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No. 12

No.	CONTENTS.	Page.
1.	Nutrition—Its Importance to India. By R. McCarrison, C.I.E., M.D.; D.Sc., F.R.C.P., Col., I.M.S.	329
2.	The Rural School Teacher, By Rao Bahadur A. Vedachala Ayyar, B.A.,	338
3.	Urgent Rural Needs, By K. S. Venkataramani, M.A., B.L.,	341
4.	Rural Re-construction Notes, By "A Social Servant."	
5.	Fertility and Sterility in Plants.	
6.	Agri-Horticultural Notes, By "Viswamitra."	
7.	Notes and Comments Welcome—Marjoribanks Veterinary movement in articles and gives sary—The next Forest Panchayat South India. ence—Memorial to a Co-operative in it. is To increase your Busi- Work in Temples—Village —Forest Research—Adu and Ghee—Village Panchayat Rural Medical Relief animals—Training of Cattle Breeding in P Veteran Co-operator sa	
8.	Reviews and Notices.	

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Vol: IV.

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No 12.

Nutrition.

Its Importance to India.

By R. Mc Carrison, C.I.E., M.D., D.Sc.,
F.R.C.P., Col., I.M.S.

I have chosen to speak on nutrition, believing that for no country in the world has this science a greater importance than for India and for no part of India a greater importance than for the Madras Presidency. No country has more need to profit by the newer knowledge of Nutrition, and none more opportunity to add to it. Millions of the Indian people are living on restricted diets which are either incapable of maintaining them in a state of normal nutrition and health, or capable only of sustaining them at a low level of physical efficiency. Malnutritional diseases are rife, while the great scourges of the tropics—malaria, cholera, dysentery, leprosy—exact an immense toll from India's malnourished multitudes. In this Presidency alone, "deficiency diseases" of almost every kind abound, and the level of physical efficiency of the masses is, in general, low. But while this is so in certain parts of the Peninsula there are others where the inhabitants are unsurpassed by any race of mankind in physique and capacity for endurance and hard work. Nowhere is the composition of human dietaries more influenced by racial, religious, economic and climatic considerations, and nowhere have foods and food-habits remained more consistently the same from one generation to another. So it is that the diverse races, comprising the population of India, afford an unrivalled, and almost wholly unexplored, source of information regarding the effects to diet on the physical effi-

+ An Address given to the Rotary Club, Madras.

ency of human beings. India has thus not only much to do in applying the newer knowledge of nutrition and in surveying, in the light of this knowledge, the foods available for the use of her immense populations, but much to learn regarding their nutritional needs, and much—by such learning—to teach the rest of the world.

Science of Nutrition

Let me, in as few words as I can endeavour to explain to you why this is so.

"La vie est une fonction chimique." So said Lavoisier in 1780. He it was who inaugurated the modern era of the science of nutrition and who first applied the balance and the thermometer to the investigation of the phenomena of life. He was executed by the "Powers-that-were" of his time; but his work still lives and that of to-day is but a continuation of it. To his dictum it may be added that everyone of the myriad cells of which the body is composed is a chemical laboratory where in the materials provided by the food are, with the aid of the oxygen derived from the respired air, broken down or built up into substances required for the nature and energising of the body as a whole. The sum of these chemical changes—whereby the function of nutrition is effected—is known as "metabolism"; health accompanies its perfection, ill health is the sequel of its imperfection.

The food, then, must provide all the substances needed by the living cells for the proper exercise of their chemical processes: there must be none that are in deficiency and none, if the cells are not to be burdened with a maximum of labour, that are in excess. For if there be some that are deficient or lacking in the food, then do the chemical changes with which these substances are concerned become impaired or fail with resultant impairment or failure in function of some corresponding organ or tissue of the body. While if there be some that are continually in excess certain cells will ultimately fail from exhaustion brought about by overwork, and disease of the corresponding organ or tissue will result. There are thus two directions in which nutritional disorders may arise: the one by deficiency of essential elements in the food; the other by excess of certain ingredients of the food; and these two by their combination may provide a third. The ideal food is therefore a palat-

able mixture of essential food-stuffs arranged in such proportions as to satisfy every need of the body without overburdening it with work.

Essential Food Stuffs

The essential food-stuffs are nitrogenous substances called proteins; starches and sugars called carbohydrates; fats; mineral salts; and water. The amounts of these required for each sex, from infancy to old age and under varying conditions of rest, work, climate and temperature are now fairly well-known though there is still much to be learned especially in regard to the quantities of them that are needed in tropical countries for various classes of labour. All these food-stuffs exist, some in greater proportion than others, in the food-materials which Nature provides for our use: the proteins principally in animal foods, such as meat, fish, fowl, egg and milk but also in vegetable foods such as pulses and cereal grains though in less suitable form and in less proportion than in animal foods; The carbohydrates exist principally in vegetable and fruit; the fats in the flesh of animals, milk, egg and certain fish, as well as in various nuts and seeds; while the mineral salts—of whom there are some 20 essential kinds—are derived both from animal and from vegetable sources. The essence of successful nutrition is so to combine these natural foods as to provide a sufficiency of all essentials without excess of any.

The five essential food-stuffs of "proximate principles" as they are called—proteins, carbohydrates, fats, mineral salts and water—can be prepared in the pure state and set out, as it were, in bottles in one's laboratory bench. Not so very long ago—only a few years before the Great War, in fact—it was thought that these "proximate principles" were all that the body needed for the normal processes of nutrition. But it was found, by Gowland Hopkins of Cambridge, that if they be combined in due proportion and given as food to young rats—the animals usually used for nutritious work—the food mixture did not admit of growth nor sustain life. But if to it a little whole milk were added then growth proceeded and health was maintained. Later it was shown that if the milk were subjected to heat in the presence of air, growth again failed and the animals died. There was 'something' in the milk other than proteins, fats, carbohydrates, salts and water, which was essen-

tial to life. The something is "vitamin". Soon it became known that there are more 'vitamins' than one: some soluble in water, others soluble in fats; some destroyed by heat, oxidation and certain chemical agents, others not; some contained in one kind of food-material, others in another. To distinguish them they were named after the letters of the alphabet and designated vitamin A, B, C, D and E. At the present time there are known to be six; B having recently been divided into two (B1 and B2).

Natural Foods.

Twenty years hence this number may have increased several fold: But whether there be six or sixty they will all be found to exist in the simple foods made in Nature's Laboratory, whole cereal grains, milk, milk-products, fresh fruit and green leafy vegetables—and in quantities and combinations adequate for the due digestion and assimilation of the natural food-stuffs with which they are associated in Nature. Their multitude need cause the layman no anxiety provided she remembers that it is only by the purification, sophistication storage and excessive cooking of Nature's foods that they become deficient in these elusive and most necessary substances. Nowadays it is possible to buy concentrates of some of them over the counter of druggists' shops but the wise man will rely on Nature and not on the druggist for their provision; for no synthetic diet which it is possible to prepare in the laboratory is in my experience as good as one made from a proper combination of natural foods.

The "proximate principles" are the substances from which the body is built and repaired and from which it derives energy and warmth; the vitamins are substances which enable these, principles to be properly utilised. Some years ago I likened the action of vitamins to that of the spark which ignites the fuel mixture of a petrol driven engine liberating its energy. The spark is of no use without the fuel nor the fuel without the spark, nay, more! the efficacy of the spark is dependent on the composition of the fuel-mixture. This simile has its limitations but so far as it is applicable it will serve to fix the function of vitamins in the mind.

With the discovery of "vitamins" and with more exact methods of experimentation knowledge of nutrition progressed

rapidly: experiments as is the way of science, revealing causes and causes inventing new experiments. Presently there arose the conception of disease as being due to negative as well as positive causes: a conception slow to gain general acceptance no doubt because "it is the peculiar and perpetual error of the human intellect to be more moved and excited by affirmatives than by negatives; whereas it ought properly to hold itself indifferently disposed to both alike" (Francis Bacon). At the present time there are few who would dispute the influence of either. The negative factors are lack or deficiency of certain essential elements in the food, the positive factors are, for the most part, pathogenic agents such as bacterial and protozoal organisms. Sometimes one or other of these factors may operate alone in disease production, but more often they join forces. And it is not only in those whose food is insufficient in quantity, but in many whose food is sufficient or even excessive in quantity while lacking in quality that these forces operate to cause disease.

Vitamin Deficiency.

Let me now attempt to describe the sequence of events leading to disease as a result of deficiency in the food of a single factor. For this purpose I shall choose "vitamin A" one of the most common of all deficiencies in the dietaries of India's inhabitants: indigenous as well as non-indigenous. But before I do so I would emphasise that it is rare to find only one substance deficient in a diet: more often there are several and more often still the deficiencies of some essentials are combined with excess of others. Balance of the food in every essential is a principle as important as the avoidance of deficiency in any. And if I select for this story of pathogenesis a vitamin-deficiency it is not to say that an equally impressive one could not be told in regard to deficiency of some "proximate principle" such for example as of the mineral elements: lime, phosphorus, iron or iodine. To limit my story to a reasonable compass I will not only select a single deficiency—vitamin A—but will tell of its effects on only one tissue of the body: mucous membrane. As you know it is with mucous membrane—a highly specialised skin—that various cavities and passages communicating with the outside air are lined; the conjunctive, the alimentary tract, the passages from the kidneys to the bladder, the bladder itself and the respiratory passages. To

protect it and through it the body against attack by pathogenic organisms Nature has endowed mucous membrane with a very wonderful defence mechanism. It is unnecessary to enter on a description of this mechanism; suffice it to say that the cells covering the mucous membranes produce certain secretions and possess certain qualities antagonistic to harmful bacteria. When vitamin A is absent from, or deficient in the food, the cells covering the mucous membrane dry up and become what is called keratinized. The mucous and other secretions are either no longer produced or such as are produced are lacking in protective quality; the outward defences of the body are thus broken down and a door is opened for the entry of bacterial and other pathogenic agents into the tissues of the body. This door they are not slow to use. When this sequence of events takes place in the conjunctive and the nearby tear-producing glands infection of the eye is likely to occur especially in a dusty land like India and the whole organ may be rapidly invaded and destroyed. In this Presidency alone there are thousands of people who have been wholly or partially blinded in this way. Your distinguished ophthalmologist—Lt. Col. Robert Wright—has recently emphasized this cause of blindness in Madras, a cause discovered by patient experiment on rats. Or if the respiratory tract be affected in a similar way the bacteria which cause such diseases of the lungs as pneumonia and tuberculosis have the way made ready for their ravages. Herein is one cause of the wide prevalence of tuberculosis and an illustration of the way in which dirt and diet combine to cause disease. Or if the urinary tract be similarly involved infection is likely to occur therein, chemical changes are brought about in the urine, and its contained salts and other substances no longer remain in solution but are deposited in the kidney or bladder with the formation of that common and distressing malady: "stone"; in my own laboratory stone in the bladder and kidney has been produced in this way and prevented as easily by adding whole-milk containing vitamin A, to the stone-producing diet; while many disorders of the gastro-intestinal tract have been shown to have a like causation.

DEFICIENCY DISEASES

There is no organ nor tissue of the body which is not affected in some similar kind of way by one deficiency or another or by the combined action of such deficiencies and pathogenic agents,

the nerves, the bones and teeth, the stomach and intestines, the reproductive glands, the thyroid, the adrenals, the liver, the kidneys, the spleen, the blood and skin. And according as one or other or several of these are affected there appear certain clinical pictures which we recognize as disease entities, keratomalacia, beri-beri, scurvy, rickets, ostomalacia, pelagra, anaemia and so on. But underlying them all, and causing many conditions of ill-health for which we, as physicians, have no diagnostic label, there is depreciation of chemical and cellular functions: the foundation upon which disease is built.

Not long ago I had occasion to survey the incidence of lung diseases in the rats I use so largely for experimental work. I found in 2,000 odd postmortem examinations carried out in deficiently fed animals that no less than 35 per cent of lung diseases; while in an average daily population of 800 or more well-fed animals the incidence of lung disease was less than one per cent. An observation of this kind has an immense significance. The final cause of the lung disease was a microbic agent but it was the defective food which enabled it to overrun and kill the host. Ten years ago I made a similar observation in regard to dysentery. Such experiences lead one to think that sometimes we, as physicians and investigators of disease, fail to see the wood for the trees and that by singling out for meticulous study the pathogenic organisms associated with certain diseases we often neglect to consider the influence on their growth and disease-producing potency of the human soil in which they may become implanted. For myself I do not doubt but they may become implanted. For myself I do not doubt but that faulty nutrition is the prime means whereby the soil is made ready for the rank growth of morbid organisms.

STUDY OF NUTRITION.

It is not only in regard to man but in regard also to his domestic animals that the study of nutrition is of such vast importance. Time does not permit me to dilate on the veterinary and stock-rearing aspects of the matter. It is sufficient to say that animals are no less subject to dietary diseases than man himself and that the future of the veterinary science like the future of medical science, lies largely in the study of nutrition. Nor do the ramifications of the science of nutrition end with man and his domestic animals: they extend to his crops

and to the very soil itself. Soil, irrigation, manure: all these have their influence not only on the quantity of the crops as food. So it is that nutrition has its human, its animal and its plant aspects and its proper study must embrace them all.

In this brief sketch of so wide a subject I trust I may have said enough to convince you that it is one having an interest for everyone: laymen as well as medical men, rich as well as poor. Fortunately, like the principles of true religion, those of nutrition are simple and easy of comprehension. It is not my purpose here to expound them. I have done so lately in a little book called "Food" which I hope some of you may be sufficiently interested to read. It is the answer, so far as I am able to give it, to a question put to me twenty seven years ago. At that time and shortly after my entry into the service, I had in the Hi du Khush my first private patient: a Mullah whom I afterwards came to number amongst my friends. He was suffering from "gravel". Ripe from the University and full of the medical lore of my day I disposed of his case with the confidence of youth, insisting magisterially on a certain line of treatment. He heard me with becoming courtesy not to say deference and then remarked, "But Sahib what shall I eat." I did not know. I had been taught much, some of it of doubtful utility, but not this essential thing: Now after 27 years devoted to research some glimmering of the predominant part played by diet in causing his condition is being revealed to me. But still his salutary question—"what shall I eat,"—recurs to me in connection with many other states of ill health; and I realise that my days of research must come to an end before I can learn its complete answer. "What shall I eat?" is a problem that has exercised the minds of many since the dawn of medical history. Its full solution lies in the future and goes to the very root of medical science. Indeed the prophetic words of Hippocrates spoken in regard to the nutritive quality of different breads, are as apt to-day as they were 2,000 years ago:

"Whoever pays no attention to these things, or paying attention does not comprehend them, how can he understand the disease, that befall a man?"

What Should Madras Do ?

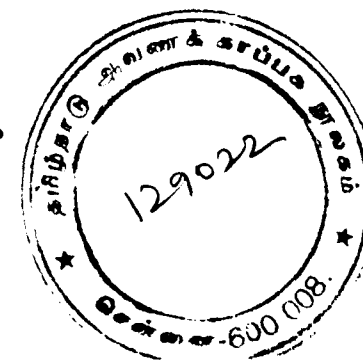
In view of the importance of this subject is it not a little remarkable that while India—and to go less far afield, Madras

—has her great and essential organisations dealing with the nurture of the fruits of the earth and of the trees of the field, she has as yet, none dealing with the nurture of man himself and of his domestic animals. It is true that she has her medical, veterinary and public health departments; all beneficent in their own sphere and effecting great good. But the two first are for the most part engaged in the salvage of wrecks, while the last though brilliantly successful at times in its skirmishes with disease, must continue to fight a losing battle until it is recognised that malnutrition is the root cause of the vast proportion of human and animal diseases in this country, and until means are found for improving the standard of the living of the masses.

What then should India, what should Madras, do in this matter? Mindful that the business of the scientist is to stick to his science I say nothing of means for improving the standard of living of the masses; but there are two adjuvants to that end: education and the development of research. India should see to it that the elements of nutrition are taught in her schools and that this subject occupies a prominent place in the medical curriculum of her universities. She should find amongst her own sons and daughters those capable of undertaking and desirous of devoting themselves to nutritional research: those actuated by the spirit of enquiry and possessed of a fitting humility. "the entrance into the kingdom of man, founded on the sciences, being not much other than the entrance into the Kingdom of Heaven, where unto none may enter except as a little child" (Bacon). Following the example of Japan she should house these votaries of science in her own National Institute for Nutrition: where they are taught trained and tried and where they in their turn train and teach: where every aspect of nutrition is ardently explored: "where tireless striving stretches its arms towards perfection, where words come out from the depths of Truth: where the clear streams of reason has not lost its way into the dreary desert sand of dead habit." (Tagore).



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The Rural School Teacher.

By Rao Bahadur A. Vedachala Iyer, B. A.

Retired Registrar of Co-operative Societies.

The Co-operative Societies Act of 1912, the Village Panchayats Act of 1920 and the village Courts Act—these three Acts have as their objective, the growth of concerted and organised action by the rural folk and a study of them by the village folk is an absolute necessity.

The co-operative Act allows people to *organise* themselves voluntarily, improve their lot materially, morally and even spiritually. The organisation pursues methods having the guiding principles of self-help and self-sacrifice. This act does not, however, compel people to join such organisations. Organised and concerted action should have a strong backing of finance and expert leadership. Such organisations should be worked up by competent men well-trained in such work with a sound heart and with sympathy towards the rural population. Local leaders should be educated, trained and fitted for such work. The village teacher becomes a very important leader in this respect.

The Village Panchayat Act is a statute which compels all the residents to carry on the village administration in specified matters, Education, health, welfare, sanitation, housing, irrigation kudimaramut and it virtually enables people to discharge their community duties as opposed to individual duties. It inculcates the principle of self-taxation to satisfy the necessary wants of the villages suited to the capacity of the inhabitants to bear such taxation. The introduction of the Village Panchayats Act and the constitution of Village Panchayats are no doubt blessings conferred on the people by Govt. though long deferred and ill-equipped for functioning. The act has to get into effective working state, through the co-operation of the various Government Development Departments and through the active fostering care of the higher non-official self governing bodies (Taluk and Dt. Boards). Money

Notes of talks given to the Summer class for Taluk Board and Panchayat School Teachers held at Tiruvattipuram, Cheyyar Taluk, North Arcot District. The previous instalment of the Notes appeared at page 301 of Vol. IV.

is the principal factor in any undertaking and state aid in regard to propaganda and education is a blessing to the people. It is poison if it is likely to kill the self-reliant and self-respecting spirit of human beings.

The village teacher should as an educated resident of the village, be in constant touch with literature on rural economics and impart the ideas he has derived to the people and freely discuss with them. They are expected to be as useful, if not more useful than the local leaders to be trained for the purpose of rural reconstruction.

The two movements—rural development under the Panchayat Act and the economic development movement of co-operation—are the two eyes in the rural body politic though probably government did not realise at the time the democratic ideal which these movements are expected to foster. Literacy in economics is sure to be the result if these movements are sympathetically administered by the people themselves guided by paid or honorary workers. These two movements are expected to gather in their fold all the available brain power for social service and for real service to the cause of humanity.

One important factor which one can put forward without fear of contradiction is the introduction of hand spinning and hand loom industry and the manufacture of Khaddhar. Here is a simple educative mechanism with small investment which gives scope for profitable employment of unemployed labour to the advantage directly of the worker. There are two classes of people (1) actual labourers (2) Leisure class who own lands and who live on the income of such lands minus labour charges and the inevitable government dues and local taxes. The former are out of work in some parts of the year and the latter are suffering from the troubles of idleness which more often lead to vicious habits of slandering and behaving mischievously in faction and litigation. Hand-spinning for these people will enable them to utilise their spare hours for their benefit and for the benefit of the community. The teacher and his wife can earn an extra 4 Rs. a month by doing such work and serve as a stimulus for the production of cloths valued at Rs. 4,000 to 5,000 a year. Real charity consists in making labour earn its livelihood and make itself self-reliant. The Taluk Boards will be well advised to supply each

school with one or two charkas the use of which can be taught to the youngsters.

The village teacher can also learn many handicrafts under the guidance of village artisans and aided by the use of up-to-date appliances; can secure additional income out of such work and serve as an example to the people to earn their living by taking to such subsidiary occupations.

The village school is the place where the people will naturally go to for light and guidance and the extent to which the teacher will be sought after will depend upon their satisfaction in the capacity of the teacher and his practical wisdom. The Village Munsiff and the Karnam are also in a similar position but they suffer from the disadvantage of the exercise of plenary powers over delinquent rural folk. Small men in the glamour of exercising authority are apt to lose their mental balance and become objects of fear. The school teacher has no such authority but he tries to help the people with his *love and knowledge* which are the true passports for helping humanity.

To sum up, the primary school teachers have their clientele not merely within the four walls of the school room. They are the real village teachers unlike urban school teachers and college professors whose work is confined to the class room. The rural school teachers have the whole body of villagers to hear them and have ample scope to make researches in education to find out the best method of transmitting knowledge to the unfortunate rural folk who have been long neglected by the department of education owing to absence of financial and other facilities. They are the most efficient channels to carry the tiny stream of knowledge to the arid desert of the mass of rural people whose welfare is the concern of everyone inclusive of government, and are the foundation stone of rural civilisation and its adaptation to changed environments. They are placed in the happy position of being useful to others if they will it. They are normally incapable of behaving badly as they have been fortunately deprived of any facilities to lord over others except their own personal arrogance and pride if it exists in them. They are the first and best rung in the ladder of one of the honourable professions—Education. Their pay is no doubt low but it is capable of advancement if they become more

useful. They need to qualify themselves with knowledge of the subjects which affect the people in whose midst they are placed. Their merit alone must advance their prospects mental, moral and economic. The salvation is in their hands. And so they have to be self reliant and the preservation of self-respect should be their ideal of life and self-sacrifice is the application of that ideal. Reward in the shape of contentment is sure to come, if not immediately, at least in the long run. If they come to enjoy high regard which teachers of old in villages commanded and the day will not be far off when the rural folk will educate themselves and will not invoke the aid of the provisions of compulsory education. Education is a very important factor for human beings as air and water. Community life can only breathe in villages the air of freedom and self-respect through education alone. The village teacher is indeed lucky in being placed in charge of such work!

(Concluded)

Urgent Rural Needs.

By. K. S. Venkataramani M. A., B. L.

An Indian village functioning healthily on all sides is to my mind the real Paradise on earth. Owing to several causes the Indian village has fallen on evil days. But already the thoughtful among the Indians are turning their attention towards the rejuvenation of our village life. It is the most hopeful sign for the future of our country and the fructifying, of the renaissance impulse that is now moving the masses as well as the classes to the higher joy of a life of work, refinement, culture, and freedom.

Our village life is pitifully stagnant now. New and vigorous life has got to be poured into it before it becomes too late. The immediate reforms are indeed very many now and worth cataloguing at least for the sake of a clear programme of work.

1. An effective and a representative Panchayet or a village council shall be immediately established with full powers of control over the affairs of the village.

2. All facilities for the promotion of scientific agriculture shall be given.

3. The Panchayat shall run a co-operative store of seeds and agricultural implements of the latest improved models, and also of general merchandise suitable to rural needs. The exports, imports and the commercial life of the village shall be controlled and guided by the Panchayat.

4. The tanks and the channels in the village shall be maintained in proper condition. Irrigation works of a minor character but of vast common good shall be explored and executed. Every field shall have the benefit of a clear source of irrigation and an outlet for drainage of its own. The absence of this essential minor facility in many cases reduces by half the fruits of hard labour in the fields. It is also the cause of undue friction between adjacent holders leading to bitter factions.

5. Fouling of the streets, tanks, streams and ponds shall be made an offence punishable with fine or imprisonment. Now the outrage committed in sacred rivers and common tanks is indescribable.

6. The Panchayat shall do its best to beautify the village and keep it clean and healthy. It shall strive to rear public gardens and avenue trees wherever possible on waste lands.

7. It shall employ a doctor and a mid-wife to render free medical aid to the poor who now die like flies whenever cholera or any other water-borne disease appears.

8. It shall run a school, a reading-room, a library, and a theatre for the use of all, and arrange as well for periodic lectures on subjects of general, cultural and scientific interest.

9. It shall establish a village court presided over by a judge in which the panchayat sits as the jury to try all civil and criminal cases arising within its jurisdiction (i.e.) within the limits of the village.

Any measure of Swaraj or Dominion status we may get will never improve our real status if provision be not made therein for the complete autonomy of our villages which are now but mere slaves feeding listlessly the scattered and voracious towns. We must put again our villages on solid foundations.

As suggested in my book "Renascent India," every village shall have the power to retain 50 per cent of the tax raised in the village itself to meet these primary needs of its local life. Will India produce a leader who has the vision to see this and the gift of practical statesmanship to render the vision into an

ever-lasting deed of public good, at least to the dumb 300 millions who depend on agriculture, even supposing that the other 20 millions would manage to live on by the witchcraft of pen, ink and paper, and the black magic of a liberal profession?

Rural Reconstruction Notes.

By A Social Servant-

A Rural Re-construction Conference.

On the 16th of October last a Rural Reconstruction Conference was held at Thanthonimalai in Karur under the presidentship of Mr. K. C. M. Venkatachela Reddiar, Zamindar of Minnampally and Vice-President of the Trichinopoly District Board. It was intended for those dry villages of the Kuhlalai, Karur and Dindigul Taluks, where the Ponkali Reddiars form the main land-holding caste. Mr. Reddiar complimented the organisers of the Conference on having made area, not caste, the basis of the Conference. Caste and its discipline no doubt served a useful purpose in the past, but in the changed conditions of the present, caste ought to be given quite a subordinate place. Caste discipline is unsuited to the present time and should be consigned to the limbo of obsolete institutions. Mr. Reddiar was severe and outspoken in a manner which is excusable in one who is addressing one's own kith and kin. He condemned in scathing terms their petty quarrels, their vanity and wastefulness on marriages and funerals, their apathy to education, insanitary living and superstitious fear. Said he "Your labour is uneducated and inefficient and consequently agriculture suffers. You allow the sewage water to run through the streets, keep your cattle in a court yard, convert every nearby place into a manure heap, allow prickly-pear to grow at all places, never clean the streets, contaminate the drinking water in wells by washing all sorts of things, and having thus spoilt the God-given air and water and breed germs and flies which carry disease from man to man, you quietly put the blame on a Mariamman or a Karuppanaswamy and try to appease them by a slaughter of sheep". He then recommended the starting of better living organisations like those adopted by the people of Gurgoan District under the guidance of Mr. F. L. Brayne and described in his book, "Re-making of Village India"

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This Conference was inspired and to a great extent organised, by Mr. K. G. Sivaswami Aiyar of the Servants of India Society who has been permitted by that Society to do intensive rural work in Trichinopoly District. The Conference adopted a number of resolutions for the promotion of village panchayats, co-operative societies, primary and adult education and better living. It also recommended the starting of a peripatetic training school with a staff to be provided by the District Board, consisting of a Health Inspector, a Scout Master, a trained teacher and an Agricultural Demonstrator trained in co-operation. This training school is to be conducted for three months at a place and thus four centres are to be served in a year. The object is to give instruction to intelligent villagers in order that they may become "village guides." The idea is obviously taken from Mr. Brayne of Gurgaon. The Chingleput District Board and the Tadepalligudem Taluk Board in West Godavari District have adopted the "village guide" idea and have held training classes, but they have depended upon the village teacher--obviously because he possesses the necessary education and mental capacity to profit by the training given and to be an efficient "guide." On the other hand he is often not a man of the village and is liable to be transferred at the pleasure of the authorities that control him. Whereas any training given to the intelligent individuals of a village will be a permanent addition to its moral resources.

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The difficulty, however, is to find men in villages who are earnest and keen enough to benefit by the training. Sir Fredrick Nicholson summarised his monumental report on co-operative credit banks in Germany in the two words, "Find Raiffeisen" meaning thereby that if only persons of social position, character and intelligence, being of the villages themselves and yet above the average level were discovered and enthused, in other words, if men possessing the qualities that Raiffeisen possessed in a remarkable degree were discovered and roused, the Co-operative Movement would succeed in India as it had done in Germany. We have however, not had the patience to find Raiffeisens and started societies in numbers with overconfidence. We have neglected the human side and hence the present muddle in the co-operative Movement. The main thing

is to find the men that will make suitable Village Guides. Then training may be given them, either in the villages or at a little distance. Otherwise a training class may come into being without a soul.

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The resolutions of the Conference constitute a good, if somewhat ambitious, programme of work for village uplift. They are full of suggestions to those who want to serve their particular villages according to their own limited capacities and opportunities. One may help his village in working the co-operative society, the panchayat, the school, the adult education scheme, or the better living organisation of two or more of them together. A humble beginning would be to work the co-operative society in the right spirit. Those who wish to take part in rural reform will do well to begin with the co-operative society and *Work it in the right spirit*. How it should be done and what steps should be taken were mentioned by Mr. Venkatachala Reddiar in his address and also adopted by the Conference as a resolution. The membership of the society should include all those who could benefit by the society, not only land-lords and tenants but also artisans and labourers as well as women who by tending a cow or a buffalo could add to their income; the habit of thrift should be promoted among the villagers by persuading even the poorest among them, to make saving deposits with society; local patriotism should be stimulated among the better off people by getting deposits from them; and non-credit activities such as selling the produce and buying the requirements of the village through the co-operative societies as far as possible should be attempted. These items form a good programme of work for any earnest villager who is keen on improving the economic condition of his village. He will also be well rewarded if he works steadily and patiently.

Fertility and sterility in Plants.

Fertility or sterility is not a peculiar characteristic of human beings alone; plants and crops are subject to similar conditions. The ability of a human being or plant to bring forth living young ones is termed fertility. Conversely, the failure of the sex act completely or partially is termed sterility. While there has been considerable research on the problem of fertility or sterility in human beings, the work in

respect of plants and crops is comparatively less particularly with Indian crops and fruit trees. Seeing that the keynote of all of our agricultural and horticultural developments is to enable the plant to reproduce itself in large numbers, the subject of sterility in crops and fruit trees becomes one of paramount importance. On this problem, Mr. Maboob Alam, M.Sc. of the Botanical Section, Agricultural Research Institute, Pusa, has contributed an illuminating article showing considerable research which is given the place of honour in the current issue of the *Agricultural Journal of India*. The lack of fertility *i.e.* sterility may be caused by various agencies which may be roughly classed into two groups. (1) Environmental, largely external to the organism and beyond its control and (2) germinal, always internal and peculiar to the organism.

The environmental causes of sterility are considered under four aspects. (a) Nutrition. (b) light (c) humidity and (d) disease. As regards nutrition, sterility may be induced by either a deficiency or an excess of food. Every plant and animal must have sufficient nourishment to reproduce itself properly. It is not enough that food be supplied in sufficient quantities, but it must also be balanced. The limiting points of all environmental factors are three namely, Minimum, Optimum and Maximum. Only under the optimum conditions life processes go on satisfactorily. When the minimum or maximum is reached the balance is disturbed, and abnormal features set in. Plants require for their growth moisture and mineral nutrients, including nitrates and carbo-hydrates. An abundance of moisture and mineral nutrients including nitrates without an available carbohydrate supply results in weakened vegetation and the plants are nonfruitful. On the other hand, an abundance of moisture and mineral nutrients especially nitrates coupled with an available carbo-hydrate supply makes for increased vegetation, barrenness and sterility. Decrease in nitrates in proportion to the carbo-hydrates makes for an accumulation of the latter and also for fruitfulness, fertility and lessened vegetation while a further reduction of nitrates without inhibiting a possible increase of carbo-hydrates makes for a suppression both of vegetation and fruitfulness. Thus it will be seen that an excess of certain food ingredients is prejudicial to full fertility. Fruitlessness is not associated with maximum nitrates or carbo-hydrates but with a condition of the balance between

them (Optimum condition.) For example, fruit trees that are liberally fertilised and cultivated so as to stimulate vegetative growth are slow in bearing. Even if blossoms are formed these are dropped off shortly after pollination. Similar conditions are noticed in agricultural crops also and when the environmental conditions are such as to stimulate vegetative growth fertility is reduced. An instructive example of this is given by the author showing the effect of over irrigation on the relative yield of straw and grain in wheat which shows that an increase of irrigation water from 5 to 10 inches brings about a rise in yield of straw and grain in equal proportions, but further additions of water give a greater proportion of straw.

The amount of light and the relative duration of day light and darkness have a profound effect upon growth and reproduction in plants. It has been found that normally plants can attain the flowering and fruiting stages only when the length of day falls within certain limits and consequently these stages are reached only during certain seasons of the year. Shortening or lengthening the period of light causes many plants to stop vegetative growth and to flower and set seed, thus in certain species in the absence of favourable length of day required for reproduction, vegetative development may continue indefinitely while under the influence of suitable length of day, flowering and fruiting may be induced. Thus the relation between the length of day and the time of flowering is of great importance in crop yields.

The effect of humidity in bringing about unproductiveness and sterility is often seen on various crops in the diminished yield resulting from prolonged cloudy weather at flowering time. Some crops are more susceptible to it than others and as a rule leguminous crops suffer much from a prolonged cloudy weather.

Disease is one of the most important non-hereditary causes of sterility among crops and fruit trees. The rust of wheat, the red rot of sugarcane, wilt disease of pigeon-pea, and the mosaic disease of tobacco are well known to agriculturists.

Germinal agencies of sterility can be grouped under two well defined classes. (a) Incompatibility, (b) Impotence. Incompatibility is a type of sterility in which the organism is fully developed and function normally in every way except that fertilisation cannot take place in certain matings but are

brought about in other combinations. In impotence, the organisms are not normally developed in respect of their reproductive organs and are unable to produce viable germ cells or the embryos after fertilisation may be incapable of development. Regarding the author's very interesting discussion on these two aspects of the problem which though of high scientific interest are far too technical and not likely to interest general readers.

Agri-Horticultural Notes.

The Kitchen Garden.

(By Viswamitra.)

Sufficient emphasis has been laid in previous notes on the necessity for proper and thorough tillage operations, and the kinds of tools necessary have also been mentioned. In the case of tillage operations of vast areas, one has to be satisfied with such labour-saving methods, that will work a great area in a very short time. Here it is not possible to pay particular heed to the depth of the soil worked, though one may desire to reach greater depth. But in the case of the Kitchen garden, the greatest attention has to be paid for tillage. In fact the greater the depth the soil is dug, the greater will be the advantage in the raising of the garden crops.

The soil should be worked when it is in a fit condition; that is, when there is enough moisture in it. Advantage should be taken to work a soil, as soon as possible after rains. But this can never be had either at will or at the time after a crop is removed and before it is made ready for another crop. In all such cases, the plots or beds should be artificially watered, sufficiently to enable the soil being worked to an appreciable depth. In the absence of moisture, the soil if worked, results in big lumps, and causes a great deal of labour to the gardener. Subsequently the big lumps have to be again broken into smaller ones until the natural state of the soil is brought about. In fact, after a few years attention, during which time if manure is added in enough quantities, there will not be any trouble to work the soil, as it will acquire a physical texture, which will be soft, mellow and easy of working without the addition of water either artificially or naturally. This cannot be done in

one operation and it has to be done as many times as are necessary in order to bring the soil to a proper consistency and the total depth to be reached in working should be at least one foot.

Immediately after the soil is turned over, all the weeds should be completely removed by picking by hand, paying sufficient attention to remove the plants with the roots, as in some cases, the plants shoot up again even though the tops are removed. This act, instead of helping us to be rid of the weeds, gives a fresh stimulus for fresh shoots to grow, as the plants behave similarly to instances when they are pruned. The removal of plants with the roots, is not enough in some cases of weeds, where under-ground stems, as in the cases of *Cyperus rotundus*, nut grass (பேரணா) and *Cynodon Dactylon* (அருகிப்புல்) are left behind, and they easily grow into plants again. So the soil has to be properly searched, as it were, and all portions of weeds should be completely removed. At the same time, stone, tiles, broken pieces of glass, nails, etc., which one generally meets with in the kitchen garden soil, should also be completely removed, far away from the garden. If especially portions of roots of some plants are left in the neighbourhood, there is a chance for them to come again into the plots and establish themselves once more. It should also be stated that on no account these weeds should be thrown in the manure pit, with a view to increase the supply of manure; although some plants are useful this way. Of this in detail in subsequent notes and in the proper connection.

When once the soil is properly worked the next important operation to be done is to divide the area available into beds and pathways. The usual practice is to divide the area available into a number of beds, by allowing small bunds around. In this method, the gardener has to reach the beds which are away from the first, by walking on these narrow bunds at the time of watering or subsequent operations like bedding and stirring the soil. These operations will be considerably hampered for want of sufficient moving space for the gardener. Therefore it is always recommended, as a result of experience to divide the soil into strips of 3 feet width and of any convenient length and allowing a foot and a half of pathway between two such strips. This method is considered by some people as waste of land. But on the other hand, a proper lay

out of the garden with sufficient pathway to move about and freely handle the plots in subsequent operations, amply compensates the loss in area available to grow crops.

(Next instalment—sowing seeds.)

Notes & Comments.

WELCOME. We extend a most hearty welcome to Lt.-Col. Sir George Stanley on the assumption of the Governorship of this Presidency. In the short speech which H. E. made after assuming office he expressed his desire to work for the well-being and prosperity of this province and its peoples. When His Excellency arrived there was bright sunshine which enabled the satisfactory and successful carrying out of the functions connected with the assumption of charge. During the day, there was heavy monsoon rain dispelling the fears of the people whether the long break in the monsoon meant a postponement or a possible failure of it. His Excellency's entry upon his great office under such favourable circumstances is a happy augury for the future of this presidency. May His Excellency's period of Governorship be marked by progress and prosperity.

MARJORIBANKS VETERINARY DISPENSARY. Of the many public functions which Sir Norman Marjoribanks, performed during the period of his acting Governorship of this Presidency, the laying of the foundation stone of the new buildings for the Veterinary Dispensary in Venkatagiri, was by no means the least important. The popularity and usefulness of the dispensary which was started in 1926 has been increasing as evidenced by the gradual increasing daily attendance of animals. As happily expressed by Sir Norman Marjoribanks the Maharaja Sahib of Venkatagiri has conferred a boon to the ryots and general public by giving the site free and agreeing to bear half the cost of the buildings.

THE NEXT FOREST PANCHAYAT'S CONFERENCE: In accordance with the decision come to at the last Conference held at Ongole under the presidency of Rao Bahadur B. Muniswamy Nayudu Garu, B. A., B. L., M. L. C., the next Conference should be held early next year at Trichinopoly. We have not heard yet what arrangements are being made to hold the Conference and to render it as successful as the Ongole Conference had been. The first requisite is the choice of a President who should at once command the confidence both of

the Panchayatdars and the Government and be able to give a proper lead to the deliberations of the Conference. There are several important matters which will require consideration at the Conference. By far the most important of them is the placing of the Forest Panchayats on a statutory basis, a request which has been repeatedly pressed on Government at previous Conferences and which formed one of the subjects submitted for consideration by the deputation which recently waited upon the Hon'ble Mr. A. Y. G. Campbell, the then Revenue Member. The orders of Government on the several matters submitted by the deputation are eagerly awaited. The Panchayatdars will be grateful if the Government would be pleased to pass orders sufficiently early before the next Conference.

In this connection we have to refer to a suggestion that has been made to us by some Panchayatdars that for some time to come and until the movement gets sufficiently consolidated, it may be well if the Provincial Conference is held in the capital town (Madras) leaving the District Panchayats to hold their own Conferences to consider the matters affecting the Panchayats in the Districts. Successful Conferences for groups of districts, say, the Ceded Districts, the Tamil Districts and the Circars may also be arranged for in which the delegates assembled would belong to one linguistic area. This is a matter which may be discussed at the next Conference and decided upon.

Panchayat Forests are to be found almost throughout the Presidency and there is quite a variety of forest products. To arrange for an exhibition of representative minor forest products in connection with the Conference will be an interesting adjunct to it and will prove of high educative value to the Panchayatdars assembled at the Conference. If the organisers of the next Conference should decide upon having an exhibition it is very necessary that the Government and the Board of Revenue should be addressed early for help, co-operation and guidance. Government should be requested to circularise the Collectors in order that the Panchayat Deputy Tahsildars may render the necessary help to the Panchayats in this behalf. The Deputy Tahsildars should be in charge of the Exhibits relating to their District and be able to give all information required by the visitors. The occasion may be utilised by the assembled Deputy Tahsildars to meet together and compare

notes. This free and frank talk among themselves will be of benefit not only to the Deputy Tahsildars but also to the Panchayat forests. This will secure uniformity of procedure in the management of these forests.

MEMORIAL TO A CO-OPERATOR. The Madras co-operators have honoured themselves by honouring the memory of the late Mr. F. R. Hemingway, the unveiling of whose portrait at the instance of the co-operators of Madras was performed by Sir Norman Marjoribanks as acting Governor. That was a tribute to the memory of a good man who possessed a rare sympathy and a kindly disposition which endeared him to all. His chief work as an official in the Madras Presidency was in connection with the co-operative movement. When he was appointed Registrar, the movement began to develop remarkably and as appropriately observed by Sir Norman Marjoribanks he tackled with energy and enthusiasm the problems which came before him and was the brain that was responsible for inaugurating many useful schemes for the successful working of co-operative societies.

MEDICAL WORK IN TEMPLES. According to the Young East (Japan), the prefectural authorities of Shimane have started work to open dispensaries in temples at fifty six out-of-the way villages under their jurisdiction where medical aid cannot be easily obtained. Physicians will be despatched from the nearest town to these dispensaries for a stay of one week or so to examine patients. A subsidy of 50 Yen a year is given from the prefectural treasury to the temple maintaining the dispensary, the priest being in charge of it. We heartily commend this highly beneficial social welfare work to the Ministry of Health and the Religious Endowment Board as representing the temples in this Presidency. The woeful inadequacy of medical relief in the rural parts is a standing grievance and it seems to us that the good example of Shimane prefecture may with advantage be followed. This will be a legitimate object on which the temple funds may be spent and with a small subsidy from Government several of the out-of-the way villages where fortunately there are temples in working condition may open dispensaries for offering medical relief to the villagers.

VILLAGE COURTS IN MADRAS Reviewing the District reports on the work of Panchayat Courts, Government

Dec. '29]

note with satisfaction the evidence of the growing popularity of these courts. In the Districts of East Godavari, Tanjore and Trichinopoly, despite an increase in the number of courts there was decrease on the number of suits for disposal. In Trichinopoly, it is attributed to party feeling between the President and members of the Panchayat Courts while the Collectors of East Godavari and Tanjore have not attempted an explanation. Madura evidently is indifferent in taking advantage of these useful and cheap institutions for there was a marked decrease in the number of courts as also in the number of suits for disposal. Such an enlightened district as Tanjore might have been expected to show a better appreciation of these institutions for we note with disappointment that as many as 33 members had to be removed from 27 courts for their absence from more than five consecutive meetings and that such a drastic measure should have had to be taken does little credit to their sense of service and sacrifice.

FOREST RESEARCH: His Excellency the Viceroy Lord Irwin opened the other day the Forest Research Institute at Dehra Dun which we believe is the largest and most complete Institute in the British Empire, if not in the whole World. Considering that the Indian Forest Department has to deal with nearly one quarter of the area of British India, that it makes an annual profit of nearly 3 crores of rupees and that it has such wide opportunities of increasing the prosperity of the people not only in the villages and remote tracts but also by the development of trade in commercial centres, those who have planned the Institute have, as well put by His Excellency, been inspired by no unworthy conception of its potential value to the wealth of India. The economic side of the Institute is of first class importance as the utilization for various purposes of the trees when they have grown, will be rendered possible. For instance, spars for aeroplanes, poles for gun carriages, stocks for army rifles, sleepers for railways are all the subjects of exhaustive research at Dehra Dun and have attained a considerable degree of efficiency. After many years of work at Dehra Dun, bamboos are coming into their own for paper pulp and two companies are now being floated in London to work the enormous Bamboo forests in Burmah. Another important question is the manufacture of matches from indigenous woods

and on the recommendation of the Tariff Board proposals are now being considered for extensive experimental work and for a survey of the forests which contain potential match woods so that India may as far as possible produce her own matches. In other ways also such as in assisting the manufacture of turpentine, oils from grasses, medicinal drugs, gums and other products, the economic branch of the Institute has done work of greatest practical utility.

ADULTERATION OF BUTTER AND GHEE: Ghee, which is a very important article of food in India, has been persistently adulterated for a long time and most of the ghee available for consumption is adulterated. During recent years the evil has assumed such considerable proportions as to be a serious menace to public health. Various measures have been adopted and even legislation attempted in some places against the adulterated stuff being vended but they have not been successful in putting a stop to the practice. This is partly due to the difficulty of adopting an effective method of deducting adulteration. During recent years, the task of the analyst has been rendered more difficult by the appearance on the market of an article which goes under the name of "Vegetable Ghee". In this country, butter and ghee are chiefly made from the milk of buffaloes and cows and only very rarely from that of goats and sheep. Owing to great variations in the composition of natural butter and ghee which depend on the breed of the animal, season of milking, kind and quality of food supplied to the animal and also the 'Idiosyncracies' of the latter it is not possible by merely carrying out the so called 'rapid tests' to detect in every case an admixture of foreign fat when the quantity is small. Fats commonly employed as adulterants may be of animal or of vegetable origin or of both. Mr. Phani-bushan Sanyal, M. Sc., Asst., to the Imperial Agricultural Chemist Pusa, has been able to arrive after repeated trials at certain reliable tests for detection of adulteration of ghee and butter. The processes are described in detail in the *Memoirs of the Department of Agriculture in India.—Chemical series, Vol. 10 No. 3.*

VILLAGE PANCHAYATS IN MYSORE. There are in Mysore nearly 9000 village Panchayats or in other words one Panchayat to about $3\frac{1}{2}$ square miles as against one to four

self-governing local bodies in England. Judging from the point of view of mere numbers, the result achieved in Mysore is creditable. But as pointed out by H. H. the Maharaja in laying the foundation stone of the habitation of the Kolar District Board, though Mysore may claim credit to have worked up to the English level, it has to be remembered that for each unit of local self-government here, they in England have half a dozen other local units of different kinds, for example, a club, a cricket team, a debating society, a flower show, a baby welfare centre and such like institutions and it is from the raw material provided by these that the country produces its best athletes, its artists, its public workers and its legislators. So village Panchayats should be able to afford the necessary stimulus to the coming into existence of other village institutions so that all may grow and develop animated by a spirit of health rivalry and common ideal.

RURAL MEDICAL RELIEF: The following extract from the Government Review of the Triennial Report of the Madras Medical Department will be read with interest

The scheme inaugurated in 1924, of subsidising medical practitioners who agreed to settle down in selected villages and afford free treatment to the poor, has developed considerably during the period under review, the number of rural dispensaries working at the end of 1928 being 326 against 183 at the end of 1925. The amount of the subsidies given to rural practitioners of the L.M.P. class, has recently been enhanced from Rs. 400 to Rs. 500 a year and the subsidy to midwives has been raised from Rs. 100 to Rs. 300 a year, and it is hoped that before long the problem of bringing medical relief to the doors of the rural population would have been solved to a great extent.

REJUVINATION OF ANIMALS. Dr. Voronoff, the famous doctor and scientist recently interviewed by a representative of the "Times of Ceylon" expounded his theories. "You must understand," said Dr. Voronoff, "that my work is divided into two sections—operations upon human beings and operations upon animals. The public naturally, is more interested in the rejuvenation of human beings, but the real importance of my work attaches to animals—the re-strengthening and rejuvenation of valuable cattle, the improvement of breeds and so forth.

"Take, as an example a valuable stud horse. It may be that he is worth from £3,000 to £10,000. He becomes old and feeble. He cannot be put to stud more than three or four times a year, and when he is, the colt is weakly and poor.

"With the gland operation we change this. We take a young and sturdy animal—not necessarily valuable or of good breed—and we graft the gland from him on to the other. The effects are almost immediate. The old horse becomes strong, his muscles firm up, and his breeding powers are not only as good as before, but frequently they are even better.

"We have never had a failure, and myself have conducted thousands of these operations within the past ten or fifteen years. We know for certain that we can add years to the lives of animals in this way.

"Just imagine the economic possibilities of this thing! With valuable sheep, it is nothing for old animals two years after the operation, to put on 10 kilos more flesh and 750 grams more wool. With all cattle it is the same. We put more meat on to their bodies, we lengthen the lives of good stud animals, and in every way we improve and strengthen the breed." He added that he had English pupils working for him now, and at the request of the British authorities in India he might go to that country for two months to help them there with cattle.

TRAINING OF VILLAGE WORKERS. The National University founded by Mr. Gandhi at Ahmedabad has prepared a scheme for starting a school for training village workers, with the sum of one lakh of rupees donated by Mr. Nagindas Amulakh Ray. Young men who accept the aims and objects of the University and bind themselves to work five years at any centre to which the University deutes them, will be admitted to the School. They will be given scholarships of up to Rs. 20. Those who have studied up to the Matriculation class will have to undergo a course of training lasting 2 years and those who have studied up to the B. A. class a course of one year's training. At the termination of their course of training they will be engaged on salaries of Rs. 30, rising upto Rs. 50, and in special cases, upto Rs. 60.

The courses of study include Gujarati, the Geography of India and the World, Accountancy and Book-keeping, music and bhajans, economics, including rural spinning, carding and

carpentry, sanitation and hygiene, household medicine and first aid to the injured, athletics, land survey, etc. After his period of training, the village worker will have to do propaganda work on behalf of the Congress, conduct spinning and weaving centres, open primary schools where none exist, as also night schools promote village sanitation, treat ordinary cases of sickness, organise sports and bhajan parties.

CATTLE BREEDING IN HYDERABAD. H. E. H. the Nizam's Government have sanctioned a scheme for a cattle breeding farm, which was drawn up by the Agriculture Department in consultation with Mr. William Smith, Imperial Dairy Expert, and Dr. Harold Mann, D. SC. An extra grant of Rs. 3 lakhs has been provided in the current Budget for this purpose: A site for the proposed farm has been selected below the Himayat Sagar Reservoir, some miles from Hyderabad City.

The main object of the farm is to improve the milking capacity of the draught cattle of the State. At present the cows produce very little milk, and are usually an unprofitable burden to the ryots who, if they required milk, have to keep buffaloes whose yielding capacity was much greater. The improvement would be effected by selection from the local cattle and not by cross-breeding. This process would necessarily take time, and it would be a number of years before results could be obtained on any appreciable scale. The department proposed to start a dairy as an adjunct to the cattle breeding farm, not only as a means of reducing the working expenses of the farm by selling the milk produced to consumers in Hyderabad City, but as a model dairy for the encouragement of private enterprise on up-to-date, profitable lines.

WHAT A VETERAN CO-OPERATOR SAYS: Mr. Henry W. Wolff, one of the founders and up to 1907, President of the International Co-operative Alliance, who advised the Government of India on the introduction of co-operative credit in this country, writes as follows from England to Mr. H. M. Hood, Registrar of Co-operative Societies in Madras with reference to the Madras Co-operative Department's last annual report:

You have in your Province the same difficulties to cope with, that present themselves in some Provinces in an aggravated form elsewhere. But you appear to be grappling with

them on quite the right lines. There is very much of that slipshod discharge of business to be corrected, which makes you, among other things, urge the appointment of paid secretaries and I cannot see that consideration for honorary officers should deter you from prosecuting criminous gentlemen of the class. I hope you may succeed in placing supervision and local unions on a better footing. It is very satisfactory to learn that the attention bestowed upon the improvement of supervision has to some extent lessened the accumulation of overdue debt. But one would wish to see co-operation put to extended use in the service of agriculture not necessarily in the collective holding and working of holdings. The small profits made in the co-operative sale of milk and, I hope, its consumption in a purer state, are likewise to be welcomed. But I wish that local authorities could show more favour to co-operative labour societies, which, I would think, must have some promise in them for the raising of the humbler class and the fitting of it to the use of co-operative distribution. The weaver and kindred trade worker also evidently need badly the teaching that you urge in respect of standardisation of quality and also regularisation of output of goods. I hope the Madras Central Bank is extending its business seeing how it is dealing with its accumulated capital and you seem in Madras to be pushing education and instruction which is the mother's milk for the healthy growth. For as soon as we have a sufficiently large posse of co-operators in the full sense of the term, we are sure to have successful and beneficent co-operation.

Reviews and Notices.

ECONOMIC ORGANISATION OF INDIAN VILLAGES.

Vol. II by Prof. N. G. Ranga, B. Litt, (Oxon) (Published by D. B. Tarporevalla Sons and Co. Bombay).

Readers of this journal need no introduction to Prof. N. G. Ranga, an indefatigable worker in the field of rural economics. We had the pleasure of noticing in these columns the first volume of his "Economic Organisation of Indian Village" which dealt with some of the villages in Bapatla and Tenali Taluks selected as fairly typical of the economic conditions of the deltaic area. After a careful study of the family budgets of the peasants and labourers, Mr. Ranga had furnished facts and

figures showing the farming costs of the ryots, their standard of living and the condition of labour. In the present volume, he has dealt with many other aspects of the rural problem. The chapters on the migration of ryots from the Andhra Desa into the Nizam's Dominions and the internal migration of people within the Madras Presidency furnish interesting materials regarding the economic condition of British emigrants in the Nizam's Dominions and as stated by Mr. Ramdas Pantulu in his 'Foreword', they raise an important question of policy. Prof. Ranga gives prominence to the question of migration as a solvent to the appalling unemployment which prevails in the Madras Presidency. For instance, the Nizam's Dominions contain vast tracts of virgin cultivable lands which are capable of absorbing a considerable portion of the unemployed population of the Andhra Districts. But unfortunately the village administration of those areas is grossly unsatisfactory and malaria is prevalent in them, not to mention other impediments which tend to retard migration. His suggestion that the Government of India should appoint an officer of their own in the Nizam's Dominions to look after the interests of the settlers, merits consideration, as his other suggestion for the establishment of labour exchanges with regard to internal migration. In this Presidency, certain tracts are thickly populated while others are sparsely peopled with large tracts of uncultivated lands and if the author's suggestion is adopted there will be ample scope for agricultural development. Similar exchanges function successfully in Europe and elsewhere. The volume also embodies the results of intensive studies of the economic condition of the people in selected dry villages. Prof. Ranga describes the low standard of living obtaining in those villages, the poor incomes of the ryots, their indebtedness, want of irrigation and transport facilities, frequent failures of rains and consequent distress and the urgent need for taking on hand suitable irrigation schemes.

The author's proposals for remedying the evil of fragmentation of holdings, liquidation of ryots' prior debts and prevention of unproductive borrowing and the formation of agricultural panchayats and federations are well thought out and deserve consideration. The appearance of the book under notice is timely when schemes of rural reconstruction are being

seriously considered. Mr. Ranga deserves to be congratulated on the materials which he has been able to gather and publish. The field of enquiry is vast and one who is actually engaged in local enquiries in villages in gathering facts and materials even from very old people which is not an easy task cannot also afford the time to systematise and generalise. Others can take up the materials and work upon them unless Prof. Ranga himself takes up the work.

TWO BOOKS ON CO-OPERATION.

CO-OPERATIVE READER: (Telugu) by Rao Sahib N. V. Appa Rao (Retired Extra Assistant Registrar of Co-operative Societies), Asha Printing Press, Berhampur, Ganjam Dt. Price 8 annas.

II. PRIMER OF CO-OPERATION: by Prof. H. L. Kaji, M. A., B. Sc. I. E. S. Prof. Sydenham College of Commerce and Economics, Bombay. (City Book Depot Madras, Price 8 annas.)

Village improvement or as it is more popularly known 'rural reconstruction' is a live theme of discussion at the present day. The object aimed at is to build up a strong self-reliant and prosperous peasantry and co-operation affords the only satisfactory means of working up to this ideal. The ryot suffers from lack of capital and it is only by the application of co-operative method can he be placed in funds to improve his lands and successfully carry on cultivation. If the benefits of co-operation are to be realised adequately, it is necessary that the underlying principles should be clearly grasped and understood by the people in order that they may follow in their daily life the virtues of self-help and mutual trust, the two essential requisites of successful co-operation. Rao Sahib Appa Rao, who has intimate knowledge of the needs of the rural population, has prepared the co-operative reader for the benefit of pupils in elementary and middle schools. The broad principles of co-operation are explained in easy Telugu with suitable illustrations so that they can be easily understood by the school children for whom they are primarily intended. The "Primer of Co-operation" is a Telugu rendering of Prof. Kaji's well-known work on the subject, and clearly explains the aims and objects of the co-operative movement and the benefits to be derived from it. The publishers have rendered a service by bringing out a Telugu translation of the Prof's book which should prove useful to the villagers in the Telugu districts.

THE ANNUAL NUMBER OF THE SCHOLAR is an attractive issue containing a number of articles on a variety of topics of cultural value and interest by well known writers. Dr. Radhakumud Mookerji's article on the "Historical fitness of India for Democracy" is timely and is an illuminating contribution to the discussion on the subject. Democratic ideas are traceable to the Rigveda and the Rigvedic kingship was from the first limited by the assemblies called the *Sabha* and

the *Samiti* which were organic parts of the earliest Indian constitution. But apart from the limited monarchies there were in ancient India full-fledged democracies and as early as the 5th century B.C., these democracies had developed a complete set of regulations for the conduct of their business by their assemblies or parliament (called *Sanghas*) touching such topics as *quorum*, notice of meeting, notice of motions, resolutions, arrangement of seats, the whip, vote, vote by ballot, decision of votes by the majority, teller of votes, reference to select committees, and even Referendum. In the article entitled "Youth and the remaking of Rural India," the Hon'ble Mr. V. Ramadas Pantulu stresses the point that among the instruments for the revival of decayed village life the most potent is the co-operative movement and says that for bringing about this happy revival the youths who are the future hope of India will have to partially abandon the so called amenities of urban life and cultivate a rural bias with all its discomforts and inconveniences. Sreemathi Ragini Devi pleads for the restoration of Indian music to its ancient glory and purity. Among other articles of interest may be mentioned "Democracy vs. civilisation" by Mr. K. S. Ramaswami Sastri and "In the Throats of a rebirth" by Mr. K. S. Venkataramani

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We have received from Messrs. V. Ramaswami Sastrulu and Sons the following books:—(1) Village officers' manual. (Telugu), second edition, by Mr. V. S. Rangaswami Rao. (2) The Village munsiff, Maniyagar, Special Test Question Papers with answers, parts I and II (Telugu) by V. S. Rangaswami Rao. (3) The Indian Penal Code in Telugu with notes by Mr. V. S. Rangaswami Rao.

The first book gives all the information which the village munsiff, the maniyagar and the karnam need to know for the proper discharge of their duties. The arrangement of the topics is intelligible. In the second book, part I of the special test examination question papers, relates to the powers and duties of the village munsiff and the maniyagar and part II to village sanitation. Candidates for the village officers' special test examination should find this useful.

The legal enactments in force in British India and the decisions of the courts as reported in the law reports are all in English. The great majority of our people who are not acquainted with English have no means of gaining knowledge of the more important acts in force in India; for instance, the Indian Penal Code. It is a well known legal maxim that ignorance of law is no excuse and a wrong act done unwittingly by an ignorant man is dealt with in the same manner as if the act had been done by one who knew the law and the consequences of the wrong act. Messrs. Ramaswami Sastrulu and Sons, the well known publishers, deserve to be thanked for bringing out a Telugu translation of the Indian Penal Code, with notes embodying the recent decisions of the High Courts.

Our Exchanges.

English Edition.

The Agriculturist, The Agricultural Journal of India, The Business Magazine, The Benares Hindu University Magazine, Bharatha Dharma, Brahmacharya, Better Business, The Childrens' News, Commercial Education, The Educational Review, Economist, Eastern Herald, Federated India, The Garland, Journal of the Union of Egyptian Agriculture, The Hindu illustrated weekly, The Humanist, The Health, Home and Hemeopathy, Hindi Pracharak, The Indian Labour Journal, The Industry, The Indian Review, The International review of science and practice of Agriculture, The Indian (Singapore), Indian Humanitarian, Indian Thinker, Indian Veterinary Journal, Indian Educator, Journal of the Central Bureau of Animal Husbandry, and Dairying, Junglewallah, The Madras Agricultural Journal, Journal of the Madras Geographical Association, The Journal of the oriental Research, The Jaina Gazette, The Journal of the Mysore Agricultural and Experimental Union, The Lasting Youth, Lakpathy's sporting News, Mercantile Miscellany, Matrimonial Review and Miscellany, The Mysore Economic Journal, Madras Bulletin of Co operation, The Madras Forest College Magazine, The Madras Village Panchayat Bulletin, The Magazine, (Trichur) My Magazine (Madras) New India (weekly), The National Christian Council review, The Nature Healer, Our Home Magazine, The Peace, The Poona Agricultural College Magazine, Prohibition, The Quarterly Journal of the Mythic Society, Quarterly Journal of Andhra Historic Research Society, Scientific Indian, The Student, The South Indian Teacher, The Scholar, Self Culture, Tropical Agriculture, (Trinidad), The Tropical Gazette, Triveni, Vedanta Kesari, The Voice of Youth, Vaitharini, Wealth and Welfare, Young East, (Tokyo) Young Men of India, The Young Liberator, Zoroastrian and New Thought Era.

Tamil Edition.

Ananda Bodhini, Ananlagunabodhini, Balavinodini, Bharathi, Chintamani, Elavyavasayee, Gramanukulam, Arogyathipikai, The Indian Agriculture, The Indian, Kannabalan, Kumaran, Maruthi, Madras Village Panchayat Bulletin, Ramakrishna Vijayam, Swarajya (weekly), Tamil Nesan, Vimochanam, Yathavamithran, Kalaimakal, Kudi Arasu

Telugu Edition.

Ahimsa, Andhra Vydya Sammelana Patrika, Devangasevi, Grandhalaya, Sarvasvamu, Arogyaprakasika, Kannadasahakari, Kanmodaki, Kumarabodhini, Raithangamu, Sahakarumu, Samadarsini, Swavidhi, Subodh Swadarmaprakasini, Santi, Trilinga, Thelaga, Vasavi, Hindi Kisan, Canarese Sahakari.

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