter incidence in the Andes).
- (2) Boil your water.
- (3) Wash your hands before eating, cooking and leaving the latrine.
- (4) Feed your child protein foods (nutrient education).

- (5) Do not substitute store-bought milk for breast milk.

In Nicaragua we have this summer assisted in launching another radio campaign in the fight against death caused by diarrhoea and dysentery. There the message to mothers is how to prepare a simple saline solution - water, salt, sugar and lemon - for their sick children in order to overcome the effects of dehydration. We call it *Super-Limonada* and our objective is drastically to reduce the infant mortality rate from this epidemic condition.⁴

These subjects can all be dealt with in messages of either 30-seconds or 60-seconds. Most of them have already been designed and pretested and proved understandable, acceptable and actionable. They cover the problem, the action, and the benefits to be derived.

The disadvantage of longer-length programmes (interviews, talks, etc.) is that they must compete with programmes of greater popular interest on other channels and, therefore, are fated to attract small audiences made up mostly of the already-motivated.

SHORTCOMINGS OF THE WEEKLY PROGRAMME FORMAT

Let me give you an actual example from the Dominican Republic of the shortcomings of the weekly programme format for our purpose.

In that country, there has been a programme called "Hacia una Nueva Familia" and it has been broadcast over the radio for several years. Its subject matter is family planning but in the broadest definition of that term. So that while its major purpose is to encourage birth control practice (it is financed through International Planned Parenthood) it also deals with all the other aspects of family responsibility.

It is broadcast from some eight points in the country so as to cover virtually the whole population.

In Santo Domingo it is broadcast over Voz de Tropicico, one of the top 15 or 16 stations in the city, from 8.00 p.m. to 9.00 p.m., Monday to Friday.

The programme is claimed by its sponsors to be a very successful effort - that 28% of the women listen to it. I had my doubts that any *one* programme on one station out of so many could possibly attract such a following.

A little research on my part produced the information that a survey of radio listening had been made in October 1975 by the Association of Advertisers.⁵ I obtained a copy and this is what it showed:

- (1) The 8.00-9.00 p.m. hour was one of the poorest in audience size. All the stations combined represented only 8% of the total daily woman's audience. Voz de Tropicico has only a minor share of that 8%.
- (2) The average audience for the programme showed only four women for the survey week out of a total sample of 17,230 women.

Now, as it turns out, this is a particularly distressing performance, far worse than I would have anticipated. But even were the results more encouraging certain conclusions are still inevitable:

- (1) In a typical radio market, a campaign needs more than one station because audiences are too fragmented.
- (2) The campaign needs more than one time period because people listen at different times and no one time period is able to deliver even a majority of the target audience.

- (3) Programmes usually occupy one time period a day on one station and are, therefore, confined to very narrow audiences.
- (4) Therefore, only by scattering the programme, in the form of short messages, over several stations and in many time periods on these stations is it possible to fulfill the audience objectives and the frequency requirements of the task.

This does not mean that there is no place for other radio formats in nutrition education planning. But we must come to understand the strengths and deficiencies of each and to use them to their best advantage.

It is obvious that to reach the most mothers it is ideal to have many "time periods" during the broadcast day and on as many stations as possible, and it would be ideal to pick those time periods when most women are listening.

It is impossible to do this with longer-length programmes entirely because:

- (1) It would require a tremendous amount of material and work to put so many programmes together every day.
- (2) It would be difficult to make so many programmes individually interesting so as to attract big audiences. The women would probably not want to listen to them regularly since they would tend to cover the same material.
- (3) The cost would be prohibitive.

THE "SPOT ANNOUNCEMENT" TECHNIQUE

This is why the technique of "spot announcements" was developed:

- (1) A spot announcement is short and is carefully designed to be a complete item of education.
- (2) It can be placed frequently every day *inside* and *between* programmes.
- (3) And we can be sure to get the biggest audiences because we can put the spots in the most popular programmes.
- (4) And we can get the maximum number of women because we can pick the programmes we know that are popular with women.
- (5) And we will capture the unmotivated woman in our net because we are reaching out for her instead of depending on her to reach out to us.
- (6) And we don't have to worry about our audience getting tired of our education because the message is so short that they will listen to it because they want to listen to the programme in which the spot has been placed.
- (7) And the cost of production, unlike a programme, is minimum because the same spot runs over and over.
- (8) And we can be sure that one message will be learned because the spot is recorded and is, therefore, unchanged each time it is heard.

So innovative use of the mass media requires that we intimately understand the differences in radio formats and techniques and make sound decisions as to which to use in terms of project objectives.

REASONS FOR LACK OF MASS MEDIA CAMPAIGNS

I have used the example of radio in my remarks thus far. But what I have said is applicable to T.V., and other mass media. Why, then, if they have so much potential effectiveness, aren't there more mass media campaigns in operation in most countries? *Inertia* is perhaps our greatest enemy. In general, it is easier, more convenient and comfortable to continue with traditional ways and to find neither time nor energy for the new. But there are also certain stark realities - political, social and professional - we must acknowledge.

THE PROBLEM OF ACCESS

To use mass media, the nutrition educator must have access to the public air waves or to the press and other channels. This is difficult to accomplish on a *continuing basis*. The commercial advertiser *buys* his access to radio, television, the cinema, the press, and makes continuity of delivery of his messages a principle of his enterprise.

Nutrition educators rarely are given the opportunity for such continuity for their messages. Rather, they are given as a "public service", a one-time programme of 15 or 20 minutes whose limitations for nutrition education we have pointed out.

The airwaves are a major communications tool, national policy should embrace the notion that they must be an extension service for nutrition education on a regular, continuing basis.

This is a policy problem and nutrition educators must face it.

MISCONCEPTION OF THE NATURE OF THE MASS MEDIA

The mass media and most broad-based mass communications techniques like advertising, enjoy a low regard among food and nutrition officials and others in positions of social authority.

This is a case of "mistaken culpability". They disapprove of what is being done commercially via these media and *mistakenly blame the media for the message*.

The automobile is not to be blamed for the drunken driver, nor is fire to be condemned for the arsonist.

Mass media techniques like advertising need not be the special province of the commercialist. We have allowed him to usurp them. The reason he rushed to do so is that he discerned early on that they were indispensable. The nutrition educator must learn to use them. He must rethink old policies in the light of new educational imperatives. *National media policy* must embrace the principle of *regular, continuing free access* to the airwaves for such education.

LACK OF PROFESSIONAL MASS COMMUNICATIONS EXPERIENCE

Nowhere is this more evident than in the matters of *message design* and *media use patterns* as I have tried to explain. But these are concerns of professional communicators whose services are required. Instead, the already overburdened nutrition educators have assumed them without the requisite knowledge and experience as to what constitutes effective *message design* or *appropriate media scheduling and patterns*.

What is needed is the establishment of standards in both areas so that there are guidelines and training based on sound professional experience.

THE EVALUATION PREJUDICE AGAINST MASS MEDIA

No other educational method has been so beleaguered with demands for evaluation as has the mass media and mass communications, in general.

The prevailing attitude is that, since there is no "hard proof" that the mass media are capable of effecting behavioural change, mass media efforts are not to be encouraged except for "promotional" or "motivational efforts" in contradistinction to traditional educational procedures like the schoolroom, face-to-face interpersonal techniques, etc. The result is an unfortunate relegation of the mass media to some superficial, frivolous role. This is deplorable because we shall never realize mass media's full potential so long as this attitude fashions our uses of them. It is a self-fulfilling prophecy: the mass media become what we fear them to be.

Yet, with no other educational medium do we insist on standards as harsh as these. Where is the "hard proof" that our schoolrooms change behaviour (without the parent to insist on what the school teaches, or the policeman to enforce the rules the schoolroom explains)? On the contrary, there is growing evidence that our schoolrooms are not working. (Is it because our mass media are?) Yet, is this a warrant for closing them down? Obviously not. The responsibility is to find new ways to make our schoolrooms better *while we continue to operate them.*

Why can't we accept this policy as valid - no, essential - with respect to the mass media? Why shouldn't they, like the classroom, be a "must" for nutrition education while we continue to experiment with alternative techniques and messages and media patterns and evaluations?

How will we ever have the evaluation we aspire to if we don't have the projects to evaluate?

MISCONCEPTIONS OF THE "SHORT-BURST" PHILOSOPHY

Where nutrition education projects have been launched via the mass media their duration has been limited and, therefore, their evaluation remains questionable.

How long does it take for behaviour change to take place significantly so it is measurable? One year is evidently too short a time with deep-seated traditions, while not too long at all with something less radical as a switch to iodized salt.

Two years, three years, five? We don't really know since there are so many variables depending on the specific item of behaviour and all the components that affect it. But we do know that all behaviour is susceptible to change and where the health of the individual is concerned, the effort is a social obligation.

Never, to our knowledge, has there been a mass media nutrition education effort *without a terminal date*. Consequently, the need for evaluation has interposed periodic trackings, characteristically, on a six-month basis for a year, perhaps two.

Such tracking studies pick a point in time and measure behaviour then and only then. Since we do not know when such change occurs, it is frustrating to conceive that change might have begun to make itself evident some time after the researchers are gone. But, alas, that is too late. With the results in, the evaluation made, the project at its scheduled end, we shall never know. And, as a result, it may mistakenly be concluded that the mass media and the messages were ineffectual and we are then deprived of their utility to our vital educational work.

By contrast, no such time limitations for evaluation are ever imposed on other classic educational techniques. Schooling, in one form or another, is a lifetime procedure. We recognize no terminal dates for learning in face-to-face groups or one-to-one situations. It is perplexing when one seeks to reconstruct why the

mass media as a channel for education should have been conceived as a "short-burst" technique and then condemned for its failure to produce long-lasting results.

One could conclude, in irony, that such a conception was intended to miscarriage.

Meanwhile, the commercial food processor ignores all such doubts. His tracking studies (evaluation) are designed to inform him as to *whether his message is working, not whether he should be mass communicating one*. If it's not working he changes the message, but he never, never discontinues the campaign. He accepts the essentiality of the mass media as a continuing component in his programme. He merely seeks to learn how to make them work better ...while he continues to work them.

THE LACK OF COORDINATION AMONG GOVERNMENT AGENCIES

Many different agencies have an interest and concern in total nutrition which involves sanitation, health, agriculture, education, as well as food. As a result, there is at any one time, the *likelihood* of several educational programmes operating independently. The danger of miscoordination and conflict of information is very real.

Furthermore, the demands for mass media access coming from so many different directions can paralyze the mass media authorities into a *recalcitance* of denying access to all to avoid having to deal with any one.

Such a situation calls for inter-agency coordination to govern nutritional policy, priorities, message content, etc., so that the efforts of all can be more effectively realized.

Operating as a coordinated programme, mass media officials are presented with a reasonable demand which they can responsibly deal with.

FAILURE TO SET PRIORITIES

So often, nutrition education programmes fail to identify problem priorities, and to set specific objectives for their solution and systematically to devise the strategies to achieve them. A mass media effort requires *priorization* and dealing with first problems first and only a select few at a time, each with its own singular objective and strategy.

THE SPECIAL RURAL CULTURAL PROBLEM

Cultural inadequacies emerge when city people think about country people, cast their problems in city terms and, in general, assume that certain facts and conditions exist without validating them by living and working in the countryside or, at the very least, maintaining direct contact with country people in their homes.

These, in summary, are some of the major handicaps to innovative use of mass media, particularly radio. But each can obviously be overcome.

LIMITATIONS OF NUTRITION EDUCATION IN SOLVING NUTRITIONAL PROBLEMS

The most expensive solutions to social problems are most often economic solutions. And, yet, they are sometimes the only possible *real* solutions despite well-intentioned efforts to find other less costly (more "cost-benefit efficient") ways. These futile operations are particularly deplorable when prevailing wisdom is sufficient to advise against them. For example, education (either by the schoolroom or mass media) cannot really *cure* the health problems caused by inferior water systems. What is needed is not behaviour changes in the individual but fundamental *social system behaviour modifications*.

The temptation to exploit the highly visible mass media for such purposes would be an abasement of a precious national resource and to waste it on what it cannot do and deny it to what it can.

It is the nutrition educator's responsibility to maintain a vigilant stewardship of this tool to prevent its potential abuse through such misapplication. Given the innovative professional skills required and the innovative social attitudes and policies, the mass media can and should emerge as the most innovative contribution to nutrition education technology since its inception.

FOOTNOTES

¹Manoff International Mass Media Nutrition Education Contract from US AID, Philippines.

²Effectiveness tracking research conducted among 700 mothers before the messages went on radio (Wave I, August 1975) and among 700 mothers after the messages had been on radio for eight months (Wave II, May 1976). All research is being conducted by an independent research company: Consumer Pulse Incorporated.

³*Using Modern Marketing Techniques for Nutrition Education: Ecuador.* Final Report, December 31, 1975. Prepared for US AID, Ecuador, by Manoff International Incorporated.

⁴Manoff International Incorporated Mass Media Nutrition Education Contract for US AID, Nicaragua.

⁵*Asociación Dominicana De Anunciantes.* Audience measurement study of radio stations in the Dominican Republic, Santo Domingo, Dominican Republic, October 1975.

NEWSPAPER CLIPPINGS

BIGGER PLUG TO AGRICULTURE ON ELECTRONIC MEDIA

From The Jamaica Daily News, 21 September 1976

The 50 delegates from 15 Caribbean states attending the Seventh Annual Conference of the Caribbean Broadcasting Union (CBU) decided to put their resources at the disposal of the Caribbean Community to promote the Regional Food Plan.

A communique said after the meeting that the CBU will approach regional Governments through the Caribbean Community Secretariat to offer assistance in publicising the plan, which aims at slashing the billion-dollar-a-year Caribbean food import bill.

The broadcasters will also try to get the Governments to ease work permit restrictions, making it easier for them to implement their plans of intensifying staff exchanges among the Region's radio and television systems.

The CBU executives also decided to finalise plans for organising an agriculture broadcast production course for Caribbean broadcasters. Radio and television services throughout the Caribbean will be expected to send representatives to the course being developed in conjunction with the Commonwealth Fund for Technical Cooperation.

Another programme decision taken calls for the CBU to produce a monthly series of thirty-minute programmes in the new year dealing with important social, political and economic matters facing the Caribbean.

The meeting also agreed on two major studies, one to examine the cost of introducing regional cultural programming on the Region's radio stations, and the other to investigate the technical needs of members of the CBU, particularly those in the smaller islands.

The second study dealing with the technical requirements of member states will look into the question of transmission and frequency difficulties now being faced by the Caribbean.

The meeting also agreed that the CBU should continue to give immediate regional coverage of events of general Caribbean interest.

PRIVATE SECTOR AND NUTRITION

From the Public Opinion, Jamaica, 8 October 1976

The Private Sector Organisation of Jamaica has noted with interest the recent seminar on "Nutrition and the Mass Media" held by the Caribbean Food and Nutrition Institute.

It is then stated: "The Private Sector has long regarded the provision of adequate nutrition for all Jamaicans as one of the prime aims of business endeavour and has, over the years, supported and initiated several programmes which have brought about a substantial increase in the nutritional quality of the diet of our people. Our member firms and individuals are pledged to cooperate in all efforts to stimulate the production, distribution and education required to bring about a healthier Jamaica.

A CRITICISM

"We noted, however, that reports of the discussions tended to give the impression that business houses were interested in product sales for profit without any reference or care for nutritional value or food quality. It also seemed to be the view that nutrition would be a hindrance to efficient commercial advertisement.

"We completely reject this view as not only false, but as insupportable, against the evidence of the many efforts made and being made by commercial houses to distribute nutritious products, to develop nutritious products, and to educate the public in their use.

WILL ASSIST

"Like all other Jamaicans we are disturbed by the malnutrition reported among 25% of the children in the age group under two years old, and would like to be of even more assistance in a national effort to remove this unfortunate aspect of Jamaican life. We propose, therefore, to work closely with the Jamaica Nutrition Council and the Caribbean Food and Nutrition Institute to explore whatever means are possible to help in solving this problem.

OUR FARMERS

"We are proud, for instance, of our farmers who are producing a range of high quality produce and our commercial channels which today distribute over 100,000,000 lbs. of meat per year to the nation, providing Jamaica with an annual meat consumption of 73 lbs. for every member of the population. We regard it as unfortunate that one-third of this is still imported and, as an Organisation, we will assist the Government in reducing the import content to the minimum figure.

WORK COMMENDED

"As Jamaicans, we are also proud of the sterling work of agencies such as the Caribbean Food and Nutrition Institute and the Public Health Nurses of the Ministry of Health, who, over the years, have gone a long way in making Jamaicans aware of nutrition as a vital aspect of life. We sincerely hope that it will be possible for all sectors of the community to cooperate in solving the last vestiges of this problem once and for all."

CARDI, GUYANA AGRICULTURE MINISTRY TO MERGE WORK
From The Jamaica Daily News, 3 August 1976

The Caribbean Agricultural Research and Development Institute (CARDI) and the Guyana Agriculture Ministry have announced an agreement to coordinate and integrate their work programme in the development of livestock, corn, soya beans, blackeye peas and cotton production.

A statement said the agreement came at the conclusion of a week-long visit here by a team of agricultural scientists from CARDI led by Dr. P.O. Osuji, coordinator of the livestock programme.

Other members of the team were Dr. D. Walmsley, soil scientist responsible for research and development in CARDI and Dr. N.D. Singh, nematologist and leader of the cotton project.

During the week they paid visits to agricultural stations on the Demerara coast and up the Berbice River and the National Service agricultural holdings at Kimbia, also up the Berbice River.

The statement said: "Joint projects have been developed in corn, soya beans and blackeye peas (cow peas), to investigate fertiliser requirements, methods of weed control and storage problems, and to evaluate varieties for their yield potential, resistance to diseases and pests, and adaptability to mechanised production in the local environment."

It said the cotton project will include a selection of medium staple types suitable for the area and the development of management systems to ensure efficient production.

The livestock programme is to be concerned with fodder production and utilisation, with particular reference to milk production, the statement said: "Existing and new varieties of grasses and legumes will be evaluated and management systems developed for use in the intermediate savannahs and other areas."

Investigations are also to be carried out on utilisation of local by-products for animal feeds.

The investigations would be directly geared to assisting in the large-scale commercial development activities presently being pursued in the intermediate savannahs of Guyana, the statement explained.

The Institute has been established to provide an efficient agricultural research and development service to the CARICOM states in the coordination and integration of their research and development programme to enable the agricultural sector to keep pace with general economic growth.

The main CARDI objectives are to provide for:

- The research and development needs of agriculture in the Region as identified in national plans and policies.
 - Appropriate research and development service to the agricultural sector of member states.
 - The application of new technologies in production, processing, storage and distribution of agricultural products of member states.
 - The coordination and integration of the research and development efforts of member states where such is possible and desirable.
 - Teaching functions, normally at the postgraduate level, limited to the development of relevant research by any member state.
 - Long-term research in pertinent areas for specified periods.
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'BAREFOOT DOCTORS' FOR GUYANA

From The Daily Gleaner, Jamaica, 8 November 1976

A new health scheme involving "barefoot doctors" is being implemented in Guyana, aimed at improving and rapidly expanding health services at an affordable cost, particularly in the rural and hinterland areas.

The scheme, titled "Medex", is being supported by the International Development Research Centre (IDRC) in Ottawa, Canada, while professional training of the staff is being undertaken by the University of Hawaii, Honolulu. When fully implemented, Guyana is expected to become the centre for such training to include and revolutionize the health care system throughout the Commonwealth Caribbean.

The objective behind the programme is to lessen the work of the physicians by providing able assistants who could not only act in cases of emergencies, but be an extension by performing exercises in preventive medicine, immunization, nutrition and prenatal care.

Initially, nurses and midwives will be given specialized training to carry out the functions formerly reserved for the physician.

*Every man shall eat in safety
Under his own vine what he plants, and sing
The merry songs of peace to all his neighbours.*

*Shakespeare
King Henry VIII*

NEWS BRIEFS

NUTRITION EDUCATION CAMPAIGN

A Nutrition Education/Communication Programme is to be launched next year by the Ministry of Health and Environmental Control, Jamaica. This Programme, which is designed to eliminate malnutrition chiefly among infants and preschoolers, will include a large breast-feeding component, and a baseline survey to measure knowledge, attitudes and practices related to breast-feeding has already been conducted.

The campaign will involve the extensive use of mass media as well as interpersonal communication channels, and Health and other associated groups will receive both nutrition and communication training before it is officially launched. A Review Committee, comprising Health Education, Nutrition and Family Planning representatives, together with Public Information and media personnel, has been meeting regularly to discuss the planning and implementation of this Programme. Representatives of the Scientific Research Council and CFNI have also been invited to sit on this Committee in an advisory capacity.

FOLLOW-UP TO TECHNICAL GROUP MEETING

A Meeting aimed at establishing greater cooperation and collaboration between the Private Sector and nutrition agencies in the solution of Jamaica's nutritional problems, was recently called by the Private Sector Organization of Jamaica (PSOJ). This Meeting, which can be viewed as a direct outcome of CFNI's Technical Group Meeting on "Nutrition and the Mass Media", involved representatives of the Scientific Research Council, the Nutrition

Division of the Ministry of Health and Environmental Control, the Nutrition Advisory Council and CFNI.

Resolutions made at the Meeting included the regular routing of information on food items vital to the maintenance of good nutrition, to all firms in the distributive trades, with a view to their maintaining adequate stocks of these items. Local nutrition authorities will also review the Advertising Code, currently being drafted, in order to ensure that nutritional specifications are fully met. The PSOJ has expressed an interest in actively participating in current nutritional programmes, and members of the Organization pledged to work closely with nutrition-related agencies concerned with the implementation of such programmes, particularly those aimed at combatting malnutrition.

CFNI POLICY COMMITTEE MEETING

The Tenth Annual Meeting of the Advisory Committee on Policy for the Caribbean Food and Nutrition Institute was jointly convened by PAHO/WHO and FAO on 30 November and 1 December 1976 in Trinidad. The Committee for the Meeting comprised representatives from the Governments of Barbados, Guyana, Jamaica, Surinam and Trinidad and Tobago, as well as from Dominica and St. Vincent representing the Lesser Developed Countries. There were also representatives from the University of the West Indies and from UNICEF and the Ford Foundation.

Observers were also invited from Cuba, Haiti, Puerto Rico, the Dominican Republic, the Caribbean Agricultural Research and Development Institute and the CARICOM Secretariat. At the Meeting the Committee reviewed the programme and budget of CFNI, and discussed other matters related to the functions of the Institute.

CFNI STAFF MEMBER ATTENDS ADA MEETING

Miss Manuelita Zephirin, Public Health Nutritionist at CFNI attended the 59th Annual Meeting of the American Dietetic Association, held in Boston from 11-15 October 1976, at which Dr. Micheline Beaudry-Darisme, Nutrition Education Adviser of the PAHO Washington Office was also a delegate.

"Action" theme of the Meeting was "A Nutrition Bill of Rights" which highlighted the right to good nutrition, food choices and nutrition information. Of special relevance to the Caribbean situation was the Symposium on Diabetes which featured lectures on the team management of the diabetic, and an update of principles related to the nutritional care of diabetes with guidelines for professional use. A "rap session" on "Getting Nutrition into the Media" through the press, radio, television and public relations also constituted one of the sessions of the Meeting.

WHO VISITING FELLOW AT CFNI

Dr. Lourdes Macavinta, Head, Paediatrics Department, Southern Islands Hospital, Philippines was based at CFNI from 21-28 October 1976 on a WHO Visiting Fellowship. While at CFNI, Dr. Macavinta, whose speciality is the teaching of Public Health Nutrition, visited local nutrition-related and health organizations including the Children's Hospital, Nutrition Products Limited and the Tropical Metabolism Research Unit, and held discussions with relevant authorities. On the final day of her visit, she presented a lecture on "Rehabilitation of Malnourished Children in the Philippines" which was attended by members of the Jamaica Paediatric Association, staff of the Departments of Medicine and

Paediatrics, and Social and Preventive Medicine, UWI; and representatives of the Ministry of Health and associated agencies.

STC IN NUTRITION EDUCATION

Dr. Ernestine Vanderveen, Ph.D. in Nutrition Education, was engaged as Short-Term Consultant (STC) in Nutrition Education for CFNI from 1 November - 11 December 1976. After a short period of orientation in Jamaica, Dr. Vanderveen went on to Barbados and St. Lucia. Her assignment in Barbados was to review the curriculum for the Dietetic Technicians Course at the Barbados Community College, and the course content of the proposed training programme in Community Nutrition.

In St. Lucia she took part in the review of a locally prepared nutrition curriculum for primary schools which, it is hoped, will gain wide usage in that country and probably elsewhere in the Caribbean.

RECENT APPOINTMENTS

Dr. Omawale, formerly lecturer in the Faculty of Natural Sciences, University of Guyana, has been appointed Director of the Nutrition Research Institute at that University. 'Cajanus' wishes to extend to Dr. Omawale warm congratulations and sincere good wishes for a successful term of office.

Dr. John McKigney, who will be fondly remembered as Deputy Director of CFNI during the early years of its existence, and who has, on more than one occasion, served both as External Examiner

for the Diploma in Community Nutrition and as a Short-Term Consultant for the Food and Nutrition Policy Workshops, has been appointed Nutrition Advisor in the Office of Nutrition, Technical Assistance Bureau, of the Agency for International Development (US AID). Dr. McKigney formerly served for five years as Health Scientist Administrator in the Growth and Development Branch of the National Institute of Child Health and Human Development in Bethesda, Maryland, U.S.A., and has shown a keen and consistent interest in the programme and activities of CFNI. We wish him much success in his new post.

CFNI STAFF MEMBER AT BRAZILIAN CONGRESS

Dr. William Simmons, Public Health Nutritionist at CFNI was invited by the Brazilian Government to attend the Second Brazilian Congress on the Prevention of Blindness, which was held in Brasilia from 3-6 November 1976. During a discussion on Vitamin A deficiency, Dr. Simmons presented a paper on "The Epidemiology of Hypovitaminosis A in North-East Brazil", where he had worked for six years before joining the staff of CFNI.

Dr. Miguel Gueri, Medical Nutritionist, formerly of CFNI Trinidad Centre, has recently joined the staff of CFNI Jamaica Centre.
