

be troubled by *Hariali* from under the ground, raise him up by a top dressing of nitre. If it is your desire that your cigar should burn well and steadily leaving a silvery stick of ash, don't fail to give your tobacco crop a doze of nitre. Perhaps you desire to grow such good English vegetables as cabbage, cauliflower, turnip, etc., then make it a rule to feed them with nitre. In short, if you suspect any of your crops not up to your expectations, give a stimulant dose of nitre and you and they will look cheerful in a few days.

It is however a pity that the value of such a Talisman is not fully recognised by the majority of the ryots. They recognise the efficacy of cattle manure, sheep's dung and poudrette, but have a lamentable lack of understanding with regard to the value of the essential product in these.

It is the want of understanding of the value of this earth on the part of the farmer that tempts the village manufacturer to rob his stalls, and walls of such an important manure and prepare the salt for a foreign market. For, India exports as much as 20,000 tons of refined nitre to foreign countries. Imagine the consequences of this incredible thoughtlessness! The writer strongly feels that any effort which aims at inducing the ryot to make a systematic use of his "salt earth," directly contributes to his prosperity.

V. Ramachandra Ayyar.

*Student Class III.*

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### Notes.

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*Fish Manure* :—There are one or two points of interest regarding this fish manure industry which are worth recording. Fish manure consists of beach dried sardines from which no oil has been extracted. The sardines are dried on the bare sand, and on exposure to the sun's heat an appreciable quantity of oil exudes.

This causes the sand to adhere to the fish and explains the high percentage of sand commonly found in this type of manure. The best firms collect the dried sardines with care and go to the extent of submitting them to a cleansing process so as to separate a considerable amount of the sand still adhering to the fish. Even then the percentage of sand is seldom under 10 per cent, and as a rule approximates to 15 per cent. The discarded sand is retained as it contains an appreciable quantity of fish refuse and fish oil. It is held in high esteem by tobacco cultivators and is sold to them at a price out of all proportion to the intrinsic value as calculated from its organic content relative to that of fish manure. *Fish guano*, on the other hand, is practically free from sand, but in almost all cases the price demanded for it is nearly double that of fish manure. It contains so little sand for the reason that clean fresh fish only can be handled in the oil mills. Fish guano consists of the solids remaining after the oil has been extracted. This also has to be thoroughly dried in the sun, but in this case special care is taken to dry it on matting. This procedure is not adopted in the case of beach dried sardines because of the very large quantity both in bulk and in weight that has to be handled. Fish from which the oil has not been extracted takes much longer to dry thoroughly and would necessitate an investment of no mean sum in mats only. Fish manure merchants tell me that they do not normally or readily sell on the basis of a maximum per cent of sand for the sole reason that they are not aware of any means of ascertaining the actual percentage in any sample. On being informed that this could be done by a chemical analysis of a fair average sample, some of them are seriously considering the advisability of analysing samples and selling on a percentage of sand basis.

It is of special interest to note that though fish-manure contains normally about 15 per cent of sand, yet the price demanded for fish guano is nearly twice that demanded for fish manure. I failed to discover the explanation for this

apparent anomaly. (*Extract from April monthly report of Dy. Director of Agriculture VI Circle.*)

*Calculations of manure applications.* There is often a demand for a ready reckoner by which applications of manures can be easily distributed throughout the field. This is supplied by the calendar of the "Chilean Nitrate Propaganda" and is here reproduced.

From these tables the number of plants per acre at various planting distances can readily be seen and the quantities of manure to be applied to each plant can be ascertained:—

Table for Square or Square measure.

Sq. mile.	Acre.	Sq. rood.	Sq. yard.	Sq. feet.	Sq. inches.
1	640	102,400	3,097,600	27,878,400	4,014,489,600
	1	160	4840	45,560	6,272,640
		1	30 $\frac{1}{4}$	272 $\frac{1}{4}$	39,204
			1	9	1296
				1	144

Number of plants per acre at various distances.

	3 ft.	3 ft. 6 in.	4 ft.	4 ft. 6 in.	5 ft.	5 ft. 6 in.	6 ft.
3 feet.	4840						
3 ft. 6 in.	4148	3555					
4 feet.	3630	3111	2722				
4 ft. 6 in.	3226	2765	2419	2150			
5 feet.	2904	2489	2178	1936	1742		
5 ft. 6 in.	2640	2263	1980	1760	1584	1440	
6 feet.	2420	2074	1815	1613	1452	1320	1210

For other distances multiply together the two distances in feet at which the trees or bushes stand apart and divide the product 43,560; by the quotient will be the number of plants required. Quantity of manure to be applied per plant. (in ozs.)

lb. per. acre.	3 ft. × 3 ft.	3 ft. × 3 ft. 6 in.	3 ft. × 4 ft.	3 ft. 6 in. × 3 ft. 6 in.	4 ft. × 4 ft.	4 ft. 6 in. × 4 ft. 6 in.	5 ft. × 5 ft.
350	1.15	1.35	1.54	1.58	2.07	2.60	3.21
400	1.32	1.54	1.76	1.80	2.35	2.97	3.67
450	1.49	1.73	1.98	2.02	2.65	3.34	4.13
500	1.65	1.92	2.20	2.25	2.94	3.71	4.59
550	1.82	2.11	2.42	2.48	3.23	4.07	5.05
600	1.98	2.32	2.64	2.70	3.52	4.44	5.51
650	2.15	2.51	2.86	2.93	3.82	4.81	5.97
700	2.31	2.70	3.08	3.15	4.11	5.18	6.43
750	2.49	2.89	3.31	3.37	4.41	5.54	6.89
800	2.65	3.08	3.53	3.60	4.70	5.91	7.35

Tropical Agriculturist, April 1917. C. N. A.

*Green maize for milking* :—Green maize if fed to milking cows before it shows the tassel, will do no injury, but it must be remembered that the greatest amount of nutriment is contained in maize when the cob is turning from the milky into the glazing stage. This however does not apply to any of the Sorghum family, such as Sorghum sacharatum, Planters Friend and Amber cane. These must on no account be fed to cattle unless in the flowering stage or unless they have been allowed to wilt; that is to say, Amber cane cut in the morning can be fed in the evening or if cut in the evening can be fed the following morning without any danger to the stock. (*From the Agricultural News, Durban*). W. R.

*Stimulating the milk flow:*—The Dairy cow can often be brought up to a high degree of efficiency by some very simple means. The persistency of the milker will pay well for all the extra time spent. Try to make the cow think she has not given enough and she will set about to make it up next time. A little milk left in the udder will make her think she is giving more than she is expected to and at the next milking she will not have quite so much for you. There is a great difference in the percentage of butter fat in the first and the last milk drawn. The first will sometimes be as low as 1 per cent and the last has been known to run as high as 12%. It pays to work for the strippings. The manipulation of the udder will often result in the increase of a pound of milk. This is usually done after the milker has secured all the milk he can by taking the teat in the hand and pushing the udder up close against the body, repeating this about round close to the body 3 times with each quarter, in turn, between the hands and rub down. The extra milk secured at the single milking may not pay for the time but it will stimulate the cow to give that much more at the next milking with extra work. Here is where the profit will come in. We all know that a cow with which the calf is allowed to run will very soon adjust the flow of milk to the needs of the calf and it is equally true that the Dairy cow can and will increase the milk flow if encouraged by the milker. Get all the strippings. It will pay. (*From the Agricultural News, Durban*). W. R.

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*Breeding for Atropine.* The high prices paid for crude drugs, brought about by the abnormal economic conditions of the last few years, have stimulated a wide and popular interest in the cultivation of the plants yielding these products. It may be said that financial success in the cultivation of drug plants depends upon the possibility of increasing the alkaloid content of these plants by plant breeding methods. It at once becomes

evident that the work of increasing alkaloids in a plant differs from that of increasing size, changing color or form. The investigator is dealing with unseen characters. Since the characters with which we are working are unseen, the number of individuals that can be placed under observation is therefore limited, and in turn the chances of success are proportionately reduced. In establishing a system of selection of belladonna (*Atropa belladonna*) at the Mulford Drug Gardens, the effort was made to overcome this difficulty by establishing a correlation between some apparent physical character and alkaloidal content. The breeding plot contained 500 individuals which were chosen from a lot of several thousand seedlings. Some of the features of the plant were recorded on a card at the time of setting out. These included size in its first and second weeks, and when adult; the blooming date, color, size of leaf and of root, and any other facts which seemed likely to be of interest. These plants were examined once each week for the first three weeks and then as often as the date on the cards required. The leaves were gathered at the usual time—just as the flowers are opening—and enough leaves were allowed to remain to mature the fruit pods. The leaves were then air dried on drying racks in bundles corresponding to the plant from which they were taken, after which they were assayed for alkaloidal content. The error incident to this process was minimized by running the assays in duplicate. The alkaloidal content of the samples, expressed in percentages, was as follows :—

Alkaloidal content.	Number of samples.
·0—·09	4
·1—·19	8
·2—·29	26
·3—·39	83
·4—·49	94
·5—·59	65

·6—·69	42
·7—·79	26
·8—·89	25
·9—·99	6
1·0—	6

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Total. 385

Mean = ·507

The standard of the United States Pharmacopeia is 0·4 atropine in belladonna, and the average sample found in the markets varies from this minimum to about 0·6. It is evident, then, that nearly 7% of the plants were above the standard in chemical content, and that six of them yielded 1% or more of atropine—a remarkably high percentage. They were as follows:—

1·020

1·000

1·100

1·230

1·030

1·039

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Avg. 1·07

Interest naturally centered on these plants, and a study of the records showed that every one of them was small at the time of harvest, while practically all the plants which yielded ·01 or less were large and vigorous in growth. Furthermore, the six high plants all had light stems, while the plants yielding ·1 or less had dark stems. These characters were the only ones found which seemed to give a clue to the chemical constitution of the plants, but they were marked enough to warrant special attention during the coming season, when a selected second generation will be grown.

In conclusion, it must be remembered that this work covers only one season and hence must be regarded as merely preliminary. It is highly encouraging to us, however, in indicating the extreme variation of atropine content in the belladonna plant and giving hope that valuable commercial results can be secured by selection. (*The Journal of Heredity*, April 1917). G. N. R.

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*Coconut-selection and planting.* It is a common practice among Coconut planters to pick out the seed from a pile of nuts gathered from all the trees in the grove. As is commonly the case, the largest, and the best looking nuts in the pile are from trees bearing but few nuts to the bunch. The selection from the pile of these big and nice looking nuts for seeds will tend to increase the number of poorly producing trees. The farmers should focus their attention on the valuable characteristics of the coconut trees, and they should select their seeds while the nuts are still on the trees. The trees from which the seed nuts should be taken should exceptionally and regularly be productive.

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While the Coconuts should not be planted in the seed bed before they are thoroughly ripe, it is likewise undesirable that their planting be delayed much after this time. The danger in this case is that the plumule will be fixed in its direction of growth inside the husk and that a deformed seedling will result from placing the nut in a different position. (*The Philippine Agriculturist*, January 1917). G. N. R.

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### Departmental Notes.

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A. Ramalinga Ayyar, S. P. T. Assistant Farm Manager, will on return of the Central Farm Manager from leave on 7th June 1917, be posted to Palur,



M. R. Ry., V. R. Venkatarama Ayyar, Supervisor, Pumping and Boring Section, Trichinopoly Section is granted privilege leave for two months from the date of relief.

Privilege leave for 6 weeks from or after 15th May 1917 is granted to Agricultural Demonstrator M. R. Ry., K. T. Bhandary.

One month's privilege leave is granted to M. R. Ry., K. Unni Krishna Memon, Farm Manager, Palur, from or after 16th May 1917.

M. R. Ry., S. Subbaya, Assistant Agricultural Demonstrator, is granted privilege leave for one month from the date of relief.