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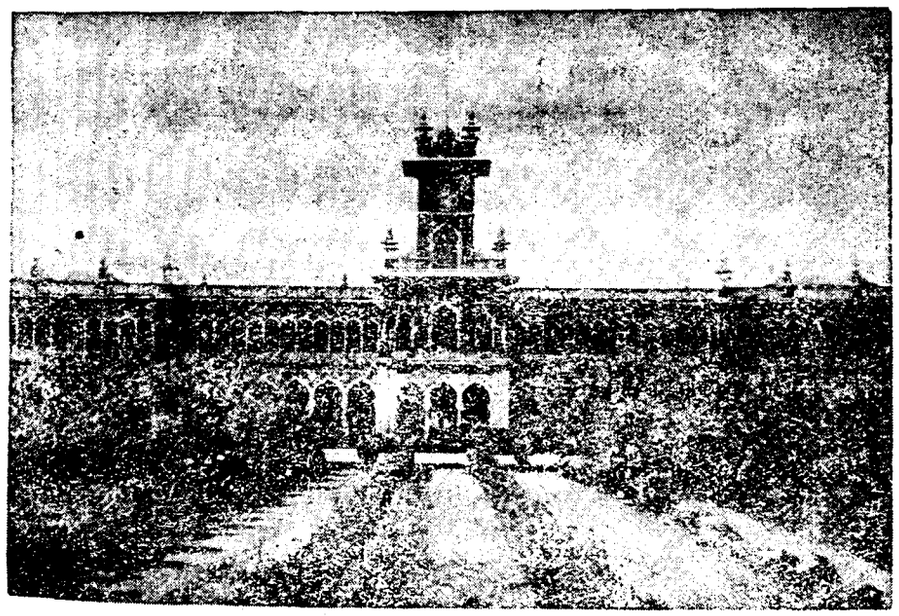

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Editorial

National prosperity in our country is largely the prosperity of the farming community, who constitute nearly eighty per cent of our population. Even amidst all the industrial development around us, agriculture is still the most important vocation in the national economy and would continue to be so for quite a long time to come. It is accepted on all sides that agriculture is the foundation of national wealth and that farm income and national income rise and fall together. The income of the farmer is based on three things, the output per acre, the cost of production and the prevailing prices for agricultural produce. The output and cost of production are inter-related, but in any final analysis, the ultimate factor deciding income is the price.

In recent months agricultural prices are spiralling up and Government are adopting various measures to bring them down. It is essential that the basic products of agriculture, namely food and raw materials of industry should be available at reasonable prices and all measures adopted to achieve this end will have universal approval. What is equally important, however, is that these measures should not adversely affect the income of the farmer or his standard of living. It is notorious that this standard of living in the agricultural sector is already of a very low order and any deterioration will only result in dire poverty. The peculiar situation in agriculture is that it is not organised as the other sectors and in the event of any downward phase in the price cycle, the farmer has still to carry on, for a ruinous return.

In his own economy, the farm costs are mounting up with increases in labour wages and other prime costs. Amidst these rising costs, the small producers who form the

majority are still lacking in resources to adopt improved technological production methods with the result that their yields continue to be low, cutting in on any surplus they may have. Even with better credit facilities and good surpluses, liquidation of accumulated debts would prove difficult unless price levels are favourable. Thus farmers would ever remain indebted. Any policy leading to this situation in the agricultural sector may defeat the very objective of our plans to improve the standard of living of our masses with higher employment and better income.

The fixation and stabilisation of agricultural prices at an economic level therefore, calls for an examination of the costs and economy of agricultural production. In spite of their wide variation, reasonable figures could be arrived at to guide price stabilisation policies. Agriculture in our country is often said to be a gamble with the monsoons and prices. In a planned economy it need not be.

Livestock Industries in Australia

by

C. L. SUNDARARAJAN, B. Sc. (Ag.)

Sheep: Australia is the leading wool producing country in the world. With less than one-sixth of the world's sheep population, she produces more than one quarter of the world's wool. It is often said that Australia is riding on the sheeps' back and that the nation is built on grass. Export figures (£ 42 millions or 50% of the total exports) vouchsafe for the accuracy of the former statement. How literally true the latter statement is, one can only understand from a visit to many of the sheep stations scattered right through the continent. Whether in the rich Camperdown district in Victoria or in the poorer Urriara and Tharwa of New South Wales, one cannot but be struck by the wonders that the clovers are doing for the farmer in particular and the nation in general. Apart from its intrinsic value as a good feed, the clover plants are so many miniature fertiliser factories fixing atmospheric Nitrogen in the soil and adding fertility to the paddock in the same way as and at a lesser cost than, the factories. By a series of trials and experiments over a period of many many decades, various strains of clovers have been selected and adapted for the development of the pastoral industry. And in recent years a new strain of sub-clover which thrives in sub-tropical conditions, has been evolved by workers in Sydney University. Attempts are still being made to find suitable legumes for growth in the tropical areas. The significant work done by scientists in discovering nutritional deficiencies of each individual type of soil and rectifying them by the application of super-phosphate and many trace elements specially molybdenum, copper, zinc or cobalt, has transformed many of the former scrub lands into good pastoral areas. Nor less important is the pioneering work done by the early settlers in introducing Merino and other breeds of sheep and evolving suitable strains to suit different local conditions; strains different in their body size, appearance, response to varying climatic conditions and feed requirements, but all producing the best of a number of types of wool to meet the varied requirements of the modern markets.

Scarcity of water and arid conditions are the bone of the country; but the innumerable tiny patches of water so meticulously conserved from run-off during times of high rainfall, by the construction of small earthern dams, and a good number of shallow

bore wells worked by wind mills, so characteristic of the Australian rural scenery, open our eyes to the wonders one can do in the most adverse situations. Each farm is subdivided into a number of paddocks enclosed by the same monotonous barbed wire fencing, 4 feet high with closely knitted fencing for the first three feet, which we learnt, is essential for rotational grazing and for keeping off that plague of pastoral industry — the rabbit, five of which consume as much grass as one sheep does. Here too, modern science has come to the rescue of the farmer in the form of myxomatosis — the deadly virus which has helped the almost complete extermination of the pest. Once on a sheep farm, we are at first perplexed by the innumerable "cocky gates", stocks of various medicines and appliances in the farm, the very many dipping and spraying devices, the different types of machinery, the various dwelling houses for shearers and farm hands and lastly the inevitable sheep dogs. No wonder then that the Australian sheep industry is a specialised one and it is by no mean chance that the Australian sheep gives the highest yield of the best clips of the world.

Coming to the details of production, we find that, with the use of superphosphate and of minor trace elements for fertilizing the paddocks, the subclover *(Trifolium subterraneum)* thrives well and in due course stores up nitrogen in the soil thus increasing its fertility. The various grasses like rye grass, Paspalum, *(Paspalum dilatatum)* or Cocksfoot, depending upon the rainfall of the area put on growth in proportion to the nitrogen status of the soil. This results in a good pasture of legume cum grass, which combination caters to the protein and carbohydrate requirements of the animals grazing on it. As compared to the native pastures, the improved pasture not only gives increased yield of fodder, but gives a fodder of superior nutritive value. The subclover seeds profusely and the seeds serve as excellent food concentrate during dry summer when all the plants dry out. Experiments carried out at Dickson Experiment Station, Cnaberra indicated that the introduction of subclover alone in the native pastures increased the carrying capacity of the paddock to two sheep per acre, while the introduction of a suitable grass, rye grass, and use of super-phosphate increased the carrying capacity to six sheep per acre as opposed to one sheep per acre usually carried by the native pasture. In another set of experiments it was proved that the average weight of sheep on improved pasture was 99 lb. compared to that of 52 lb. of a sheep on un-improved pasture. The yield of wool per sheep rose

from 9 lb. to 12 lb. The lambing of ewes increased from 65% to 110%, while the wool from improved pasture was claimed to be of a better staple and of finer quality. The irrigated pastures carried 8 to 10 sheep per acre per annum.

The subclover seeds profusely right under the ground and regenerates itself during autumn every year. A pasture of subclover and rye grass is thus kept on indefinitely for years till the soil becomes too rich for clover and is, therefore, dominated by grasses. The high latent fertility of the soil is then cashed in by raising a cereal crop, wheat, barley or oats or rice, reference to which is made later. We came across at least two outstanding farmers in two places, far apart who claimed an average clip of 14 lb. of wool per sheep per annum. Both were prosperous farmers owning, even by Australian standards, large blocks of land under improved pasture and managing their property in the most efficient manner.

The locality of a farm determines the breed of sheep and the type of sheep farming carried out on that farm. In well-watered country with even rainfall and good growth of pasture, fatlamb production assumes importance and the production of wool becomes subsidiary. Fatlamb production and cross breeding of sheep (Merino and any one of the British breed of sheep — Lincoln, Border Leicester or Romney Marsh or Dorset Horns) go together. The aim of cross breeding is the production of a dual purpose animal, the ewes of which have a body form with good mutton qualities and yield a reasonable amount of tolerably good quality wool. The wool pays the upkeep of the ewe for the year leaving the fat lamb as the profit. The lamb attains a live weight of 75 lb. in about 16 weeks time. It has been estimated that in a flock of 100 ewes with 80% lambing, a gross return of £ 586 is attained, £ 246 being the value of fleece and £ 340 being the value of lambs. The gross return per ewe per annum is £ 5—17—0. In another survey the net return per sheep per annum is estimated at £ 2—4—0.

Merino sheep are kept in comparatively arid country with light rainfall and extremes of temperature. Food is scarce and the merino with its hardy body is able to traverse long distances for food and water. There are a number of strains of merino for different types of country. Corriedales and Polwarths, evolved in Australia and New Zealand, are also to be seen in this country. The finest wool comes from the poorest country. Cross-bred sheep give wool spinning up to 56's to 58's while the merino gives wool spinning from 60's to 90's.

The four big jobs in a wool growers' year are dipping, crutching, lamb marking and shearing. Dipping, or more appropriately, spraying the sheep against infestations by external parasites, is done 4 to 6 weeks after the sheep have been shorn. Crutching is shearing off a long oval portion of wool from the sheep's crutch under the tail to keep the area clean and guard against blow fly pest, the maggots of which will kill sheep if infestation is not corrected. This is done a month before the sheep are due for lambing. Each sheep owner has a registered mark and the sheep are marked every year to identify its owner.

Shearing of wool is usually an annual affair taking place at the beginning of summer. Shearing is done with the aid of mechanical contrivances and is an art specialised by a team of people who migrate from station to station and do this tricky job on a contract basis. A good shearer usually shears about 150 sheep per day and gets a wage of £ 7—6—0 per 100 sheep shorn. Flocks of sheep of the same age and sex are shorn separately. Wool-classing is a specialised work and many of the farmers undergo training in wool-classing in the local technical schools. In the bigger sheep stations grading and preparing the clip for the market is done by prefessional classers. Marketing of wool in Australia is entirely a free trade and sales are conducted by open auctions by the great wool brokers in important cities and attended by buyers from all the world over.

Sheep raising is carried on in all parts of the Commonwealth with the greatest concentration of sheep population in New South Wales (60 millions) and Victoria (21 millions) followed by Queensland and South Australia. The total population of sheep in the country is estimated at 127 million heads and the production of wool at 1,245 million pounds. The production of mutton and lamb is estimated at 395,090 tons.

During our visit to one of the warehouses of a firm of wool brokers in Geelong, Victoria, we saw wool being sorted out and rearranged for auctions. One particular bale of superfine wool attracted our attention and we were informed that this bale was from the Victorian Valley, Western Australia, and represented the Super A fine wool in its best. The staple length was 2" and less and the wool would spin 90's. These fine wools were usually exported to Italy for the manufacture of luxurious garments and billiard table cloths. A pound of wool in Grease would fetch

anything from 160 to 200 pence. The price of a pound of average quality of merino wool is at present about 60 pence.

Two serious impediments in the increased use of wollen garments are (1) shrinkage of the material and (2) the difficulty involved in washing and laundering them. These shortcomings place the woolen garments at a decided disadvantage over the new synthetic fibres now flooding the market. To overcome these defects, the wool research Laboratories of the C. S. I. R. O. at Geelong is carrying out some fundamental experiments on these twin problems. Results so far obtained indicate, that shrinkage of the material can be overcome by the use of some synthetic resins during the processing of wool and a slight modification in the processing will make any woolen garment as easily washable as, say cotton or Nylon. Commercial possibilities of these findings are enormous and it looks as though wool will continue to reign supreme in the worlds' fibre market.

Research on the better production of wool and on the many problems associated with the sheep industry are carried out in many of research stations of the C. S. I, R. O., in close colloboration with the departments of Agriculture and the Universities. The Federal Bureau of Agricultural Economics studies subjects dealing with the economics of wool growing and sheep station management. Finance for these research activities is met from a fund to which the commonwealth Government contributes one half of the amount raised under the wool tax.

The Australian Wool Bureau, constituted under the Wool Use Promotion Act 1953, is a body of representatives of wool growers and meat producers charged with taking measures to improve production and increase the use of wool. The activities of the Bureau are financed by a wool tax of 4 sh. per bale of wool produced.

Dairy Industry: A flourishing country is said to be flowing with milk and honey. This statement holds good to a few of the chosen countries of the world and Australia is foremost among them. The number of milk bars one comes across and the enormous consumption of butter, cheese, ice-cream, and other milk products is something colossal. It may even be said that the general health of the population and of the chubby children, we so lovingly fondled in many of the Australian homes we were privileged to stay, is an index of the unfailing supply of that nectar of human health—

milk — and the gigantic proportions of the dairy industry. The industry has been in existance ever since the colony was founded. But the great strides that it made, begin with the perfecting of the technique of cold storage and its application to and use in the ocean-going vessels. Nowadays the Australian dairy products find their way into the homes of many countries in as fresh a state as they left the farms and factories in Australia. In 1953—1954 the net value of all dairy products amounted to £ 135 millions and the dairy industry has to its credit exports valued at £ 30 millions.

In the course of our tours, we visited a good number of typical dairy farms and a few butter factories on the Gippsland Dt., Camperdown Dt., and the irrigated districts of the Murray valley. The dairy industry is concentrated in the richer parts of the country with high rainfall and along the coastal areas east of the Great Dividing Range. The State of Victoria tops the list with a production valued at £ 53 millions followed by New South Wales valued at £ 41 millions.

The one peculiar feature that arrested our attention is the complete absence of stall feeding of animals and all the evils associated with it. There are no cow sheds or barns as understood in other parts of the world. No large amount is spent on the purchase of the so-called concentrates considered so essential for maintaining the yield or even of the health of the cow. Here the whole show is so planned, arranged and so highly mechanised to the minute detail that a herd of 50 cows in milk the minimum maintained by a commercial dairy farmer to maintain a decent standard of living (£ 1500 to £ 2000 net income per annum) is entirely and efficiently managed by the farmer with the assistance, perhaps, of his wife.

The culture and management of pastures, the principle of having enclosed paddocks for rotational controlled grazing are the same as found in the sheep stations. In the wetter districts a mixture of white clover and sub-terranean clover along with perennial rye grass, cocksfoot and Phalaris are sown in the pastures and the average carrying capacity was one cow per $2\frac{1}{2}$ acres. The development of perennial pastures in Victoria requires at least 25 to 30" of rainfall per annum. In irrigated districts, white clover predominates and an average paddock carries a cow per acre. Lucerne is also grown in many farms. During spring time when the growth of pasture far exceeds grazing by cows, the pastures are

These two merino rams are typical of the breeding stock on which Australia's ast flocks depend. Both these animals were bred on Haddon Rig, an extensive ieep property in New South Wales.

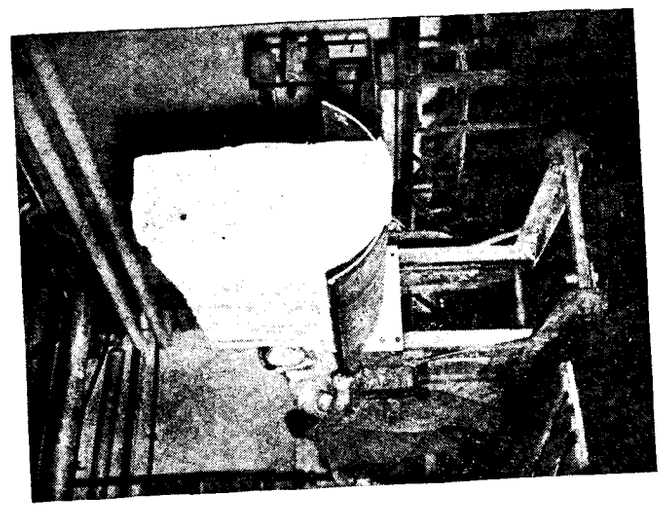
Australian News & Information **Bureau.**

Examining the fleece of a two-year-old Merino stud ram at Boonoke Station, New South Wales.

A Prize-winning Illawarra Shorthorn dairy cow. This breed, developed in Australia, and named from the New South Wales south-east district where they originated, are renowned for their milk production. The beast seen here, in eight 273-day lactations produced 103,000 lb. of milk, yielding 3,950 lb. of butter fact.

(Australian Information Bureau).

Shearers on the "board" at Wales handle on an average, 17,000 sheep each year. During a season, which lasts about 11 months, full-time shearers each handle about 20,000 sheep. When a shed is completed they move to another.



Butter being taken into cold store at an Australian butter factory.

Cream is being delivered at a picking-up point. Lower Southgate, N. S. Wales.

mowed and hay is baled and stacked for use in winter. A modern innovation is in the use of electric fences, to sub-divide each paddock, to allow strip grazing and to force the animals to feed close to the stubbles and thus avoid wastage of feed.

The cows are pictures of perfect health and satisfaction. They are there on the paddocks right through the year, grazing as they pleased and having at their will full access to water and shade. There is no let or hindrance in their way of life except during milking time, when they quietly enter the shed, part with the enormous burden of milk in their udders and quietly slip away back into the paddocks, the happier for being light in the hind quarters. Some farmers are in the habit of feeding the cows a pound or two each, of oats at the time of milking. Hand milking is too costly and cumbersome a method to be followed by the modern dairy farmer. The milking machines of stainless steel kept under conditions of good sanitation are there in every farm and takes only 6 minutes to milk a cow giving an yield of 4 gallons per milking. Some farmers send the whole milk to the factory while others separate the cream in their own premises and despatch the cream alone to the factory. In the latter case pig raising, to utilise the skim milk, is a profitable side line.

In this connection mention must be made of a gigantic milking plant we saw in Camden, N. S. W., the rotolactor plant in the possession of the Camden Park Estate Pty. Ltd., where 1500 cows can be milked every day morning and evening, at the rate of 350 cows per hour and employing only ten men to do the job. The plant is one of the two that exist in the world, the cost being £ 50,000/-. This firm has extensive grazing properties and specialises in supply of full milk to Sydney market.

There are two types of farmers, one specialising in supply of whole milk to the metropolitan areas and the other specialising in butter production. Their areas are clearly demarcated, though, in certain areas, they intermingle. The former invariably has a herd of Friesian or Ayreshire cows, which give the farmer a higher yield of milk (8,000 to 10,000 lbs. per lactation) of low butterfat content (3 to 4%). Basing their economy as they do on butter fat production, the latter prefer to have Jersey cows which are reputed to yield 5,000 to 7,000 lbs. of milk per lactation of 5 to 6% butter fat content.

Three herds of cows evoked our admiration. The Hawksbury Agricultural College, New South Wales, has a herd of fine Friesian cows and an outstanding cow in the herd averages 15,000 lbs. of milk per lactation. The Friesian cows at the Werribbee Experimental Station average 11,000 lbs. The Dookie Agricultural College, Victoria, possesses the finest Ayreshire pedigree cows (165 in number) averaging 10,000 lbs. per lactation of 300 days. The Australian Illawara Short Horn breed does splendidly well in the tropical and sub-tropical areas of Queensland and is well worth introduction and trial in India.

Whatever the breed of cattle a farmer chances to possess he invariably adheres to the following principles in the selection and maintenance of individual cows: (1) The cow shall yield a minimum of 7,000 lbs. of milk or 400 lbs. of butter fat per lactation. (2) The cow shall calve every year. (3) It should be amenable to milking by machines. Cows not conforming to the above requirements are culled.

A good bull is half the herd. The close attention the farmers pay in the selection proper bulls and the strict rules they observe in maintaining the purity of the type and the pedigree of the cows has paid them rich dividends. No effort is spared and no finance is withheld to introduce really good sires. The emphasis laid on the sires was well brought home to us when a few of us saw an outstanding bull of proved performance purchased by a firm of beef cattle breeders at a cost of £ 13,000. Herd testing of cows has become an established feature in many of the commercial dairy farms, some of which reported an average herd increase of as much as 75 lbs. of butter fat per lactation in so short a period of testing as 10 years.

As much as 90% of the total dairy production in the country is marketed through Dairy Farmers' Co-operative Societies scattered throughout the dairy areas. The Dairy Farmers' Co-operative Milk Company, New South Wales has a total annual turnover of £ 5 millions while the Co-operative Factory at Camperdown, Victoria has a turnover of £ 1·5 millions. The latter manufactures a variety of products including skim milk powder and casein and employs the most modern machinery. Rules and regulations regarding the details of construction of dairy buildings and maintenance of the sanitary condition of the premises, utensils and machinery in the factory and on the farm are very strict and are meticulously followed.

The Australian Dairy Produce Board, constituted under an Act of the Parliament, is the sole Australian Exporter of butter and cheese. For various political and economic reasons, the Australian Dairy farmers are unable, at the present time, to compete on equal terms with their counter-parts of other nations, specially the U. S. A., in the international markets. And since the Dairy industry is dependant upon the overseas markets for the disposal of 30% of her total dairy production, the Commonwealth Government have evolved a scheme of high internal market price (£ 420 per ton) and a subsidised export price of £ 400 per ton, the Commonwealth Government paying a subsidy of 9 pence for every pound of butter produced. The subsidy is to enable the farmer to get an over-all average price of 4 sh. 6 pence per pound of butter fat supplied to the factory, the minimum price which would allow the farmer to maintain a decent standard of living. The subsidy paid by the Commonwealth Government in the year 1955–1956 amounted to £ 14·5 million.

The pastoral industry of Australia, whether of dairy or beef cattle or sheep, is fortunate in more ways than one. Rain, though scanty in many areas, is evenly distributed. The land available for the industry is extensive, fertile and responds well to good management. Pioneers have evolved and modern breeders continue to evolve breeds of stock to thrive well on the sunny plains of the country, and maintain their purity and build up the pedigree through well-organised breeders' Societies. To crown them all, the stocks are entirely free from many of the contagious and infectious diseases which cause havoc in many other countries. Foot and Mouth, Haemorrhagic Septicemia and Rinderpest are entirely unknown. The quarantine regulations governing the entry of livestock from other parts of the world area so well laid out and so strictly administered that, for the past many decades, many diseases have been kept off the shores of Australia.

Groundnut — Mixed Cropping Experiment

by
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Introduction: Groundnut is one of the important commercial crops of the Madras State and it occupies nearly two million acres with an estimated production of one million tons of nuts in shell valued at nearly 33 crores of rupees. The area under groundnut has expanded phenomenally at the expense of other crops because of the ease of cultivation and the attractive monetary returns. Groundnut is grown pure and also extensively as a mixture with other cereals and pulses. The benefits of mixed cropping have been stressed by many agronomists. The practice is not new to the Indian ryot whose holding is small and a variety of crops is taken by resorting to judicious mixed cropping. However to get the best results out of mixed cropping subsidiary crops to be grown have to be chosen carefully to see that the components do not react adversely on each other.

Summary of previous work: Previous work done in this regard in the other States has been dealt at length in a previous paper on the subject by John, Seshadri and Shanker Rao (1943). At the Agricultural Research Station, Hagari (Andhra) Groundnut-*tenai* was found to be ecologically a sound mixture. At Guntur (Andhra) Cotton-groundnut mixture gave highest monetary return per unit area. Similar results were obtained at Dharwar (Bombay). Mehta (1942) reported that redgram and groundnut mixture was better than redgram sown pure. The same combination proved successful at the Agricultural Research Station, Siruguppa, (Andhra). Mixed cropping trials with cotton at the Agricultural Research Station, Koilpatti (Madras) have shown that groundnut, among the different mixed crops, has the least effect on cotton. Mixed cropping experiment was conducted at the Agricultural Research Station, Tindivanam (Madras) from 1939–'40 to 1948–'49. Results obtained in the first series of experiment from 1939–'40 to 1941–'42 have already been published and in this paper results obtained in the second series conducted from 1942–'43 to 1948–'49 are reported.

Materials and Methods: *(a) Treatments:* The experiment was conducted at the Agricultural Research Station, Tindivanam for seven years (1942–'43 to 1948–'49) in two series. The main object of this experiment was to study the relative effects of the mixed cropping on the two main types grown in the country viz. spreading and the bunch.

I *Series (Bunch Groundnut) (1942–'43 to 1945–'46)*

	Treatments	Strains	Spacings
1.	Groundnut and Cotton	Groundnut TMV. 2	6" x 6"
2.	Groundnut and Redgram	Cotton - Co. 4	3' x 9"
3.	Groundnut and Castor	Cumbu - Local	3' x 6"
4.	Groundnut and Cholam	Tenai - Local	3' x 6"
5.	Groundnut and Tenai	Castor - TMV. 2	6' x 2'
6.	Groundnut ann Cumbu	Redgram - Local	6' x 9"
		Cholam - Local	6' x 6"

II *Series (Bunch and spreading groundnuts)*
(1946–'47 to 1948–'49)

	Treatments	Spacings Groundnut	Other crops
1.	Groundnut (TMV. 2) - Bunch pure	6" x 6"	
2.	Groundnut (TMV. 2) - Castor (TMV. 3)	6" x 6"	6' x 2'
3.	Groundnut (TMV. 2) - Redgram P. S. Strain	6" x 6"	6' x 9"
4.	Groundnut (TMV. 2) - Cholam - Local	6" x 6"	6' x 6"
5.	Groundnut (TMV. 2) - Cumbu - Local	6" x 6"	3' x 6"
6.	Groundnut (TMV. 1) - Spreading pure	9" x 9"	
7.	Groundnut (TMV. 1) - Castor - TMV. 3	9" x 9"	6' x 2'
8.	Groundnut (TMV. 1) - Redgram P. S. Strain	9" x 9"	6' x 9"
9.	Groundnut (TMV. 1) - Cholam - Local	9" x 9"	6' x 6"
10.	Groundnut (TMV. 1) - Cumbu - Local	9" x 9"	3' x 6"
11.	Castor pure (TMV. 3)		3' x 2'
12.	Redgram pure - P. S. Strain		3' x 6"
13.	Cholam pure - Local		1' x 6"
14.	Cumbu pure - Local		1' x 6"

The randomised method of layout was adopted. The net plot size after rejecting requisite borders was 44' x 6' or 1/165 acre in the first series and 33' x 6' or 1/220 acre in the second series.

(b) Cultivation details: The fields were cultivated as are usually done for the groundnut crop. Town rubbish was applied at the rate of 10,000 lb. per acre and was incorporated into the soil. Sowings were done in the proper seasons. Two hoeings and weedings were given to all the plots, the first during the fourth week and the second a month later. The bunch groundnut was harvested by pulling the plants and stripping the pods and the spreading variety by digging with mammuty and stripping the pods. After the harvest of groundnut H. M. Guntake No. 2 was worked in between the rows of Castor, Redgram and cotton to remove weeds.

(c) Season: First Series: The first series of the experiment was conducted during the four years 1942–'43, 1943–'44, 1944–'45 and 1945–'46. The first season though started late, was a favourable one for the bunch crop. Good distribution of rainfall during the earlier part of the season proved ideal for the bunch groundnut and very good yields were obtained. The rapid development of the groundnut plants affected the growth of the subsidiary crops and the short duration cereals were the worst affected. The second season (1943–'44) was characterised by increased activity of the north-east monsoon, which favoured only the long duration subsidiary crops. The groundnut crop was an average one. During the third season (1944–'45) immediately after sowing there was a heavy downpour which affected the germination of all the six subsidiary crops grown mixed with groundnut. Excessive rains delayed harvest of the groundnut crop and as a result large percentage of nuts sprouted in the field. The yields were erratic and hence discarded. The fourth season (1945–'46) was a normal one and fairly good yields were obtained.

Second Series: In the first year 1946–'47, groundnut was sown by the middle of July. Rainfall received during the crop period was in excess of the requirements. The distribution was also not altogether satisfactory. The yield of bunch groundnut was below normal. In the second year, 1947–'48, season was adverse to the spreading groundnut as the north east monsoon was a near failure. The distribution of rain during south west monsoon period was uneven and unsatisfactory. The yield of bunch groundnut was below normal while that of spreading groundnut was poor. In the final year 1948–'49, the season was marked by partial failure of both the south west and the north-east monsoons. Prolonged drought prevailed in the initial stages which greatly affected the growth of the crop especially that of bunch groundnut. The north-east

monsoon also failed and rendered harvesting difficult. The initial setback greatly upset the results of the experiment, especially in case of bunch groundnut.

Results: *(a) Yield:* The yield of groundnut grown as a pure crop and as mixture crop was recorded for all the seasons. The yield data were statistically analysed and the results are given in tables below, series wise.

TABLE I (a)

Mixed Cropping of Groundnut (1942 - '43 to 1945 – '46)
Groundnut Yield Data — (Average for three years)

Particulars	Groundnut Bunch-pure (Control) A	Groundnut and Cumbu B	Groundnut and Tenai C	Groundnut and Cotton D
Acre yield in lb.	1,450	1,242	1,275	1,370
Percentage on Control	100·5	85·7	87·9	94·5

Groundnut and Castor E	Groundnut and Redgram F	Groundnut and Cholam G	Standard error	Whether significant or not (P=0 05)	Critical difference
1,336	1,180	1,105	37·1	Yes	105·0
92·1	81·4	76·2	2·6	Yes	7·2

Conclusion : A, D, E, C, B, F, G.

TABLE I (b)

Groundnut mixed cropping experiment (1946—47 to 1948—49)
Yield of Groundnut in lb.— (Average for 3 years)

Second Series:

Treatment	Bunch TVM. 2		Spreading TVM. 1	
	Acre yield in lb.	Percentage on control	Acre yield in lb.	Percentage on control
Groundnut Pure	900	100·0	850	100·0
Groundnut and Cholam	519	57·7	485	57·1
Groudnut and Castor	722	80·2	764	89·9
Groundnut and Cumbu	689	76·6	606	71·3
Groundnut and Redgram	729	81·0	620	73·0
Standard Error	51·5	5·7	42·4	4·9
Whether Significant or not (P=0·05)	yes		yes	
Cretical difference	145·6	16·2	120·0	14·1

Conclusion : Groundnut, Redgram, Caster, Cumbu, Cholam
Groundnut, Castor, Redgram, Cumbu, Cholam

TABLE II (a)

Mixed Cropping Experiment

Yield of subsidiary crops when grown with bunch groundnut

First series:

Treatments	Yield in lb. per acre		
	1942 — '43	1943 — '44	1945 — '46
Castor	147	420	87
Cumbu	59	360	221
Tenai	32	354	307
Cholam	128	710	631
Cotton	82	121	76
Redgram	261	317	600

TABLE II (b)

Yield in lb. per acre

Second Series:

Years	Treatments	Pure	When grown with bunch groundnut	Percentage on pure crop	When grown with spreading Groundnut	Percentage on pure crop
1946'–47	Cholam	248	327	131·9	308	124·2
	Castor	254	93	36·6	184	72·4
	Cumbu	590	186	31·5	375	63·6
	Redgram	488	152	31·1	227	46·5
1947–'48	Cholam	822	529	64·3	666	81·0
	Castor	940	288	30·6	536	57·0
	Cumbu	590	70	11·8	68	11·5
	Redgram	822	375	45·6	330	28·0
1948–'49	Cholam	407	237	58·2	319	78·3
	Castor	228	71	31·2	106	46·5
	Cumbu	262	65	24·8	108	41·2
	Redgram	1196	210	17·6	303	25·3

(c) Economics: The economics of growing groundnut as a pure crop and as a mixture crop was worked out in each of the years of the first series of experiment. The results are given below:

TABLE III

Economics of Cultivation on acre Basis in Rupees

Particulars		Treatments						
		Groundnut pure (Bunch)	Groundnut Cumbu	Groundnut Tenai	Groundnut Castor	Groundnut Cotton	Groundnut Redgram	Groundnut Cholam
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1942–'43:	Cost of cultivation	31	35	36	37	34	36	35
	Gross return	71	60	62	77	77	76	63
	Net Profit	40	25	26	40	43	40	28
1943–'44:	Cost of cultivation	33	38	38	38	37	38	36
	Gross return	64	70	69	69	86	72	63
	Net Profit	31	32	31	31	49	34	27
1945–'46:	Cost of cultivation	60	65	69	69	66	69	68
	Gross return	135	152	157	150	150	173	155
	Net Profit	76	87	88	81	84	104	87
Average for three years:								
	Cost of cultivation	41	46	48	48	46	48	46
	Gross return	90	94	96	99	104	107	23
	Net Profit	49	48	48	51	58	59	47

The gross return was calculated by taking into account the value of groundnut produce, haulms, produce of the mixed crop, at the prevailing market prices.

Discussion: *(a) Yield of groundnut: First Series:* In the first year, cotton and castor had very little effect on the yield of groundnut, but the other crops reduced the yield significantly. In the second year, there was significant reduction in yield of groundnut compared with pure groundnut due to the effect of mixed cropping in all cases. But castor and cotton had comparatively lesser effect. In the final year, only redgram and cholam had diminished the yields and the rest had little or no effect. The combined analysis of the three years data showed that the treatment effects were statistically significant independent of seasonal differences. It is evident from the results that the yield of groundnut gets reduced when raised as a mixture crop and that in all the three years *Cholam* caused the maximum reduction (23·8%). The percentage of depression in the yield of groundnut crop is not as much as recorded in the previous series of experiment with spreading groundnut reported by John et al (1943).

Second Series: In the second series the differences in the yield between the crop raised and that grown mixed with other crops were statistically significant only in the first two years. In the first

year, the mixtures of 'Groundnut and Castor' and 'Groundnut and Cumbu' recorded significantly higher yields over the mixture "Groundnut and Cholam" in the case of both bunch and spreading groundnut. In the second year 'Groundnut and Cholam' mixture recorded significantly less yields than all the other treatments in the case of bunch groundnut. In the case of spreading, groundnut pure and "Groundnut - Castor" mixtures recorded significantly higher yields than 'Groundnut and Cholam'. In the third year (1948—'49) the yield differences did not satisfy the 'Z' test. Combined analysis of the data for the three seasons revealed that cholam when grown as mixture with groundnut either bunch or spreading depressed the yield of groundnut significantly than other crops.

Comparing the effect of other crops on the bunch and spreading types it is seen that bunch crop suffers lesser reduction in yield than the spreading groundnut particularly when grown mixed with cumbu and redgram. The percentage of reduction in yield of bunch and spreading groundnut when grown mixed with other crops are given below in Table IV for each year and also the three year average.

TABLE IV

Mixed cropping experiment reduction in yield of groundnut

	Bunch Groundnut	Spreading Groundnut
1946—'47 :		
With Cholam	36·3	42·3
With Castor	8·3	8·2
With Cambu	6·6	3·5
With Redgram	23·4	31·0
1947—'48 :		
With Cholam	45·6	48·8
With Castor	10·9	2·1
With Cambu	21·7	48·4
With Redgram	24·0	32·8
1948—'49 :		
With Cholam	44·6	37·9
With Castor	43·8	18·0
With Cumbu	43·5	32·1
With Redgram	19·3	17·1
Average for three years :		
With Cholam	42·2	43·0
With Castor	21·0	9·4
With Cumbu	23·9	31·3
With Redgram	22·2	27·0

(b) Yield of other crops: First Series: None of the subsidiary crops has given consistently good yields in all the three seasons. In the second year when the season was adverse for the bunch groundnut all the subsidiary crops have fared fairly well. The wide variations in the yield of subsidiary crops are not only due to the seasonal effect. The bunch groundnut crop being very vigorous in the initial stages especially in years when the rainfall distribution is favourable as in 1942—'43, the growth of the subsidiary crops is much affected and it is only after the harvest of the main crop (groundnut) that the other crops pull up. The average of the yields of the subsidiary crops are low compared with the yields of the same crops during the previous three years when they where raised as mixture with the spreading groundnut. This leads to the conclusion that other crops do not fare well when mixed with bunch groundnut.

Second Series: The yields of subsidiary crops were compared when raised mixed with bunch and spreading groundnut by expressing them as percentages on the yield of pure crops raised in the same season. The data are given below in Table V

TABLE V

Yield of Subsidiary crops 'Average of three years' expressed as a percentage of the pure crop

	Cholam	Castor	Cumbu	Redgram
With bunch groundnut	84·8	25·9	22·8	31·9
With spreading groundnut	94·5	45·1	38·8	33·3

From the above data it is seen that the bunch groundnut has greater depressing effect on the yield of other crops forming the mixtures than the spreading groundnut.

(c) Economics: 'Groundnut plus cotton' mixture has given the maximum returns, in two of the three years and the mixture 'Groundnut and Redgram' in one year. As the subsidiary crops failed badly, the mixtures groundnut plus Cumbu and groundnut plus Tenai have given lesser returns than the pure crop of groundnut. Mixed cropping of groundnut with castor and redgram has given high returns consistently and these may profitably be adopted by ryots. Groundnut and cotton mixture may specially recommended in view of the extention programme in Cotton.

The results obtained from this experiment are in conformity with the results obtained in the experiments carried out with the bunch and spreading groundnuts separately.

The principle underlying the practice of mixed cropping is not only to get maximum returns from an unit area but also to utilise the soil fully and in a proper way. By growing two crops with two different feeding zones the soil is fully exploited. For this, both the crops must have fair opportunities to develop. Groundnut is a shallow rooted crop and crops like Redgram, Castor and Cotton with deeper root systems are better suited to mixed cropping. The bunch groundnut on account on its initial vigour, over grows the young crops sown with it and inhibits their growth. This results in low yield of the subsidiary crops. Though the fact that it undergoes lesser reduction in yield is an advantage in favour of bunch groundnut, its effect on the subsidiary crops is not negligible enough to be over looked. It can safely be concluded that spreading variety of groundnut is more suited to mixed cropping with other crops than the bunch.

Conclusion: The following conclusions are drawn from the experiments:

1. The bunch groundnut suffers comparatively smaller depression in yield than the spreading groundnut when grown mixed with other crops.
2. The bunch groundnut has greater depressing effect on the yield of other crops forming the mixtures than the spreading groundnut.
3. Of the subsidiary crops forming mixtures, Cholam causes the maximum reduction in yield of the groundnut.

Based on the above conclusions the following recommendations are made:

1. Mixed cropping is remunerative than pure cropping.
2. The spreading variety of groundnut is more suited to mixed cropping.
3. The following mixtures are more economical than others
   Groundnut and Castor.
   Groundnut and Redgram.
   Groundnut and Cotton.

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The Response of Rice to Lime and Potash Manuring in South Kanara

by
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Introduction: Rice is the most important crop of South Kanara forming 70% of the total area sown and occupying about 5·6 lakhs of acres. The heavy annual rainfall of over 150 inches received within a short spell of four months subjecting the soil to a constant process of leaching, the slopy situation of the land, high temperature and humidity, all have contributed to the extremely low fertility status of the soil of this tract. As such the yield of not only rice but also most of the other food crops has been miserably low.

As is well known the adequate manuring of field is an all-important factor in rice production and phenomenal yields have been recorded by adequate manuring in recent years. An average rice crop removes about 28 lb. N, 20 lb. P205 60 lb. K20 and 28 lb. Ca0 and if normal crop production is expected year after year it is quite but natural that these nutrients have to be supplied in adequate quantities. Of the three major plant nutrients namely nitrogen, phosphoric acid and potash the response of paddy to nitrogen has been universal. Though the response with phosphoric acid fertilizers has been somewhat veriable it is being widely used in all rice growing countries. Although potash is not widely used for paddy except in Japan, response to this plant nutrient has been reported from a number of countries.

It is generally believed that potash manuring is not needed for Indian soils mainly due to the fact that soil analysis shows fairly large quantity of the same. In South Kanara there exists the common practice of applying liberal quantities of ash to paddy as well as to all other crops. Besides ash, they also use burnt earth or '*Sudumannu*' in large quantities to nurseries, vegetable crops etc. In Malabar also wood ash is applied economically for upland rice, in dry nurseries and for broadcast rice in wet lands.

An important factor in maintaining high productivity in rice soils is the base status and pH of the soil. Application of lime has to be considered as the back bone of good crop production in all humid regions where leaching removes lime from the soil. Chemical analysis reveals a decidedly acidic reaction and a low lime status in

the soil of South Kanara and addition of lime to this soil at fairly high levels has already been proved beneficial. But the cost of lime at such high levels in so prohibitive that it is out of proportion to the advantage gained. Having known the beneficial effects of lime it will be worth-while to find out the response of paddy to lime at lower levels. An observation trial was therefore laid out at the Paddy Breeding station, Mangalore to find out how far paddy responds to application of potash and lime at lower levels.

Review: Mukherjee H. N. and Sinha P (1953) found that potash in combination with nitrogen and phosphoric acid could increase the yield of paddy by two to three maunds per acre in almost all soil types of the Bihar State. In Assam potash significantly increased the yield of paddy not only in the year of application but also left a good residual effect. In China the response to potash was greatest on acid sandy loam and alluvial soils and least on alluvial soils. In Malabar in the case of transplanted swamp rice some yield increase has been recorded by wood ash application. Application of potash was also found to confer some resistance against stem rot, helminthosporium and blast in some centres though in Madras potassium sulphate and super phosphate either alone or in combination with nitrogen was found to have no effect. In water culture application of potash 35 to 45 days before heading increased the number of grains and weight of 1000 grains. In Japan one third of N, P and K is applied dry before puddling and the remainder in two portions three to four weeks after transplanting and two to three weeks before ear emergence. It is also reported that potash deficiency symptoms occur in soils which according to analytical data were well provided with all nutrients. Besides, potash has been found to be complementary to nitrogen, the latter increasing leaf's size and the former its efficiency. Potash also increases the plant's resistance to drought.

The results of the experiment with lime conducted at the station showed that application of lime at doses of 1000 to 3000 lb. per acre results in increased grain yields. Small applications of lime proved more effective per unit used than large doses, lime leaching losses increasing roughly in proportion to the quantity applied. Besides smaller applications were found to bring about greater pH change and larger crop response per unit of lime applied than heavier applications. Lime has also the indirect beneficial effect in that it speeds up the mineralization of organic matter and thus makes nitrogen available to the paddy crop. Heavily leached

soils of North Aukland were found to show response to potash only when the lime and phosphate content of the soil has been built up.

Experimental: An observational trial was laid out with two treatments, one the usual farm manuring consisting of 5000 lb. of leaf and 150 lb. of super phosphate both applied as basal dressing and 30 lb. nitrogen as Ammonium sulphate applied in two equal doses one three weeks after planting and the other six weeks after planting and the other treatments consisting of the application of 100 lb. lime and 15 lb. potash in the form of muriate of potash over the normal farm manuring. Lime was applied 10 to 12 days before planting and potash in two split doses, half at planting and the other half six weeks after. The trial was conducted during both the first and second crop seasons of 1955—'56. During both the seasons of trial all the quantitative factors contributing for yield like number of productive tillers, length of panicle, number of grains per panicle, number of chaff per panicle, length, breadth and thickness of grain and weight of 1000 grains were recorded in both the treatments. The economics of application of the ingredients was also worked out during both the seasons. The data are presented below:

Particulars (mean)	I crop 1955 – '56 Variety: MGL. 3		II crop 1955 - '56 Variety: PTB. 20	
	Farm manuring	Farm manuring + 100 lb. lime + 15 lb. K20	Farm manuring	Farm manuring + 100 lb. lime + 15 lb. K20
Tillers (1 month after planting)	5·6	9·1	6·7	9·2
Height (,,)	33·6″	38·5″	24·2″	28·4″
Tillers (after flowering)	3·3	4·4	4·1	4·8
Height (,,)	61·1″	64 8″	35·3″	36·2″
Length of panicle	20·0 cm.	21·9 cm.	13·6 cm.	15·4 cm.
No. of grains/panicle	82·6	86·0	63·5	65·1
No. of chaff/panicle	12·4	12·1	8·8	5·5
Length of grain	7·80	8·30	7·95	8·18
Breadth of grain	3·10	3·10	2·98	2·99
Thickness of grain	2·20	2·30	2·01	2·15
Weight of 100 grains	27·92 grms.	28·64 grms.	26·75 grms.	27·39 grms.
Acre yield of grain in lb.	2454	2695	2184	2312
% increase	100	109·8	100	105·8
Value of extra produce – Rs.	..	26–11—0	..	14—3—6
Cost of 100 lb. lime and 25 lb. muriate – Rs.	..	7—2—0	..	7—2—0
Net profit per acre – Rs.	..	19—9—0	..	7—1—6

Discussion : From the table it is seen that application of lime and potash has increased the yield by 9·8% and 5·8% during the first and second crop seasons respectively. The number of tillers and height both one month after planting and after flowering, length of panicle and number of grains per panicle are more in plots receiving lime and potash. The size of grain especially length and thickness and weight of 1000 grains has been found to be increased by the application of lime and potash, an effect noted to be brought about by the application of potash alone. It was also interesting to note that during the crop growth in the first crop season plants in plot receiving farm manuring alone started lodging about ten days in advance than those in the other plot. Besides it is also seen that the application of these two manurial ingredients has got definite economic advantage also.

The fact that the heavily leached soils of North Aukland showed response to potash only when the lime and phosphoric acid content of the soil was sufficiently high may be one of the reasons for the poor response of potash so far obtained in the lateritic soils of West Coast which are highly deficient in lime. Adoption of the age long practice of applying ash and Sudumannu in South Kanara for rice as well as for other dry crops and the application of wood ash in Malabar for upland rice, for dry nurseries and for broadcast rice in wet lands may not be merely with the object of conservation of soil but with the object of helping the crop to utilize soil moisture more advatageously. Moderate application of lime practiced over a period of years is likely to have better advantages than heavier doses applied at longer intervals since the solubility of most of the minor elements is reduced by such heavy applications.

The application of a single element to the soil is usually found to be beneficial only within fairly narrow limits. This is but to be expected, for such single addition if applied in quantity must upset the balance of fertiliser materials in the soil. Since the amount of one element which the plant can absorb depends on this balance it appears that the future investigations on the manurial aspect of rice has to be so orientated as to include not only the major plant food elements N, P and K but also other soil amendments such as lime and minor elements so as to determine the optimum quantities of each ingredient to fix up a balanced manure.

Summary : Under the soil conditions existing in South Kanara, rice is found to respond to application of potash and lime at low

as in combination with nitrogen and phosphoric acid. From the ious attributes studied it is seen that there is increase in the ferent quantitative characters contributing for yield due to plication of potash and lime. Due to the fair margin of profit the roposition is economically sound.

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A Note on the Variations of Soil Temperature at Coimbatore

by

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Introduction: Ramdas and Dravid (1) studied the variations of soil temperatures at Poona using soil covers of different colours. Dravid (2) has stated that Poona black cotton soil absorbs 84 per cent of the incident solar radiation while Sakrand soil absorbs only 59 per cent, by virtue of the difference in their colours. At the Central Farm, Coimbatore, black, red and alluvial soils (Tank silt) exist side by side and crops are grown on all of them. The three types of soils may be have differently to the same incident solar radiation. In the following note, the results of the study on the variations of surface soil temperature on the above three agriculturally important soils are summarised.

Materials and Methods: Red and black soils and tank silt were respectively filled and compacted in three pits of $2' \times 2' \times 2'$ prepared in the Agricultural Metreological Observatory, Coimbatore. Surface soil temperatures were recorded daily at 0735 Hrs. and 1435 Hrs. Indian Standard Time from 19—11—53 to 21—9—54. The three plots were kept barren and free from growth of any weed.

Correlation cœfficients worked out, separately for the months November 1953 to September 1954, between the maximum temperature attained during the day in the Stevenson screen and the surface soil temperatures at 1435 Hrs. in the red and black soils and tank silt plots respectively are presented in Table I. Similarly, correlation cœfficients, worked out between the minimum temperature recorded during the day and surface soil temperatures recorded at 0735 Hrs., in the three plots of soils, mentioned above, are given in Table II. The diurnal variation of surface soil temperature in these three different types of soil for each month is indicated in Table III.

Discussion: When the experiment was commenced it was expected that the black soil would record high temperatures in the afternoon, by virtue of its colour, but it is seen that tank silt has recorded higher values of temperature, as shown in Table III. The highest values of surface tempatures recorded by the three types of soils are: (1) Red Soil 63·9°C. on 3—4—1954; (2) Black soil 64·5°C. on 6—4—1954; (3) Tank silt 65·9°C. on 6—4—1954.

It may be noted that the surface soil tempature was higher in tank silt than in the black soil at 1435 Hrs. on 6—4—1954. Table III indicates the nature of diurnal variation of surface temperature and as to how it depends mainly on the colour of the soil.

TABLE I.

Values of cœfficients of correlation between maximum temperature in the screen and surface soil temperature at 1435 hrs.

Month	Red Soil	Black Soil	Tank silt
November 1953 *	0·8082	0·8463	0·7889
December 1953	·6918	·7657	·8336
January 1954	·7616	·8095	·7703
February ,,	·8695	·8105	·8331
March ,,	·8205	·7885	·7842
April ,,	·8287	·8014	·7743
May ,,	·7420	·7465	·7295
June ,,	·8926	·9100	·8569
July ,,	·7257	·7111	·7567
August ,,	·8230	·8258	·8534
September ,, £	·6221	·5716	·6015

Remarks: *Only for 12 days from 19—11—1953.
£Only for 21 days from 1—9—1954.

TABLE II.

Values of cœfficients of correlation between minimum temperature and surface soil temperature at 0735 hours.

Month	Red Soil	Black Soil	Tank silt
November 1953 *	·2271	·3626	·2504
December 1953	·6257	·6248	·5361
January 1954	·7559	·6746	·5981
February ,,	·8791	·8683	·9346
March ,,	·9008	·8961	·8935
April ,,	·6418	·6125	·5982
May ,,	·6920	·7062	·6734
June ,,	·3302	·2724	·0802
July ,,	·2906	·1883	·0806
August ,,	·5082	·5154	·4689
September ,, £	·1807	·0015	·0860

Remarks: *Only for 19 days from 12—11—1953.
£Only for 21 days from 1—9—1954.

TABLE III.

Diurnal Variation of Surface Soil Temperature.

Month	Red Soil	Black Soil	Tank silt
November 1953 *	14·6	17·0	16·7
December 1953	21·7	23·5	23·1
January 1954	21·5	21·3	22·6
February ,,	30·4	30·2	32·2
March ,,	26·9	27·3	28·5
April ,,	26·0	25·4	25·9
May ,,	20·1	18·5	18·4
June ,,	12·8	11·6	10·3
July ,,	12·6	11·8	11·2
August ,,	14·9	13·8	14·1
September ,, £	16·9	14·3	14·5

Remarks: * Only for 12 days from 19—11—1953.
£ Only for 21 days from 1—9—1954.

The diurnal variation of surface temperature of black soil is higher than either red soil or tank silt in November and December. It is the highest in tank silt in January, February and March while from August to September, it is the highest in the red soil.

From the Cœfficients of correlation between maximum temperature and surface soil temperatures of the three types of soils, presented in Table I, it may be seen that all of them are significant, indicating that the increase in the maximum temperature causes an increase in the surface temperature in all the three types of soils, as both are factors influenced by solar radiation. Further, the highest correlations are obtained in all the three types of soils in June 1954. As all the correlations are in general, highly significant it will be possible to calculate with a fair amount of success, the temperatures that may be attained by the respective soils, taking the screen maximum temperature into account.

The correlations between the minimum temperature, recorded in the Stevenson Screen, and the surface soil temperatures, recorded at 0735 Hrs., are not significant in the months of November 1953 and June, July and September 1954. During the other months they are significant for all the three typs of soils and the highest correlation cœfficients have been obtained in March. These factors indicate that only during the period December to May, the surface soil temperatures at 0735 Hrs., are proporational to the minimum temperature, recorded in the screen.

Summary and Conclusions: (i) The physical and chemical properties of soils play an important role in the absorption and disposal of solar energy, in addition to the colour of the soil.

(ii) High cœfficients of correlation oxist between maximum temperature and surface soil temperature at 1435 Hrs., in the three types of soils in all the months while the correlations between minimum temperature and surface soil temperature at 0735 Hrs. are not significant in the months of November, June, July and September.

(iii) The diurnal variation of temperature varies differently in the three soils in the different months.

Acknowledgement: The authors thanks are due to Sri P. A. Venkateswara Iyer, Agronomist and Professor of Agriculture, for the guidance and Sri R. Sankaranarayanan for the help in the collection of the data.

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Synthetic Ion Exchangers (Amberlite Resins) Purify Water

by

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Water is chiefly used for domestic purposes, for irrigation and in industry. Yet, the same quality of water will not meet all purposes. The total solids should not exceed 500 ppm. for a water of good chemical quality for drinking purposes (U. S. Public Health Service Drinking Water Standards, 1946). Among the ions, bicarbonate is preferable to carbonate, sulphate and chloride, and calcium to sodium. For industrial purposes, waters containing calcium and magnesium salts are undesirable because such waters cause boiler-scale and corrosion of the material. Irrigation water is usually judged by three criteria; (a) boron atom concentration, (b) the ratio of sodium ion content to the sum of sodium, magnesium, calcium and potassium ions and (c) total dissolved salts. The following table gives the permissible limits for total solids and percent sodium of several classes of irrigation water as generally adopted in the U. S. A. (1).

Classes of water Grade	Approximate limits for dissolved solids	Percent sodium (%Na = Na x 100 Na + K + Ca + Mg)
1. Excellent	Less than 175 ppm.	<20
2. Good	175 to 500 ,,	20 to 40
3. Permissible	500 to 1400 ,,	40 to 60
4. Doubtful	1400 to 2100 ,,	60 to 80
5. Unsuitable	Over 2100 ,,	>80

Although some irrigation waters may contain higher amount of dissolved salts the injurious effect is mitigated to an extent if calcium ions predominate. Sulphate and chloride ions are preferable to carbonate and bicarbonate. Thus the quality of water desired varies with the purpose.

The character of water depends to a large extent on the source; river water differs from lake water; lake water differs from well water, and so on. The rivers rising in mountainous regions usually have less dissolved salts and those flowing in arid desert regions collect salts from the strate in which they flow. Waters from the mineral springs are usually fortified with mineral salts and the claims made regarding the curative effect of such waters for certain ailments are not wholly without justification. The impurities (dissolved salts) which must be removed from water depend on the use for which water is intended.

There are several methods for the purification of raw water, from simple mechanical filtration through sand beds adopted in municipalities, to the most modern method of electrodialysis. The latter process consists in the removal of salts from a liquid flowing between pairs of ion-selective membranes by means of an electric field. As a point of interest it may be mentioned that the research on de-salting of saline waters by electrodialysis is well advanced in the Netherlands (2) In an interesting treatise, Ellis (3) has examined the possibilities of extracting fresh water from the Ocean on a large scale with particular reference to plant construction, operating labour, maintenance, raw meterials and power. The synthetic resinous ion exchangers are the latest in this field and these are found to be eminently suitable to purify water to any desired degree, chiefly because of their high exchange capacity, their ability to withstand extremes of temperature, chemical condition and continued operation. However, their use is not limited to this field only. They are used for various other purposes also.

These resins are synthetic polymers, which are bead-like or granular particles about 0.5 mm. in diameter. Although the resins are insoluble, they react much as acids, bases or salts, but they differ from the latter in that only cations or anions are free to take part in chemical reactions. Thus, in the cation exchange resins, the anions are fixed and irreplaceable, and similarly in anion exchangers, the cations are fixed and irreplaceable. The exchangeable ion in the resin can be almost any ion. There are "single-bed" resins which are capable of ion exchange either anionic or cationic, as well as "multiple or mixed bed" resins capable of both cationic and anionic exchange simultaneously. The greater choice of these resins confirms on them almost unlimited use. Ion exchange columns are conventionally operated downflow by passing the solution to be treated through the resin bed from top to bottom and operated at a low flow rate usually (4, 5). But it is quite possible to operate in some mixed bed systems at high flow rates also (6). When the resin is exhausted of its exchangeable ions, it is regenerated by a simple process. The exchanger column is flushed with a strong solution of the ion in particular, say, if the cation exchange resin is of the sodium, the solution usually used is sodium chloride. Sodium replaces all the cations absorbed on the resin and thus the resin becomes fully regenerated. It is then resined and ready for use again and thus the ion exchange resin can be used over and over again (7). Besides, the resins achieve economy in operation cost and space, the results are completely satisfactory and regeneration can be carried out at an inexpensive cost.

The use of ion exchangers in industrial plants in advanced countries for softening of raw water is widespread (8, 9, 10, 11), Softening of water can be successfully done by passing water through a column of cation exchange resin of sodium form when the following reaction takes place :

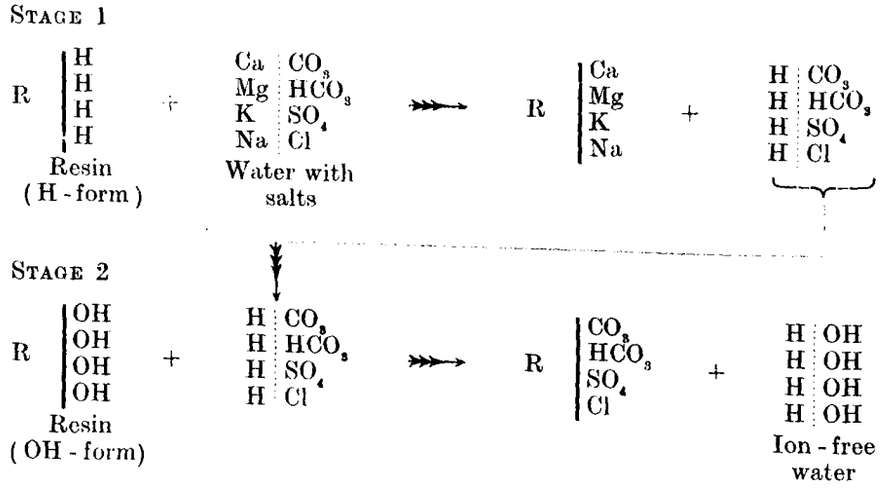
$$R\begin{vmatrix}Na\\Na\\Na\\Na\end{vmatrix} + \begin{matrix}Ca & CO_3\\Ca & HCO_3\\Mg & SO_4\\Mg & Cl\end{matrix} \longrightarrow R\begin{vmatrix}Ca\\Ca\\Mg\\Mg\end{vmatrix} + \begin{matrix}Na & CO_3\\Na & HCO_3\\Na & SO_4\\Na & Cl\end{matrix}$$

Resin — Hard water — Resin — Hard water

The cations, calcium and magnesium from water are absorbed on the resin and sodium ions are released from the resin. The water coming out of the exchanger column contains non-hardness producing sodium salts only.

The usefulness of ion exchangers in the preparation of chemically pure water is perhaps unexcelled. Deionization with mixed bed resin is capable of producing water of exceptional quality (12, 13, 14). The technique merely involves the passage of water through an intimate

mixture of a cation exchanger of the hydrogen form and an anion exchanger of the hydroxyl form and the reactions taking place may be represented as follows:



The cation exchanger adsorbs Ca^{++}, Mg^{++}, K^{+} and Na^{+} ions and releases an equivalent of hydrygen ions. The anion exchanger adsorbs $HCO\,3^{-}$, Cl^{-}, $CO\,3^{--}$ and $SO\,4^{--}$ ions and releases an equivalent of hydroxyl ions. The released hydrogen and hydroxyl ions combine and flow out of the exchanger column as chemically pure water. Both cationic - and anionic - exchange resins can be used to remove fluorides, boron and other harmful ions from contaminated water (15).

Besides purification of water the ion exchangers are used for a variety of purposes and some of them may be indicated. Metallic ion residues from crop protection chemicals may be removed from crushed fruit syrups. Valuable ascorbic acid can be recovered from citrus wastes by the use of suitable anion exchanger. The ion exchangers clarify, demineralise and decolorise sugar solutions resulting in increased purity of the juice as well as the increase in yield of sugar (16, 17, 18, 19). In recovering precious metals from solutions, the resinous exchanger may be used to remove the metallic ion until the capacity of the resin is depleted, after which the resin is ashed to recover the metal. The resins are insoluble, non - toxic and non - irritating, and hence are valuable therapeutic agents. They are used in the treatment of gastric and duodenal ulcers and for reducing sodium conncentration in patients with hypertension. Evidence is coming of late that the resins are used in fertility studies and Research in agriculture (20, 21).

Thus the synthetic ion exchangers have simplified a number of processes and methods in chemical technology which were rather exacting and complicated.

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Research Note

Insecticidal properties of the common Indian Aconite*

Aconites belong to the Natural Order *Ranunculaceae* and comprise of about 180 species growing in the north temperate zone. It has over 50 European species and 24 Indian varieties that have shown to contain active alkaloids. The word aconitum, the classical greek name, is derived from "Akwan", a dart, from its having been used to poison darts. The roots powdered and formed into a sticky paste with water, was smeared over the arrow heads for striking the darts (Chopra 1933). Gomilevsky (1916) determined that a few drops of a strong water extract from the roots of *Aconitum mapellus*, dropped upon the body of the stag beetle, *Lucunus cervus*, were fatal. Mc Indoo and Sievers (1924) experimented with roots, leaves and stem of *Aconitum columbianum* and reported that it had no effect on grasshoppers as a stomach poison and applied as dust it was ineffective against bees.

The common Indian aconite is *Aconitum ferox*, as most of the roots sold under the name of "Bish" locally by herb vendors is derived from this variety. This species of aconite grows abundantly in India, mainly confined to the eastern temperate regions of Himlayas eastward of Kumaun at an altitude of 10,000 to 14,000 feet above the sea level. According to Stapf (1905) it has nearly double the quantity of the alkaloidal contents than those present in the *Aconitum napellus*, a European variety. In order to determine the insecticidal properly of the roots of *Aconitum ferox*, studies were under-taken and the results as appeared in the preliminary tests are presented in this paper.

The roots of the common Indian aconite, *Aconitum ferox* were obtained from the Director, Botanical Survey of India, Calcutta. The roots were made into chips of about one inch in size. The chips were oven dried and prepared for the tests on insects in two forms, (1) in a dry finely powdered condition, and (2) in the form of hot water extract. In all cases the material was thoroughly dried and then reduced to a powder. When the material was used for dusting it was made very fine so as to pass through a 70 mesh sieve. Hot water extracts or decoctions were prepared by boiling the powdered material with water for 2 hours. These extracts were concentrated or diluted as desired by evaporating the liquid or adding more water to it. The decoction was sprayed cold after straining the extract in a fine cloth. The powdered material was used by dusting it on wet foliage of the food plants of the test insects.

Three species of aphids, wheat aphis, *(Aphis maidis)* mustard aphis, *(Siphocoryne indobrassicae)*, and radish aphis, *(Rhopalosiphum pseudobrassicae)* were tested by spraying the water extracts on them. Four species of chewing insects mustared saw-fly larva *(Athalia proxima)*, red pumpkin beetle *(Aulacophora foveicollis)*, kharif grasshopper. *(Hieroglyphus nigrorepletus)* and banded blister beetle *(Mylabris phalerata)* attacking mustard, gourd, juar, and pumpkin respectively were tested for stomach poison by dusting on the wet foliage. As far as possible the insects were sorted to size of the same age. The chewing insects were starved for one day before they were released on the dusted foliage for test. Four replications were used in each trial.

The trials indicate that the spray material when used at 30 gms per 1000 c. c. of water is able to control 50% of all the three types of aphis infestations. Higher mortality is obtained with the further increase in the doses. The wheat and the radish aphids appear to be more susceptible to these sprays than the mustard aphis.

The results show that the dust possesses an appreciable degree of toxicity to kharif grasshopper, red pumpkin beetle and mustard sawfly larvae. It is able to control over 56% of these test insects. The toxicity of this powder to banded blister beetle is, however, very low as compared to the other insects tested.

Although these preliminary tests indicate the possibility of usage of aconite as an insecticide, it might be well concluded that *Aconitum ferox* undoubtedly possesses a physiologically active form of alkaloid which is capable of killing insects. The experiments have shown that the roots of this plant are toxic to a considerable degree to several species of insects, either as stomach or as contact insecticide.

*A portion of the week done under the Vegetable Insecticide Investigation Scheme financed by the U. P. Scientific Research Committee, Lucknow.

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A Note on the Extraction of Seeds from the Pods of Prosopis juliflora.

Prosopis juliflora otherwise known as 'Mesquite' is largely grown as a fence plant around fields, orchards and gardens to prevent cattle trespass and as a protective live fence. The extraction of seeds from the pods has been a difficult problem. The usual method of extraction is through pounding the dry pods in a mortar with wooden pestle (Ponnaya, 1954). Harbajan Singh (1954) states that treating the pods in hot water at 70° for 10 minutes before sowing helps to get a good germination.

With the object of evolving an easier method for the extraction of the seed by employing fungal agencies, studies were under taken in September 1955 at the instance of the then Director of Agriculture Sri M. S. Sivaraman, I. C. S. who happened to notice some old pods in which the seeds were found exposed through a slit like opening in the leathery pericarp due to the infection by fungus. The fungus *Macrophoma* Sp was isolated from the infected pods and this as well as other cellulose decomposing group of fungi such as *Aspergillus* sp, *polyporus* sp and *polystictus* sp were used in the studies for infecting the pods under artificial conditions in the laboratory. It was observed that the fungal action on prosopis pods collected just before complete drying, was quick and the seeds were to be exposed through a slit like opening in the leathery endocarp in about 10 days. The seeds thus extracted have necessarily to be sown immediately to obtain good germination since their viability was found to rapidly deteriorate on storage due to the fungal action extending into the seed itself.

The action of fungi on dry pods was found to be very slow due to the absence of sufficient moisture. The pods have to be soaked in water for 3 or 4 days before inoculating with fungal culture and it was observed that the process of extraction was a lengthy one extending over more than 10 days. Germination of the fungus extracted seeds was found to be very erratic and ranged from 10 to 80% depending upon the dryage of the pods, period of soaking, storage etc. and hence no standard technique could be evolved for extracting the seed with the help of the fungus to suit the practical needs. Incidentally various other methods of extraction were investigated to evolve a suitable one for large scale use. Among the various methods tested, viz, pounding, hot water treatment and sulphuric acid treatment, the last one was found to give the best results both as regards extraction and germination. The sulphuric acid treatment is done as follows. The pods are soaked in water for 3 or 4 days and then the leathery pericarp containing the seeds are easily extracted by slightly smashing the soaked pods in a mortor.

The extracted mass of seeds still covered by the pericarp is soaked in 1 : 4 sulphuric acid solution (1 part of sulphuric acid in 4 parts of water) for 24 to 48 hours and then washed with water and kept for drying in shade. After complete drying the fruit coat covering the seed is completely removed by a slight pounding and the seeds can be separated from the fibrous matter by winnowing.

Sulphuric acid treated seeds show a pinkish red colouration due to the removal of the external hard waxy coating due to the action of the acid.

The table below shows the percentage of germination obtained by sulphuric acid treatment:

Treatment	Total No. of seeds sown	Percentage of germination		
		4th day	7th day	15th day
1. 1 : 4 sulphuric acid : water for 24 hours	100	62%	85%	94%
2. 1 : 4 sulphuric acid : water for 48 hours	100	40%	71%	94%

The extraction of seeds by this method was found to be almost cent percent. The final weight of seeds was found to be 18% of the total weight of pods i. e. 3 oz. of seed were obtained from one pound of pods. The above method was found to be the best among the various treatments tried and can be easily adopted for large-scale extractions. Almost cent percent extraction is achieved with a germination percentage of more than 9%

Our grateful thanks are due to Sri M. S. Sivaraman, I. C. S. for his keen interest and encouragement in the studies.

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Gleanings

The use of Rayungans as Seed Material for multiplication of New Sugarcane Varieties: Rayungans are cane seedlings formed by the sprouting of the buds, when the canes standing in the field are topped. This topping of the standing canes in the field is done when the crop is aged about 8 to 10 months. After topping the buds begin to sprout and they become ready for planting after 4 to 6 weeks. Simultaneously after topping, the top portion can be planted in a small portion of the field by planting the stalk vertically so that two buds are completely buried inside the soil. Here also the buds sprout and form seedlings. These are specially called as Tjeblankans. After all the buds have germinated, the cane with the sprouted buds, is cut at the bottom and each sprouted bud is separated from the stalk by leaving about 3" of the internode at the bottom of the bud and about 1" above the bud. These separated buds called as Rayungans are now ready for planting. The rayungan is planted in the field in the vertical position by holding the top 1" of the internode and pressing the same slowly into the soil so as to completely cover the bottom portion of the sprouted bud inside the soil. Care is to be taken that there is no stagnation of water in the field after planting. A small quantity (about a tea spoon) of Ammonium sulphate is to be placed after planting by the side of the rayungan by putting a small hole by its side. The rayungans are to be watched and watered till the rayungans establish themselves. This establishment is difficult in summer months.

About 8000 such rayungans are enough to plant an acre. The rayungans may be planted at a space of 9" to 12" row to row.

With a view to test the utility of rayungans as seed material in preference to the normal planting by the use of setts an experiment was conducted at Sugarcane Research Station, Gudiyattam using "Setts" and "Rayungans" as seed material. The setts and rayungans were planted at spacing of 6", 12", and 18" between these two kinds of seed materials. The results indicated that the spacing of 6" was not good as it affected the yield. The spacings with 12" and 18" recorded higher yields.

In general the use of rayungans did not prove superior to setts for getting increased yields. On the other hand its establishment in the field especially during the summer months was found to be very difficult and hence this method of seed material cannot be recomended for wider adoption by ryots, as a source of seed material. However rayungans are found to be useful for rapid multiplication of seed materials.

When a small quantity of seed material is only available or in places where pure and disease free seed materials are to be rapidly multiplied, the rayungans are very useful for such rapid multiplication. A multiplication rate of about 400 times can be achieved by using rayungans in about 8 months time as against ten times by the usual method. —(Director of Agriculture, Madras)

Drilled Fertilizer: Pays in Rice Experiment (Croplife, May 14, 1956, Page 19.) *Sacramento* — Colusa Country rice growers recently told were that fertilizer drilled into the dry rice seed bed before planting makes for increases in production as compared to an undrilled surface application. A report was presented stating that three years of tests carried on at the Biggs Station, Sacramento — California, U. S. A. show nitrogen fertilizer drilled into the seed bed 2 in. deep brought the greatest yield increases, 40%. Drilling the fertilizer 4 in. deep resulted in a 37% increase. Broadcasting the fertilizer on the water brought about the smallest increase of 8%. Broadcasting on the dry seed bed prior to seeding resulted in a 19% increase, and broadcasting on seed bed and digging produced yields 25% higher. —(G. K. C.)

Coconut Gardens: Improving Soil-Moisture Content: The coconut palm needs a good amount of water for growth and production. Where there is no irrigation available, the crop has to depend entirely on the moisture of the soil. The severe droughty conditions in summer affect the coconut palm very much, especially when it is grown in sandy soils as on the West Coast. It pays, therefore, if the coconut grower adds such materials to the soil as conserve moisture in it. Adding bulky organic manures like farmyard manure, compost and green leaves helps improve sandy soils. Addition of backwater silt, or river or canal silt also helps to retain more moisture. Inter-cultivating the coconut garden not only checks weed-growth, but also results in better moisture conservation in the soil. —ICAR

Controlling the Rice Bug: Dusting or Spraying Recommended: Rice bugs appear in the paddy field from August to October and suck the sap of the grains which are in milk stage. Ears which are attacked by the bugs do no develop normal grains and become chaffy. For controlling the bugs, dust the crop with five per cent BHC or spray it with 0·25 per cent DDT. This will give you an effective control. —ICAR

Bottom Mud or Silt: Good for Coconut Gardens: Bottom mud or silt from canals, rivers and backwaters contains a good amount of clay as well as several kinds of plant foods. Spreading silt regularly in coconut gardens prevents soil erosion, increases the capacity of the soil to hold water and raises its fertility. The beneficial effects of spreading silt are more marked in the case of sandy soils. —ICAR

Coconut Caterpillar: Two Ways of Control: The coconut caterpillar, a serious pest of the coconut palm, can be controlled. Leaves of the attacked palm should be sprayed with 0·2 per cent DDT. One gallon of the spray is sufficient for two palms. The cost of such a treatment works out to less than an anna per palm. As a precautionary measure, the palms in the adjoining areas should also be sprayed with 0·1 per cent DDT. In areas where the rainfall is not heavy, 0·2 per cent BHC may be sprayed instead of DDT. Parasites which feed on the pest also control the pests well. Such parasites are bred at the Coconut Research Station at Kayangulam and also in other States. The parasites are supplied free of cost by the State Governments concerned whenever there is an autbreak of the pests. —ICAR

Worms in Poultry: One of the common and major causes of financial loss in poultry industry is due to parasitic infestation. The worms harbour in the alimentary canal and lay there thousands of eggs which pass out with the droppings causing pens and fields to become heavily infected. The eggs hatch out into grubs on the grass. Fresh or new stock pick up infection by ingesting those grubs along with grains and feed. They invade several parts of the intestine causing diarrhœa and anæmia. Young birds suffer more than adults, the mortality rate in the former being usually very high. Their growth rate is retarded, susceptibility to bacterial and other diseases increased while the quality, number and size with respect to egg production is adversely affected.

Losses from poultry worms may be reduced or avoided by observing certain simple hygienic precautions:—

1. See that the land is drained well and that no stagnant spots exist.
2. Clean poultry houses frequently.
3. Carry out regular removal of droppings from the land.
4. Treat all susceptible and affected stock. —(MAN)

Milk Powder Markets: Australia's production of milk powder has more than doubled since 1945—'46, and the total output of milk powder products in 1955—'56 is expected to exceed 60,000 tons—5,000 tons more than the record output 1954—'55. Perhaps the most interesting feature of the post-war expansion is the marked contrast between the trend of full-cream milk powder production and that of powders derived from milk "by-products" (skim milk, butter-milk and whey). Since 1945—'46 the output of full-cream milk powders has shown a net increase of about 30% (from 23,400 tons to about 30,000 tons), which is approximately the same proportion as the next expansion in the total dairying production. Over the same period, however, the output of "by-product" powders increased nearly tenfold, from 3,700 tons to an estimated 33,000 tons.

Since 1945—'46, Australia's milk powder exports have risen from 5,700 tons to an estimated 35,000 tons this season. Shipments of full-cream powders have increased, but fluctuated widely from year to year, and followed variations in production fairly closely. On the other hand, exports of skim milk powder have shown a consistently upward trend, significantly exceeding the volume of full-cream milk powders in each of the last three seasons. The post-war development of the milk powder industry in Australia has been primarily associated with the expanding export market, especially for skim milk powder.

—(ANN)

Atomic Energy on the Farm: The use of atomic energy to develop the rural areas of Australia is strongly advocated by a nuclear scientist, Professor Harry Messel, Professor of Physics at Sydney University. If there is one country that could be opened up with small nuclear power package plants, that country is Australia, says Professor Messel.

"Imagine having hundreds of package power reactors generating from 2,000 to 10,000 kilowatts throughout Australia, through the outback of New South Wales, throughout the Northern Territory. Imagine nuclear power plants converting saline water into pure water and pumping it for irrigation purposes. Imagine this, and more, and you will see what nuclear energy can do for this great country of ours. This is not a dream-every bit of it will some day become a reality". Professor Messel believes that the possibilities of raidio-activity for food preservation are immense and exciting, as many meats and other foodstuffs now appear capable of being stored for a very long period of time after being radiated.

—(ANN)

Weather Review — For September, 1956

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January	Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam)	7·8	+ 3·1	27·9	South	Madurai	5·0	+ 0·3	17·4
	Tirurkuppam*	7.9	+ 1·8	26·4		Pamban	0·1	— 1·0	2·3
	Vellore	6.7	— 0·2	27·3		Koilpatti*	2·3	+ 0·8	11·0
	Gudiyatham*	7.7	+ 4·1	22·7		Palayamcottai	0.4	— 0·8	6·9
East Coast	Palur*	8·1	+ 2·8	26·8		Ambasamudram*	Nil	— 1·4	7·5
	Tindivanam*	6·8	+ 2·2	24·8	West Coast	Trivandrum*	2·5	— 2·0	35·8
	Cuddalore	6·2	+ 1·0	20·7		Fort Cochin	9·4	+ 1·7	101·9
	Nagapattinam	8·7	+ 5·4	19·2		Pattambi*	4·7	— 2·9	71·9
	Adutburai*	13.7	+10·6	24·7		Kozhikode	6·9	+ 0·3	104·9
	Pattukottai*	9.7	+ 6·7	21·6		Taliparamba*	8·1	— 3·1	122·5
Central	Salem	8·3	+ 2·2	22·1		Wynaad*	4·4	— 2·5	65·0
	Coimbatore (A. M. O.)*	0·2	— 1·0	9·3		Nileshwar*	7·8	— 6·9	132·7
	Coimbatore	0·1	— 1·5	9·2		Pilicode*	6·1	— 6·3	107·3
	Tiruchirapalli	9·7	+ 5·7	15·6		Mangalore	6·7	— 2·7	130·1
						Kankanady*	6·5	— 6·5	132·9
						Kotekar*	7·8	— 4·9	@
					Hills	Kodaikanal	4·9	— 2·4	30·1
						Coonoor*	3·5	— 0·4	18·9
						Ootacamund*	2·3	— 2·3	23·5
						Nanjanad*	4·7	— 0·9	32·2

Note:— 1. * Meteorological Stations of the Madras Agric. Dept.

2. @ = It is a new station. The raingauge was installed in March 1956.

The month began with widespread rains in Malabar and South Kanara, and localised showers in Tamilnad and Travancore-Cochin. The monsoon gained strength in the South Bay on 2—9—1956 and extended over the Central Bay of Bengal on the next day. Till 6—9—1956 monsoon was fairly active in the West Coast with a few scattered and localised showers in Tamilnad. For two days from 7—9—1956 conditions remained unchanged in the West Coast while the weather was mainly dry in Tamilnad. On 9—9—1956 and in the subsequent two days also the monsoon was fairly active in the West Coast while showers were scattered in portions of Tamilnad. On 12—9—1956 showers became localised practically in the entire region. An Easterely wave was found approaching coastal Tamilnad on 13—9—1956 and this gave localised showers in South Tamilnad when the weather was dry elsewhere. For four days from 14—9—1956 localised showers were received in Tamilnad while the West Coast experience a dry weather. On 18—9—1956 showers were localised in Tamilnad and Malabar and South Kanara when Travancore-Cochin had dry weather. Thundershowers were scattered in Travancore-Cochin and Tamilnad when Malabar and South Kanara had dry weather on 19—9—1956. The monsoon was found strengthening over the South Bay on 20—9—56.

Showers where localised in Travancore-Cochin and at a few places elsewhere in the region on 20—9—1956. On 21—9—1956 showers were fairly widespread in Travancore-Cochin and localised in Tamilnad while the weather was dry in Malabar and South Kanara. On 22—9—1956 west-coast had fairly widespread rains while the North Tamilnad had only localised showers. The monsoon gained strength over the Peninsula on 23—9—1956 with widespread rains in Travancore-Cochin and scattered showers elsewhere. For two days from 24—9—1956 the West Coast had fairly good rains while Tamilnad had dry weather. On 26—9—1956 and in the subsequent two days rains were fairly widespread in the West Coast while they were highly localised in Tamilnad. Rains were fairly widespread in North Tamilnad and localised elsewhere on 29—9—1956. The month ended with fairly widespread rains in Travancore-Cochin and localised showers elsewhere in the region.

Considering the month as a whole, rains in September, 1956 were fairly above normal in Tamilnad except in the districts of Coimbatore and Ramanathapuram and to some extent in Tirunelveli also. In the West Coast and hills they were somewhat sub-normal.

The noteworthy rainfall and the zonal rainfall in inches are furnished below:—

Noteworthy Rainfalls			Zonal Rainfall			
Date	Place	Rainfall in inches	Name of Zone	Rainfall for the month	Departure from normal	Remarks
1/9/56	Madras (Meenambakkam)	4·0	North	7·5	+ 2·2	Above normal
16/9/56	Tiruchirapalli	3·0	East Coast	8·9	+ 4·8	do
17/9/56	Madras (Nungambakkam)	4·0	Central	4·6	+ 1·4	do
18/9/56 & 29/9/56	Kallakurichi (Each day)	3·0	South	1·6	— 0·4	Below normal
30/9/56	Mathurai	3·0	West Coast	6·4	— 3·3	do
			Hills	3·9	— 1·5	do

Agricultural Meteorology Section,
Lawley Road P. O.,
Coimbatore, 11—10—1956

C. B. M. & M. V. J.

Departmental Notification

Gazetted Officers — Postings and Transfers.

Name and present post	Posted as
Albuquerque, S. D. S., Supdt., A. R. S., Nileswar.	Supdt., Cashew Res. Station, Mangalore.
Fuzllulakhan, Supdt., Ambalavayal.	Assistant, Fruit Specialist, Coonoor.
Gopalan Nair, T., Banana Res. Officer, Aduthurai.	Supdt., A. R. S., Ambalavayal.
Kuppamuthu, K., Assistant Lec. in Agriculture, Coimbatore.	Principal, Basic Agr., Training School, Coimbatore.
Krishnan, R. H., Assistant in Paddy, Pattukottai.	S. D. O., Vellore.
Kuppuswamy, B. S., Assistant Fruit Specialist, Coimbatore.	Assistant Fruit Specialist, Coonoor.
Kalyana Sundaram, D. A. O. on leave.	D. A. O. Crop Sampling, Tanjore.
Madhava Rao, V. N., Supdt., Cashew Research, Mangalore.	Assistant Fruit Specialist, Coimbatore.
Subramaniam, T. V., Assistant Mycologist, Coimbatore.	P. P. O. Mycology, Coimbatore.
Sriraman, K., D. A. O. on leave.	Secretary, Coimbatore Market Committee, Tirupur.
Srinivasan, V., Supdt., A. R. S. Aduthurai,	Deputed to Ceylon to study the method of Tobacco Cultivation.
Sahadevan, P. C., Assistant Paddy Specialist, Coimbatore.	Assistant Paddy Specialist, Pattambi.
Samuel Sundararaj, Assistant Fruit Specialist, Coonoor.	Banana Research Officer, Aduthurai.
Uthaman, P., Assistant Paddy Specialist, Pattambi.	Supdt., A. R. S. Nileshwar.

Upper Lower Subordinates — Postings and Transfers

Name and present post	Posted as
Ananthakrishna Rao, P. N., Working in the I. C. A. R. Scheme, Mangalore.	Assistant in Paddy, Mangalore.
Anandam Pillai, S., A. D., Dindigal.	Marketing Assistant, Tiruchirapalli.
Ambikacharan, K., A. D., Madras.	Marketing Assistant to State Marketing Officer, Madras.

Name and present post	Posted as
Bhadrachalam, R. N., Kolathan.	A. D., Tiruvannamalai.
Chandrasekharan, P., Vallioor.	Cotton Assistant, Koilpatty.
Ganghadaran, T., Malabar.	Assistant in Botany, Coimbatore.
Mahimaidass, Marketing Assistant, Trichirapally.	Assistant Lec. in Agrl. Economics, Coimbatore.
Narayanaswamy, K. R., P. A. to D. A. O., Guindy.	Marketing Assistant to State Marketing Officer, Madras.
Narayana Raja, P., Kunnathur.	Assistant in Fruits, Aduthurai.
Perumal, A. S., Special Marketing Asst. Pudukottai.	Extension Officer for Agrl., Perambalur.
Pattathan, B. N., Extension Officer, Nileshwar.	P. A. to D. A. O., Coimbatore.
Rajendran, N., Kanjeepuram.	A. D., Cheyur.
Ramanathan, M. K., Ayyampet.	P. P. A., Tanjore.
Raghu Shetty, K., F. M. Central Farm, Coimbatore,	Cashew Assistant, Mangalore.
Sankarankutty, M. M., Malayalam Journal Assistant,	A. D. Vegetables, Madras.
Subramaniam, A., Vembangudi.	Paddy Assistant, Aduthurai,
Syed Fuzulukhan, Tirupathur.	A. D., Sithalai.
Srinivasan, G., Karaikal.	A. D., Tiruvarur.
Kumari Savithri, V., Assistant in Entomology, Coimbatore.	Assistant in Chemistry, Coimbatore.
Soloman Durairaj, Botany Assistant, Gudiattam,	Botany Assistant, Coimbatore.
Shivarama Rai, P., Cashew Res. Assistant, Mangalore.	F. M. Central Farm, Coimbatore.
Sankaranarayanan, C. S., P. A. to D. A. O., Coimbatore.	Teaching Assistant in Agrl. Economics Coimbatore.
Umapathy, M. S., Vellore.	Cane Assistant, Palur.

Review of Market Condition of Commercial Crops in the Areas of Market Committees for the Month of August, 1956

Cotton: (In this Section: Candy = 784 lb. Pothi = 280 lb.)

Cotton Stocks: Tirupur: Lint: The market opened with a stock of 7847 candies of Cambodia lint and 1716 candies of Karunganni lint, 6516 candies of Cambodia and 262 candies of Karunganni were received including 1401 candies of Cambodia and 54 candies of Karunganni lint produced from ginneries. Despatches accounted for 7501 candies of Cambodia and 424 candies of Karunganni lint which include 955 candies lint sent to Travancore Cochin State, North Arcot, Tiruchirapalli, Orissa, Bombay, Madurai, Calcutta, Mysore, Madras and Nilgiris. The month closed with a stock of 6862 candies of Cambodia and 1554 candies of Karunganni lint.

Kapas: The kapas market started with an opening stock of 16,154 pothies of Cambodia and 621 pothies of Karunganni kapas. Arrivals amounted to 15,096 pothies of Cambodia and 414 pothies of Karunganni kapas into this market, which include 5,130 pothies kapas received from Salem, Madurai, Villupuram, Tiruchirapalli and Tanjore. 19,017 pothies Cambodia and 627 pothies of Karunganni kapas were disposed off leaving a closing stock of 12,593 pothies of Cambodia and 408 pothies of Karunganni kapas.

Koilpatti: Lint: The lint market opened with an opening stock of 148 candies of Karunganni lint. Arrivals amounted to 375 candies of lint from the surrounding areas. 450 candies of Karunganni lint were disposed, leaving a closing stock of 73 candies of lint.

Kapas: The kapas market opened with a stock 600 pothies, 400 pothies were received and 1,000 pothies were disposed of. There was no stock at the end of the month.

Ramanathapuram: Lint: The market opened with a stock of 1,165 candies. Arrivals amounted to 3220 candies of lint. Disposals amounted to 3020 candies, leaving a closing balance of 1,365 candies of lint.

Kapas: The kapas market started with a stock of 17,000 pothies, 36,350 pothies were received into the three markets of Virudunagar, Rajapalayam and Sattur. Disposals amounted to 36,100 pothies leaving a closing balance of 1,950 pothies.

South Arcot: Kapas: The market started with a stock of 63 pothies during the month. 138 pothies were received into Villupuram market. 192 pothies were despatched to Tirupur leaving a closing stock of 9 pothies in the market.

Prices: Tirupur: Lint: The market was active with good turnover and the prices were steady.

Kapas: The prices were steady with good turnover.

Koilpatti: Lint: After opening at Rs. 840 to 860 the prices gradually increased to Rs. 880 to 900 in the middle of the month. The prices continued steady but mills did not purchase stocks in view of the high prices.

Kapas: The prices of kapas remained steady at Rs. 120 to Rs. 126 for Uganda Kapas.

Ramanathapuram: Lint: The prices in the three markets firmed up slightly due to good demand and shrinking stocks. The prices of lint were as follows:

		Opening Rates	*Closing Rates*
		Rate per candy	
Karunganni	...	Rs. 830 to 864	Rs. 874 to 880
Tinny Karunganni	...	Rs. 815 to 824	Rs. 833 to 845
Tinny	...	Rs. 751 to 815	.....
Uganda Certified	...	Rs. 970 to 991	Rs. 1,006

Kapas: The prices slightly increased due to good demand and moderate arrivals. The prices were as follows:

		Opening Rates	*Closing Rates*
		Rate per pothi	
Karunganni	...	Rs. 106 to 110	Rs. 112½ to 117½
Tinny Karunganni	...	Rs. 88 to 103	Rs. 93 to 108
Tinny	...	Rs. 66 to 84	Rs. 75 to 90
Uganda–Rajapalayam	...	Rs. 114 to 135	Rs. 125 to 139

South Arcot: Kapas: Arrivals were meagre and the prices were put up to Rs. 104—6—0 (average).

Groundnuts: (In this Section: Candy = 531 lb.
Bag = 80 lb.)

South Arcot: Stocks: All the markets of South Arcot District together started with a stock of 2,034 tons. Arrivals totalled 10,250 tons in all the markets of South Arcot District. 383 tons were received from other districts like Tiruchirapalli, Salem and North Arcot. 7,209 tons were crushed by power mills and 225 tons were crushed by Chekkus 2723 tons were despatched to Tanjore, Tiruchirapalli, Salem and Madras while 186 tons were exported to Pondicherri State. Wastage amounted to 443 tons. There was a closing stock of 2,891 tons at the end to the month.

Prices: The prices were on the increase in the first fortnight and gradually declined at the end of the month due to rainy weather.

North Arcot: Stocks: The market started with a stock of 1,159 tons of pods and 596 tons of kernels. Arrivals amounted to 41 tons of pods and 589 tons of kernel. Offtake amounted to 382 tons of pods and 435 tons of kernel, leaving a closing stock of 818 tons of pods and 750 tons of kernels. The market was dull due to poor arrivals and absence of buying interests.

Prices: During the month the prices of groundnuts rose with good demand for groundnut oil from Bombay and Calcutta. The prices were ranging between Rs. 170 to Rs. 175 per candy as against Rs. 101 to Rs. 107 previously.

Ramanathapuram: Stocks: The market started with a stock of 1,300 tons of groundnut kernels. Arrivals amounted to 3,900 tons, 4,700 tons of groundnut kernels were disposed off, leaving a closing stock of 500 tons of groundnut kernels.

Prices: The opening and closing prices of groundnut kernels are as follows:

		Opening Rate	*Closing Rate*
Groundnut Kernels	...	Rs. 160 to 171	Rs. 160 to 162

Gingelly: In this Section: Bag = 168 lb.)

South Arcot District: Stocks: Gingelly arrivals were on the increase in the first week and third week and decreased in the second last week.

Prices: The prices were steady during the month.

Coconut and its products: (In this Section: Candy = 700 lbs.)

Coconuts: Stocks: The arrivals were fair and the transactions of coconuts in Malabar and South Kanara were as follows:

(In thousand)

Centres	Opening Stock	Arrivals	Despatches	Closing Stock
Malabar District:				
Kozhikode ...	7497	3100	4400	7109
Badagara ...	604	3100	2812	892
Ponnani ...	300	560	530	330
Tellicherry & Dharmadam ...	517	945	963	499
South Kanara:				
Mangalore ...	55	175	170	60

Prices: The prices of Coconuts were as follows per 1000 nuts.

		Maximum	*Minimum*
Malabar District:			
Kozhikode			
Ponnani	...	Rs. 110	Rs. 90
Badagara	...	,, 1,258	,, 115
Tellichery & Dharmadam	...	,, 139	,, 90
	...	,, 928	,, 92
South Kanara:			
Mangalore Dry	...	,, 180	,, 135
,, Raw	...	,, 140	,, 115

Copra: Stocks: The arrivals of copra were poor due to rainy weather conditions. The transactions of copra in Malabar and South Kanara were as follows:

Markets	Opening Stock	Arrivals	Disposals	Closing Stock
Malabar district: (In candys)				
Kozhikode ...	4923	4800	5600	4123
Badagara ...	805	2480	2290	996
South Kanara district:				
Mangalore (In tons)...	117	440	450	107

Prices: The prices of Copra District were as follows:

(Prices per candy)

Variety		*Kozhikode* Minimum	*Kozhikode* Maximum	*Badagara* Minimum	*Badagara* Maximum
Office	...	Rs. 295	Rs. 290	Rs. 315	Rs. 297/8
Edible	...	,, 310	,, 300	...	...
Madras	...	,, 305	,, 300	,, 325	,, 320
Raypur	...	,, 332	,, 325	,, 350	,, 320

The prices of Copra in Mangalore Market ranged at Rs. 290 to 310.

Arecanuts: (In this Section: Bag = 100 lbs.)

Stocks: The arrivals of arecanuts were on the increase steadily. The transactions of arecanuts in Malabar and South Kanara were as follows:

	Opening Stock	Arrivals	Disposals	Closing Stock
Malabar district:				
Kozhikode (100 lb.)	290	2745	2219	816
South Kanara district:				
Mangalore (in cwts.)	8312	5800	8700	5412

Prices: The prices increased due to good demand. The prices of arecanuts were as follows:

		Maximnm	Minimum
Malabar District:			
Kozhikode		Rs. 205	Rs. 200
South Kanara District: (Per Cwt.)			
Koka	...	,, 130	,, 85
Choll ...	...	,, 195	,, 160
Malabar Supari ...	...	No Stock	
Mangalore Supari ...	...	175	145

Tobacco: (In this Section: Candy = 500 lbs.)

Coimbatore: Stocks: The market opened with a stock of 23,340 candies of chewing and 2200 candies of Cheroot varieties. About 25 candies of chewing tobacco from Madurai and 20 candies of beedi tobacco were reported to have arrived. 3,715 candies chewing and 700 candies of cheroot varieties were despatched to Palghat, Pattukottai, Karaikudi, Aleppy, Tiruchur, Ernakulam, Dindigul, Tanjore, Malabar, and Chengleput.

Prices: The prices of different varieties of tobacco in Tirupur were as follows:

(Prices in Rs. per candy of 500 lb.)

Variety	I Grade	II Grade	III Grade
1. *Chewing Tobacco (Sun-cured):*			
(a) Meenampalayam ...	350—450	250—325	175—220
(b) Other varieties ...	235—295	170—210	85—120
2. *Cheroot varieties:* Sun-cured (grown in Erode and Bhavani) ...	275—335	200—275	120—155
3. *Chewing varieties:* Pit-cured (grown in Palladam and Sulur areas) ...	250—350	175—250	100—150

Review of the Administrative Activities of the Market Committees for August, 1956.

General: All the Market Committees continued to function under Section 6-A of the Madras Commercial Crops Markets Act except Coimbatore Market Committee and Malabar Market Committee which are functioning under an elected body. The stalemate caused in the Market Committees of Tirunelveli Market Committee and Ramanathapuram Market Committee has not yet been cleared awaiting the judgment of the Supreme Court.

The following is the progress made in the issue of licence by the Market Committees in the State.

	Section 5 (1)		Section 5 (3)		Weighmen	
	A	B	A	B	A	B
North Arcot Market Committee	177	1059	63	641	35	385
South Arcot Market Committee	218	1393	180	1208	159	1113
Coimbatore Market Committee	59	794	75	843	30	573
Tirunelveli Market Committee	—	13	—	16	—	7
Ramanathapuram Market Committee	—	29	—	28	—	7
Malabar Market Committee	49	363	65	1393	38	318
South Kanara Market Committee	10	146	—	62	1	57

A: During the month. B: Upto the end of the month from January, 1956.

Meetings: A meeting of the newly elected committee of the Malabar Market Committee was convened by the Collector of the district on 1—8—1956 when Sri. P. B. Kurup and Sri. A. G. Kunhi Krishnan Nair were elected as Chairman and Vice-Chairman respectively.

Quality appraisal: The South Arcot Market Committee continued its work on the analysis of Groundnut Kernels marketed in the district. During the month 118 samples were drawn and analysed in 5 markets out of arrivals of 97,413 bags of Groundnut Kernels comprised in 28,031 lots. The total common refraction was below 4% in 96 samples and 5 to 8% in 22 samples. The Groundnut crops marketed at Cuddalore and Panruti were wet and that the crop marketed at Virudachalam contained moisture at its minimum. Eighty per cent of the crop marketed in all the markets contained total refraction below 4% and the rest between 5 to 8%.

Quality Competition: Fifty four entries were secured by the South Arcot Market Committee for summer Groundnut crop quality competition during the month bringing the total to 160.

South Arcot Market Committee, Cuddalore

Regulated Markets Service Week Celebration

The Regulated Markets Service Week, the first of its kind was celebrated at Villupuram from 10—9—1956 to 15—9—1956. A large gathering of representatives of growers and traders were present. The Service Week was inaugurated by Sri Henry Peter, Collector of South Arcot on the tenth at the Villupuram Regulated Market premises. Sri K. V. Natesan, Secretary of the South Arcot Market Committee welcomed the gathering and explained the object of the Service Week. Sri R. V. Sundara Reddiar, Advocate, Cuddalore spoke on "Agricultural Marketing". The usefulness of Regulated Markets, the popularity that they enjoy among the public and the important role that they play in the economic uplift of the rural masses were the salient points on which the speaker laid stress. The need to expand the activities of Regulated Markets to other agricultural crops was also emphasised by him. Incidentally he requested the Collector to extend all possible help in the establishment of a sugar factory in Villupuram Taluk. The Collector thereafter opened an Exhibition got up by the Committee. The exhibits of the Agricultural Department as also of the Market Committee and that of the Hindusthan Vanaspathi, Tiruchirapalli were on display.

On the second day, Sri R. Venkatasubba Reddiar, B. A., B. L., of Tindivanam spoke as to how best the Co-operatives and Regulated Markets can co-ordinate their activities in the betterment of marketing. He envisaged the establishment of marketing societies in all assembling centres to advice and advance loans to the producers on the pledge of produce and expansion of Regulated Markets for other crop also.

Sri Sitharaman, Sub Registrar of Co-operative Societies, Cuddalore was the speaker on the third day. Sri S. Rangaswami Nadar presided. The speaker laid stress on the establishment of Marketing Societies along with the Regulated Markets to improve the facilities in the sphere of "perfect marketing" that is aimed at. The work of Marketing according to the speaker will be complete and beneficial to the public only when the Regulated Markets worked in co-ordination with the Co-operatives in the assembling centres. Sri M. Shanmugha Udayar, the speaker of the fourth day traced the history and the growth of the South Arcot Market Committee in South Arcot. He had nothing but praise for the working of Regulated Markets in South Arcot and visualised the introduction of other important agricultural crops under the fold of the Madras Commercial Crops Markets Act. Sri V. R. Nagarajan, B. A., B. L., M. L. A. presided.

The fifth days programme was highlighted by an erudite lecture on the Madras Commercial Crops Markets Act and Rules and the advantages of Markets established under the Act by Sri M. Obaidullah Shah, State Marketing Officer, Madras. Sri S. K. Sambandam, Member, South Arcot Market Committee presided. The speaker traced the history of Regulated Market legislation and how the Royal Commission on Agriculture recommended the enactment of the Commercial Crops Markets Act. The various provisions of the Act were discussed in detail and the working explained to the audience. The speaker also announced that marketing facilities will be afforded to the public during the second five year plan period, when werehouses and regulated markets will be established in areas which are not now covered either by Market Committees or Co-operatives.

On the last day of the Service Week Sri S. Chidambara Iyer, Ex-M. L. A. presided. In his presidential address he referred to his association with the South Arcot Market Committee in its initial stages and was glad to learn that 90% to 95% of the marketable surplus is now sold through the Regulated Markets of this Committee. Restriction of buying and selling inside the Regulated Markets, he added, will be welcomed by the producers and traders. Thereafter Sri R. M. Sundaram, I. C. S., Director of Agriculture distributed the prizes to the winners of the quality competition conducted by the South Arcot Market Committee and the yield competition conducted by the Agricultural Department. Being a native of South Arcot district he said he was exceptionally happy that the South Arcot Market Committee is doing yeomen service to the

producers of the district through the regulated markets. Incidentally he advocated that Co-operative Societies can work at the village level and thereby enjoy the facilities offered by the Government in advancing loans through the Co-operative Department. He also referred to the system of Co-operatives in China where the co-operatives have advanced to such a stage that one person is every family is an active member of the co-operative institution. The proceedings of the day concluded with the singing of the National Anthem.

Crop and Trade Reports

Cotton — First Forecast Report — 1956 — '57 — Madras State: The area sown with cotton in the Madras State upto 25th July 1956 is estimated at 74,800 acres. Compared with the area of 74,500 acres estimated for the corresponding period of previous year and an average area of 64,200 acres calculated for the five years ending with 1955 — '56, this is an increase of 0·4 percent and 16.5 percent respectively. The area estimated is the same as that of last year in the districts of North Arcot, Malabar and South Kanara. A decrease in area is estimated in the districts of South Arcot, Coimbatore, Tiruchirapalli and Tanjore and an increase in the other districts of the State except the Nilgiris where the area under the crop is little or negligible.

The estimated area by varieties in the current year together with the corresponding figures for the previous year is given below:

Variety		Area in '00' acres	
		1956 — '57	1955 — '56
(1)		(2)	(3)
Madras American - Cambodia	..	260	203
Madras American Cambodia - Uganda	..	110	150
Total	..	370	353
	..	255	245
Karunganies	..	59	81
Karunganni - Ordinary	..	64	66
Uppam including Ndam & Bourban			
Total	..	378	392
GRAND TOTAL	..	748	745

Ginger — First report — 1956 — '57 — Madras State: The area under ginger crop upto 25—8—1956 in the districts of Madurai, Malabar, South Kanara and the Nilgiris is estimated at 13,700 acres compared with the area of 13,030 acres for the corresponding period of the previous year it shows an increase of 5.1 percent. An increase in area is estimated in the districts of Malabar, South Kanara and the Nilgiris and a decrease in the district of Madurai. The condition of the crop is satisfactory except in the Nilgiris district where the crop is stated to have been affected by shoot borer of Ginger and soft rot.

Pepper — First Forecast Report — 1956 - '57 — Madras State: The area under pepper upto 25—8—56 in the districts of Malabar, South Kanara and the Nilgiris is estimated at 123,650 acres (105,100 acres in Malabar, 18,500 acres in South Kanara and 150 acres Nilgiris districts) as against 120,000 acres (120,360 acres in Malabar, 17,490 acres in South Kanara and 150 acres in the Nilgiris districts). estimated for the corresponding period of the last year. The condition of the crop is reported to be satisfactory except in South Kanara district where the yield is expected to be below normal.

Groundnut — First Report — 1956 - '57 — Madras State: The area sown with the groundnut crop in the Madras State upto July 1956 is estimated at 216,500 acres. Compared with the area of 205,700 acres for the corresponding period of the previous year, the present estimate is an increase of 5·3 percent. Compared with the average area of 189,000 acres calculated for the five years ended 1955 - '56, the current years estimate is an increase of 14·6 percent. The area in Ramanathapuram district estimated this year is the same as that for the previous year. An increase in area is estimated in all the other districts except Tiruchirapalli and Madurai where a decrease is estimated. The yield per acre is expected to be normal in Coimbatore district and slightly below the normal in the other districts. The total yield is estimated at 126,100 tons of unshelled nuts as against 117,100 tons estimated for the corresponding period of the previous year representing an increase of 7·7 percent. Compared with the average yield of 98,400 tons calculated for the five years ended 1955 - '56, the current year's estimate shows an increase of 28·2 percent.

Cotton — Intermediate Condition Report — Period upto the end of August, 1956 — Madras State: The main season for sowing of cotton is not yet over in parts of the State. Sowing of the crop was in progress in the districts of Salem, Coimbatore, and Tirunelveli. The condition of the early sown crop is reported to be below normal in the district of South Arcot for want of adequate rains. The crop was affected by pest in the districts of Coimbatore and Tirunelveli. It is too early to report on the condition of the crop in the districts of Salem, Tanjore and Ramanathapuram.

Sugarcane — Intermediate condition report — Madras State — Period upto the end of August 1956: The condition of the sugarcane crop is reported to be normal in Salem and South Kanara districts above normal in the districts of South Arcot and North Arcot. It is too early to report on the condition of the crop in Tanjore, Ramanathapuram and Tirunelveli districts.

The Madras Agricultural Students' Union.

PATRONS.

1. Dewan Bahadur C. Arunachala Mudaliar, Zamindar of Chunampet
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