The Farm Night School is an institution which owes its inception, foundation and continuance entirely to Mr. Murthi, and if volume of sound is any indication of success, there is no doubt that it is succeeding. The Telugu small boy makes more noise for his size, than any one else;—perhaps because in these backward parts where the cattle are not fitted with ropes or reins he has to do so driving much with his voice! As an excellent object on which the funds of the Union might be well spent, the foundation of similiar night schools at all Government stations is suggested. The expense would not be very great: the supervision would come from the Manager or Assistant Manager in charge, and the benefits would be great. The teacher's salary would be the standing charge, and would not be much. The Union would benefit, in that its activities would be more widely diffused and not so centralised as is now the case. The buffalo is of course a much more important animal in Vizagapatam than in Coimbatore, and is largely used for all draught purposes. The best animals seem to come from Kimedi, and are said to receive at intervals an infusion of blood from wild sires. A fine Delhi or Kasi cow and her calf are to be seen at the Farm. The cow is rather a nicer looking type than the Coimbatore cows, being lighter in colour and less hairy and with rather shorter legs. The bull is said to be eighteen months old, and if this is so, is better grown than the Delhi bulls used at Coimbatore, and gives promise of being a useful animal at stud.

Anakapalle,
May 24th.

R. C. W.

Cotton.*

Professor Todd first expressed his pleasure in talking about cotton. He first began to study the economics of Egypt which was

*A summary of two lectures delivered by Professor J. A. Todd at the Agricultural College, Coimbatore in March 1916.

a study of the cotton crop of that country. Then he went to America the great cotton country to study the question there. The question of cotton is of particular importance to India, and especially to this district. The War made India suffer at first on account of lowering the price of her cotton. Soon after the outbreak of war prices went down but the subsequent rise was very marked. He asserted the great future of India as a world's supplier of cotton. Dealing with the statistics of the world's supply he believed that the Indian crop was much larger than what the Govt. accounts indicated. The statistics of Egyptian cotton were very correct. Chinese figures were only approximate inasmuch as no reliable data could be got. However, one thing could be said that the crop in China is also increasing. America supplies the largest quantity to meet the world's demand. Cotton is a world wide crop. Then he discussed the supplies of cotton in the various countries severally, both as regards quality and quantity.

Sea-Island cotton is the finest in the world with a staple length of 2" fetching 40 as. a lb. It can spin anything up to 2,000 counts. To give an idea of the term counts he said that a yarn of 300 counts would mean that 150 miles of it will make a lb. Egyptian is the next best with a staple length of $1\frac{1}{2}$" to $1\frac{3}{4}$" fetching 12 as. a lb. With this it is possible to spin yarn 120 to 150 counts fine. They are specially strong and fine. American forms the great bulk of cotton in the market. It is 1" long in staple fetching 7 to 8 as. a lb. with a capacity of being spun into yarn 40 counts fine. Indian and Chinese cotton $\frac{3}{8}$" to $\frac{5}{8}$" staples are valued at 4 to 5 as. a lb. in the Liverpool market. Although none of the best cottons are in India, yet the Madras cottons are the best among them. Bengal cotton is about the most inferior of all. Dacca muslins in India many years ago were made of yarns varying from 300 to 500 counts fineness. In the whole length of India he could not find any cotton that can spin anything near such counts. In 1820 Indian cotton exports to England got a great check by the improved methods of cotton ginning introduced in America while such purer cotton ousted the Indian commodity in the English market.

The modern history of cotton dates from 1894. American middling which is taken as the standard price of cotton then fetched 3 as. a lb. in the Liverpool market whereas it is now selling at 8 as. The rise has been very steady during the past 20 years in spite of increased supply as seen from the following quinquennial averages.

1894 to 1899.	3·76	as. a lb.
1899 to 1904.	5·44	,,
1904 to 1909.	5·79	,,
1909 to 1914.	7·16	,,

In 1913—14 the price touched 7·96 as. a lb. the season's average being 7·26 as. The cause of this rise he said was to be found in the increase of demand. When a big crop came we used it all; when the crop was smaller we had to depend on the previous balance if any. To answer the question why the demand was increasing he had to say that the world is now getting into the habit of wearing clothes, and 9/10 of world's clothing material is cotton. The uses of cotton have also increased. Aeroplane sails were originally made of silk. Now they have found that cotton is more suited to it and much cheaper. After undergoing the processes of mercerising &c., cotton cloths look like silk or wool fabrics yet with one advantage that such things are individually cheaper than silk or wool. Therefore cotton fabrics of any fineness have come within the reach of the middle classes and it is the middle class demand that is the largest. 17 million bales of American cotton was the record yield in 1914 and the crop in all other cotton countries was likewise good. When war broke out the demand received a strong check. Therefore the abundant supply with a check on the demand made prices go down and the trade was in dismay. The cotton exchanges were closed and prices were artificially regulated by the exchange committees. From 7·38 annas a lb. for American middling in the end of July the price came down to 4·25 annas in December 1914. In autumn 1915 there was a rapid rise going up to 8·35 annas a lb. in January 1916.

Prices fell with the war and America held her crop much better than was thought possible. The acreage under cotton was cut short

in the whole world. In America the acreage was 15% less which with reduced manuring amounted to 30% of the usual supply. India and Egypt reduced their crops about 30% too. In 1916 the area was on the whole 25 per cent less and a bad season accentuated it. American crop was 7 million bales less. In the meantime the slackened demand also recovered. The causes of recovery were first that woolen materials had to be replaced by cotton, and secondly gin cotton for explosives was in large demand. Home demand of America and England could not be cut short. The English working man was never short of money and his demands remained the same. Japan took advantage of the bad situation and took the place of Germany and America. Consequently the standard price of cotton in the Liverpool market rose to 8·35 annas a lb. in January 1916.

Will this price last when normal conditions are regained? The present Liverpool prices are unduly inflated by the high freight charges, but this does not apply to *Bombay and New Orleans*. The price of any commodity must be high enough to cover the cost of production and leave a fair margin of profit. The highest cost of production must be taken into consideration. A, B, and C grow cotton and their cost of production and gain come to 3 as., 4 as., and 5 as., a lb. respectively. C cannot part with his produce for anything less than 5 as. If you want to purchase C's produce the price is 5 as. a lb. and if the demand requires it both A & B also get the 5 as. rate. This is a simple question of economics. Therefore taking the question of New Orleans or India, the prices are everywhere the same according to demand. Texas has the largest output of cotton and the cost of production is the highest there because the cost of labour is as dear as Rs. 5 to 10 per day per cooly to pick cotton. Therefore the Texas grower cannot grow cotton for anything less than 6 as a lb. If price goes down he will decrease his acreage. It therefore means that the Texas price fixes the world's price of cotton as the demand requires Texas cotton. Present prices pay the Indian grower. If these prices are normal the result will be an increased acreage. India can supply the world with a million bales more of cotton if the demand comes. The average yield of cotton in India is 80 lbs. lint

per acre, 200 lbs. in America and 450 lbs. in Egypt, where cases have given up to 1200 lbs. per acre. So there is scope increasing the Indian acreage. There are 25 million acres in India under cotton. If the production per acre could be uniformly raised by a lb. or two an acre it would materially improve the world's supply. Punjab colonies are expected to grow more cotton hereafter. India can better the quality of her cotton.

What India wants is to alter the proportion of her short and long staples. Bad seed is the first difficulty. There should be a regular system of seed distribution. Govt. help might be found necessary. As to methods of cultivation it is wrong to presume that all old Indian methods are bad because they are old. Handling of the produce is largely a faulty system. Ginning methods are bad. He emphasised the indiscriminate mixing of good cotton with the bad ones. The ginner is the merchant and the profit, if any, goes to him. Increased value of a good sample never goes to the cultivator as a means of encourgement for him to improve the quality. As to the value of cotton, length of staple and yield and ginning outturn struggle against each other in India. Therefore it is a question of a true market for good staple. To educate the grower, trader and even the Govt. in that matter, is the only means to improve the situation. This is the opportunity for India. If India fails to take advantage of it Japan, and China with her increasing output would win the race.

The second lecture dealt with the American and Egyptian cotton crops compared with Indian. The lecturer said that American cottons were so old as the Indian but the cultivation in America as a regular crop on a large scale dates from 1793. The expansion in its cultivation and improvements effected in the crop were, very great until now. The cotton area of America is unlike India a vast area in one great compact block known as the "Cotton Belt" measuring in all about 700,000 square miles. In these 37,000,000 acres are under cotton. The geographical distribution is interesting. The Atlantic States with the ports of Norfolk, Willington, Charleston, Savannah, Brunswick and Jacksonwell form the most important. The Gulf States and Texas

form the next area with Mobile, Pensacsle, New Orleans and Galveston as ports. Mississippi States with Memphus form the centre. Arysona and California of the western states grow cotton partially under irrigation. Texas is a prominent area by itself. The central states of the Mississippi valley are noted for their long staples. The California irrigated area grows fine cotton. Atlantic States grow both the best and the worst samples.

Dealing with the varietal distribution he said that 1st comes Sea Island cotton (2) Georgias and Floredas. (3) Mississippi long staple. (4) Orleans and Texas. (5) Upland Georgea is the poorest. Long staple American lint measures $1\frac{1}{2}$" in staple against Indian 1". The western area grows long staples also.

This vast area could but be of varying climates. Because they are mostly monsoon or rain crops the uncertainty of rainfall affects the yield. A heavy rain is as possible in one place as rainlessness in the other. In the Atlantic States they have to sow the cotton drills in circles to prevent the surface wash carrying away the crop. The Mississippi sometimes breaks its bunds ("lexees" as they are called) and the fields are covered by destuctive floods. The difficulty in Texas is one of shortage of rain and it is the controlling factor. American cotton is a low growing plant and a rainfall during the harvesting of the bolls stains the cotton badly. Winter frosts over almost the whole area of the belt, defoliate the plants and stop their growth.

Methods of growing are good in America. The negro is not a hard worker. The cotton crop is cultivated for the first two months of its growth and left alone till picking season comes in. Rain may spoil the crop before but picking is never commenced until custom dictates that picking should start. Scarcity and high price of labour are other difficulties in America. Ploughing for cotton in Texas is quite elementary and rows of cotton have to be wide apart to admit of passing horse cultivators due to dearness of other labour. If the rows could be put closer together the total output per acre could be much enhanced.

The picking charges are about 2½ cents per lb. or 3 to 5 as. a lb. Mechanical pickers to save labour were consequently tried but they cost as much as handpicking. A successful mechanical picker which is a thing of the future will alter the position a good deal.

Marketing the crop is a mixture of good and bad handling. During the first stage picking is done very clean and ginning cleaner still. Ginning is completely done by machinery, cotton being moved through the various portions of machinery by air suction. From the waggon cotton is taken off by a tube which drops it in the gins and the lint is blown out of the gin pipe where it is pressed and baled. 45 million lbs. of lint have to be baled in a very short time and therefore the whole thing has to be speedily worked. Cotton is left on the plants very long and sometimes rain causes enormous damage to the crop in the field. The whole of the American ginning processes are a model to all the world. Only 3 or 4 men are required to work a big ginning factory.

The bales are 500 lbs. each and samples are taken by cutting holes in these big bales. Every time a sample is required a new hole is cut and it is not uncommon to find a bale full of sample holes. These are subsequently covered with sample patches when being compressed for export. These bales thus form a disgrace to America.

Both in America and India there is no through ownership of the cotton from the field to the factory. On the other hand all the Egyptian cotton is dealt with mostly at Alexandria where they make it into the best bales in the world. Each bale weighs 750 lbs. but looks no larger than the 500 lbs. American bale. The firms of Alexandria hold shares in the ginneries and presses where these are afterwards dealt with and as such it is to their interest not to spoil the commodity at all. American owner, ginner,

exporter and compressor are all different people and the interest of the one man is not considered to be the interest of the others and the result is bad handling. In the compresses it is a very quick process producing nearly 200 bales an hour working 10 hours a day. This figure, would be enough to indicate the speed with which the work is turned out.

As to insect pests in America, Boll-weevil is a new introduction from 1892. In 1913 the area affected by this pest was 300,000 square miles of the best cotton area. Some areas have been practically abandoned. Long staple cotton that takes longer to mature was the most affected. The attack is greatest in August-September when the crop is maturing. Sea Island cotton area is now touched by the Boll-weevil and the lecturer feared that this cotton might become extinct in five years. New $1\frac{1}{4}''$ staple cottons have been introduced to mitigate the evils done by Boll-weevil.

The area under cotton in Egypt is very small. Out of 12,000 square miles, the cultivable area is only about 5 million acres. Of this 1,750,000 acres, are under cotton and Egypt puts in the market $1\frac{1}{2}$ million bales. This is due to the extraordinary fertility of Egypt. The area cultived consists of the Nile delta the double strip of land along side the Nile up to 560 miles. The breadth does not exceed a mile in some cases. A third of this area is under cotton. The whole area is irrigated by the Nile. The cotton cultivation under irrigation has made Egypt one of the wealthiest countries in the world.

One hundred years ago dates the present system of irrigation which is all due to cotton. In 1820 there was no cotton cultivation at all in Egypt. A French Engineer who saw a cotton plant in a Cairo garden brought it to the notice of Mahamad Ali the then ruler of Egypt. He was much interested in doing all that he could to his country and as such took up

the question of cotton introduction in earnest. Basin irrigation —a system by which the flood water of the Nile was made to flow over the fields enclosed by bunds and drained off when the land was ready to receive the seed—was the method in vogue. It did not suit the cotton crop and therefore a perennial irrigation system had to be introduced. As a further step in this direction a barrage or regulator was put up at the head of the delta to hold the level of the Nile up so that the water may enter the various canals made for the purpose. In course of time the canals became silted up at their mouths and no water would go into them when the river is not in flood. Thus the irrigation facilities provided by the canal became precarious. A stupendous work finished at a cost of 4 million sterling was thus found unable to serve the purpose it was intended to do. In 1882 irrigation Engineers from India were sent by the British Government after the occupation of Egypt by Britain. They found a solution of the difficulty by completing the barrage to maintain the level of water during the dry months and provide a store of water for the summer days. The Azaar dam was thus erected about 550 miles up the river. When the barrage was closed and the reservoirs opened the Nile was full and the water freely ran in the irrigation canals with the result that irrigation was available at all times of the year. The cultivation area spread and the demand for water outgrew the supply. The dam had to be enlarged in 1912. In 1909 again the reverse process took place and the trouble was that there was too much of water in the sub-soil and the result was loss of £ 10,000,000. The drainage system had therefore to be introduced with facilities to pump out the surplus water at the mouth of the Nile.

The cultivation methods in Egypt are extraordinarily good. Intensive cultivation prevails throughout. Two acres is the average holding of a ryot and nearly a million ryots own less than an acre. The crop is closely planted and well cultivated.

Egypt is in a fairly good position as regards insects, but Boll-worm is known. Government intervention controls it to some extent. According to the law of the land no more old plants should remain after 31st December. Pink Boll-worm was an introduction from India. The cotton worm lays its eggs on the leaves and the remedy was to pick those leaves and burn them. Defaulters had to pay the cost of labour as the Government will get the picking done when the ryots fail to do it. Non-payment of such amounts meant imprisonment and the prisoners were given the work of picking affected leaves in another man's field and thus the pest was efficiently controlled. The Soudan crop is another smaller lot but of good quality and with great prospects. Government control the sale of seed as its monopoly, send officers round to eliminate rogue plants in any field and police men to look to clean picking. The sale was also a Government business. The result was that the price of Soudan cotton in the Liverpool market stood very high. Therefore there was justification for Government interference.

Plantain cultivation near Madras.

Sothuperumbedu is a village some 12 miles N. W. ofMadras. The cultivation of Plantain is a special feature of this village, a large area being under it every year. The cultivation of plantain in this or in the surrounding villages is said to have been unknown some 20 years back and the first introduction of systematic cultivation appears to have been made by Messrs. T. R. Tawker & Sons of Madras into the adjacent village Surapet, and thence copied into Sothuperumbedu; it has since made good progress and the cultivation is now done in a very careful manner. Most of the lands in this village depend upon lift irrigation, from wells or the tank channel and the present confinement of plantain cultivation mostly to this village is perhaps largely due to its immunity from water logging, which during the heavy north-east monsoon is inevitable in the neighbouring villages.