EXPERIMENTS ON THE COMPOSTING OF SUGARCANE TRASH.

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The Indore method was originally designed to convert into compost mixed residues from crops and habitation wastes, a process which presented little difficulty as long as the materials used were such mixtures. Greater difficulty was experienced, however, when the attempt was made to apply this process to single materials, such as the by-products of plantation crops, e.g., sugarcane trash and cotton stalks.

In a paper by Tambe and Wad on "Humus Manufactured from Cane Trash," reproduced in the "S.A. Sugar Journal" in March, 1937, the authors record that using cane trash alone, the standard technique—i.e., composting by means of dung, slurry (urine-earth, wood ash and dung), urine-earth and Adco—failed to give results. They noted, however, that cane trash in small quantities in mixed residues decomposed readily, and also that if molasses were added to an old but undecomposed heap, the trash crumbled and produced good compost; the addition of molasses to fresh trash, however, left the latter largely unaffected.

The conclusions the authors came to were that cane trash must be kept in contact with an actively fermenting mass until it became capable of carrying on the decomposition by itself, a condition which they finally achieved by making heaps of alternating layers of green material (grass, weeds or leaves) and cane trash.

The heaps were turned four or five times, and to some of them fresh green stuff was added at each turn, while in others no more such material was added at the turns; the latter, they found, decomposed to a greater degree of fineness. These authors found that by this means, compost could be made in 140 days or earlier, with intermittent rainfall. It should be noted from their time-table of operations, however, given in the paper, that this rainfall amounted to 57 inches.

PRELIMINARY EXPERIMENTS AT THE EXPERIMENT STATION.

The first attempt to produce compost from cane trash here was made on a very small scale, and was intended merely to try the process, and to provide some material with which to make, when mixed with soil, a suitable seed-sowing medium for raising sugarcane from seed in tins in the glasshouse.

In this trial, layers of trash, about 4 inches deep, were alternated with layers of lawn grass clippings, and instead of a slurry, the heap watered with one per cent. molasses solution. The heap was periodically turned, and when crumbling began, sunn hemp was sown on the top, and turned in at the last turning. The heap rotted well, and was allowed to decompose till it had the consistency of earth, a stage of decomposition which is usually considered too far gone for field application, but which was wanted for the purpose in view. This took five months to accomplish, at which time it had the following analysis, supplied by Dr. E. R. Orchard of the Division of Chemical Services, who was interested at the time in compost manufacture:—

Analysis of Air-dry Material.

Moisture	5.60 per cent.
Loss on ignition	37.40 per cent.
Available P_2O_5	0.16 per cent.
Available K_2O	0.05 per cent.
Total nitrogen	1.30 per cent.

Dr. Orchard stated that "the analysis reveals a compost rich in nitrogen and with a high organic matter content, but, like most composts not treated with phosphate, the P_2O_5 content is very low. The K_2O content is also lower than is usually the case."

A similar heap was later made with bagasse, which, although it appeared more resistant to decomposition and took longer, eventually rotted to a fine state of decomposition.

It was realised, of course, that the making of compost in such small heaps bore no resemblance to field practice.

Although the fact was demonstrated that a mixture of cane trash and greenstuff could be rotted down to a finely decomposed product, the cost of doing so could not be evaluated, an item which would largely determine the value of the process to the planter.

Accordingly a series of experiments was carried out on a much larger scale, involving the handling of some tons of trash, which it was felt would provide data from which an estimate of the cost of production could be derived.

In carrying out these experiments the attempt was made to put into them as little labour as possible, provided that the end was being achieved, i.e., the heaps were decomposing. It was realised that quicker results could probably be obtained if more work, in the way of turning the heaps, was performed, and also that if the rainfall was deficient the addition of water would hasten the process; these items, however, would all increase the cost. Moreover, it is questionable if speed is of vital importance, as probably in actual practice the compost derived from the trash from this year's crop would not in the bulk of cases be required till next season's planting.

In making the heaps, also, variations of the constituent materials were tried, principally to see if the addition of extraneous green matter was essential, or could be replaced by other materials, e.g., by filter cake. Weights were kept of all the materials used, and chemical analyses were also carried out on them both before use, and when the compost was ready, in order to determine the changes in plant-food occurring during the process.

FIRST SERIES.

The first series, consisting of eight heaps, were started on the 7th May, 1940. These heaps were made on a field close to that in which the trash was lying, and were made immediately the cane was cut. (In a second series the trash was used after it had been lying on the ground for some time.)

The heaps were built about 8 feet broad, 3 to 4 feet high, and as long as the material allowed (the amount of material was largely determined by the amount of trash available from one day's cutting; as this was from a number of small experimental plots, all the cane of which had to be individually weighed, the amount of trash was considerably smaller than would be produced on a day's cutting of commercial cane.) The trash was laid in layers 4 to 6 inches deep, alternating with layers of greenstuff (where used) about 2 inches deep. After each two layers were laid down the material was watered, in some heaps with 1 per cent. molasses, in others with 10 per cent. molasses.

The watering presented some difficulty and is a factor which would have to be contended with wherever compost is being made in the field, especially during seasons or years of deficient rainfall, unless the planter is in the fortunate position of having a supply at hand.

In this case the water had to be carted from the laboratory; it was applied at the start with bucket pumps, in an attempt to soak the material as thoroughly as possible. This method, however, was found too slow and ineffectual, and was discontinued in favour of watering cans, or even open tins.

In building the heaps the centres were kept lower than the sides, to prevent the liquid running off; the bottom and the top layers were of trash.

It was soon discovered that the particular site chosen for these heaps was an unfortunate one, however, in that it was too exopsed to wind, which caused too great a drying-out of the material, and also that it prevented the rise in temperature which should accompany the decomposition process. The heaps barely heated during a great part of the time they were lying in the field, and only after the trash had weathered very slowly did the breaking-down begin.

The heaps were first turned after six weeks. After three months very little change was noticed in most of the heaps, and it was decided to see whether a further watering, with the provision of some means of retaining moisture, would hasten

the process. For this purpose a portion of about one-third of each heap was cut off, turned, watered (with water alone), and had earth thrown over it. It was realised that this would upset our final weights from the experimental point of view, but it was hoped this would be compensated for by any additional information gained of an observational character. Very soon a difference between these portions of the heaps with this treatment and the remainder of the heaps was noticed, in that decomposition was proceeding more quickly, in some cases markedly so. After another three months, however, the process appeared to have stopped, and all the heaps received another turning (after a soaking with rain), so that in each heap one portion had three turnings, and one only two turnings.

There was considerable difference in the manner in which the heaps rotted, the first ones being ready by the beginning of January, 1941. At this stage all the heaps were weighed, compared and analysed.

The length of time taken to decompose may be attributed to the fact that fresh trash was used, that the heaps were built during the cooler months, and largely to the drying-out which took place. The fact nevertheless remains that compost was made in some cases with only two turnings, and with no additional artificial watering after the first when the heap was made.

The following are the details of the different heaps made :—

Heap No. 1.

If it is necessary to have the material to be decomposed, i.e., trash, in contact with green material, the question occurred, would the green tops of the crop be sufficient in quantity and of the right nature to effect this process ? This heap therefore consisted merely of trash and fresh tops, watered with 1 per cent. molasses. The quantities were :—

5,243 lbs. trash of 61.6 per cent. dry matter	=	3,288 lbs. dry matter.
3,136 lbs. tops of 27.7 per cent. dry matter	=	874 lbs. dry matter.
1.7 galls. of molasses of 80 per cent. dry matter	=	19 lbs.dry matter.
170 gallons of water		—
		4,121 lbs. dry matter.

Decomposition here was practically nil. The tops simply dried without fermenting, and when the heaps were finally weighed this one was dry and of almost the same consistency as when made. The portion split off and covered was, however, moist and more decomposed.

The following are the percentage analyses of the material :—

	Analysis on dry basis.		
Raw Materials.	N.	K_2O.	P_2O_5.
Tops and trash	0.40	0.50	0.20
Molasses	0.35	4.63	0.03
In total dry matter	0.40	0.56	0.20
Compost...	0.62	0.67	0.19

The total dry matter in the heap when finished was 2,790 lbs.

It was clearly demonstrated, then, that under the conditions of this experiment, at any rate, the green tops of the cane itself were not effectual in promoting decomposition.

Heap No. 2.

In this heap velvet beans were added to the mixed cane tops and trash. The materials used were :—

5,285 lbs. tops and trash of 50.1 per cent. dry matter	=	2,647 lbs. dry matter.
1,370 lbs. velvet beans of 25.2 per cent. dry matter	=	345 lbs. dry matter.
1.4 gals. molasses of 80 per cent. dry matter	=	16 lbs. dry matter.
140 gals. water		—
		3,008 lbs. dry matter.

This heap rotted down well, and produced a compost ready for use at the time of weighing.

The percentage analyses are as follows :—

	Analysis on dry basis.		
Raw Materials.	N.	K_2O.	P_2O_5.
Tops and trash	0.46	0.57	0.21
Velvet beans	2.70	1.28	0.42
Molasses	0.35	4.63	0.03
In total dry matter	0.72	0.68	0.23
Compost...	0.90	0.49	0.31

The total dry matter in the compost was 2,234 lbs.

Heap No. 3.

Here the additional green matter was replaced by filter cake, supplied by Messrs. Natal Estates, Ltd.

The materials used were :—

5,807 lbs. tops and trash of 48.8 per cent. dry matter	=	2,831 lbs. dry matter.
2,455 lbs. filter cake of 51.4 per cent. dry matter	=	1,262 lbs. dry matter.
1.5 gals. molasses of 80 per cent. dry matter	=	17 lbs. dry matter.
150 gals. water		—
		4,110 lbs. dry matter.

This heap rotted fairly well, but not so well as No. 2. It was barely ready for use when the latter was.

The percentage analyses were :—

	Analysis on dry basis.		
Raw Materials.	N.	K_2O.	P_2O_5.
Tops and trash	0.42	0.51	0.21
Filter cake	0.32	0.13	0.50
Molasses	0.35	4.63	0.03
In total dry matter	0.39	0.41	0.30
Compost...	0.70	0.40	0.31

The dry matter in the compost amounted to 2,620 lbs.

Heap No. 4.

In this heap sunn hemp was used in addition to the cane material. The quantities used were :—

5,289 lbs. tops and trash of 47.7 per cent. dry matter	=	2,523 lbs. dry matter.
1,090 lbs. sunn hemp of 29.9 per cent. dry matter	=	326 lbs. dry matter.
2.3 gals. molasses of 80 per cent. dry matter	=	26 lbs. dry matter.
230 gals. water		—
		2,875 lbs. dry matter.

In opening up this heap it was found that decomposition had not proceeded evenly throughout, and while in part rotting had been satisfactory and good compost made, in other parts the heap was dry and only slightly decomposed. It was felt that this was due probably to bad building of the heap, and not to the fault of the materials, as where rotting had proceeded it was as good as heap No. 2.

The percentage analyses are as follows :—

	Analysis on dry basis.		
Raw Materials.	N.	K_2O.	P_2O_5.
Tops and trash	0.48	0.62	0.22
Sunn hemp	2.42	1.48	0.48
Molasses	0.35	4.63	0.03
In total dry matter	0.70	0.76	0.25
Compost...	1.10	0.74	0.30

The dry matter in the compost was 2,251 lbs.

Heap No. 5.

Here, in addition to sunn hemp, molasses of 10 per cent. strength was used, and lime (burned lime) was also added. The quantities were :—

6,154 lbs. tops and trash of 48.1 per cent. dry matter	= 2,961	lbs. dry matter.
1,150 lbs. sunn hemp of 29.9 per cent. dry matter	= 344	lbs. dry matter.
940 lbs. lime of 66.7 per cent. dry matter	= 627	lbs. dry matter.
15 gals. molasses of 80 per cent. dry matter	= 168	lbs. dry matter.
150 gals. water	—	
	4,100	lbs. dry matter.

This heap was moist when opened up, but not very well rotted.

The percentage analyses were :—

Raw Materials.	Analysis on dry basis. N.	K_2O.	P_2O_5.
Tops and trash	0.41	0.60	0.21
Sunn hemp	2.42	1.48	0.48
Lime	—	—	—
Molasses...	0.35	4.63	0.03
In total dry matter	0.52	0.79	0.19
Compost...	0.79	0.90	0.29

The dry matter in the compost was 2,754 lbs.

Heap No. 6.

This heap had the same constituents as the last one, except that the lime was replaced by filter cake.

The composition was :—

4,491 lbs. tops and trash of 46.1 per cent. dry matter	= 2,072	lbs. dry matter.
2,000 lbs. filter cake of 56.4 per cent. dry matter	= 1,128	lbs. dry matter.
959 lbs. sunn hemp of 28.3 per cent. dry matter	= 271	lbs. dry matter.
14 gals. molasses of 80 per cent. dry matter	= 157	lbs. dry matter.
140 gals. water	—	
	3,628	

This heap decomposed better than any other, producing a good friable compost ready for use at the time of weighing.

The percentage analyses were :—

Raw Materials.	Analysis on dry basis. N.	K_2O.	P_2O_5.
Tops and trash	0.46	0.55	0.22
Filter cake	0.32	0.13	0.50
Sunn hemp	2.42	1.48	0.48
Molasses	0.35	4.63	0.03
In total dry matter	0.56	0.72	0.32
Compost...	0.56	0.56	0.34

The total dry matter in the compost was 2,512 lbs.

Heap No. 7.

Here the heap was made of cane material and sunn hemp, but instead of watering with molasses, a slurry of cowdung, soil and wood ashes was used. The quantities were :—

3,185 lbs. tops and trash of 48.7 per cent. dry matter	= 1,552	lbs. dry matter.
520 lbs. sunn hemp of 28.3 per cent. dry matter	= 147	lbs. dry matter.
25 lbs. soil, 20 lbs. wood ash, 36 lbs. cowdung } not analysed, say about	= 50	lbs. dry matter.
	1,749	lbs. dry matter.

This heap, when opened, was fairly moist, and decomposition was proceeding; it was not, however, nearly so well broken down as some of the heaps.

The percentage analyses were as follows :—

Raw Materials.	Analysis on dry basis. N.	K_2O.	P_2O_5.
Tops and trash	0.53	0.63	0.22
Sunn hemp	2.42	1.48	0.48
In dry matter	0.69	0.70	0.24
Compost...	0.74	0.72	0.29

The dry matter in the compost was 1,647 lbs.

Heap No. 8.

This heap consisted of cane tops and trash, sunn hemp, and 1 per cent. molasses, but differed from the others in the method of building. With the object in view of spending less time in making the heap, the materials were dumped in broader layers and built higher, a boy standing on top to whom the others pitched up the material when the heap got too high to build from the ground.

The quantities used were :—

4,701 lbs. tops and trash of 50.8 per cent. dry matter	= 2,387	lbs. dry matter.
702 lbs. sunn hemp of 28.3 per cent. dry matter	= 199	lbs. dry matter.
8 gals. molasses	= 90	lbs. dry matter.
80 gals. water	—	
	2,676	lbs. dry matter.

On opening up this heap is was found to be very patchy inside. Decomposition had only proceeded in parts, and there were large parts which were dry and not rotted.

The percentage analyses were :—

Raw Materials.	Analysis on dry basis. N.	K_2O.	P_2O_5.
Tops and trash	0.44	0.71	0.21
Sunn hemp	2.42	1.48	0.48
Molasses	0.35	4.63	0.03
Total in dry matter	0.59	0.94	0.22
Compost...	0.59	0.72	0.16

The dry matter in the compost amounted to 2,325 lbs.

From these experiments, then, it was seen that the cane materials in themselves were insufficient to produce compost—at any rate, as quickly as when mixed with other materials. It may be that, if left long enough and kept watered, a compost might be produced, but the process would be slow.

The addition of extraneous fermentable material is desirable, e.g., filter cake or green material. It should be noted here that the filter cake used here was from the carbonatation process; that from the sulphitation process might have given different, perhaps better results. As far as green matter is concerned, either velvet beans or sunn hemp appeared equally effective; the latter, however, appeared more easily handled. The addition of filter cake as well as greenstuff produced the most decomposed compost, but as the heap without filter cake but with green matter was in a condition to use, it did not seem that the former was necessary.

On the whole, it was shown that compost could be made simply with cane trash and green matter, provided the proper conditions were supplied.

It should be noted, in examining the analyses given, that they are presented only on the percentage basis, of the dry material. The total weights of plant-food materials in the heaps before and after making are not given, as due to the addition of some soil to one portion of the heaps, the weights were altered. Examining the figures we did obtain, however, it was clear that in the process of making the compost a considerable loss in total plant-food had occurred; although, e.g., the percentage of N in many cases had increased, the total amount of this material had decreased.

SECOND SERIES.

From experience gained in the experiments just described, both in the making of the heaps and in the materials to use, it was decided to start a second series of experiments, to confirm these points and, further, to test the action of molasses; it will be recalled that in the last series all the heaps except one had molasses.

In this series, the intention was to make as simple a mixture as possible, such as could be made on a plantation. It was also intended to omit the addition of water after the first wetting when the heaps were made, and to leave the wetting to the rainfall.

Unfortunately, the rainfall that materialised was so much less than could be expected in normal seasons that water had to be applied. In doing so, however, the amount added was calculated to make up the deficit in rainfall between what had been received and the average for past years.

These heaps were built in February, with trash from a crop that had been cut about the same time as that which provided the trash for the first series; it had therefore lain on the field for some months, and having weathered considerably was much less resistant than the first trash used.

The heaps were built as in the first series, with a layer of trash about 6 inches deep alternating with a 2-inch layer of velvet beans. The latter were wilted for a day or more before using, as is now usually recommenced in the literature on compost making. In making these heaps, however, they were packed more firmly by having a boy on top tramping them down.

Only two heaps were made; one was watered with water alone, while the other had 1 per cent. molasses solution applied.

After the heaps were built, the two sides exposed to the prevailing wind were covered by having cane tops laid up against them, and the tops of the heaps were covered over with a layer of dry trash, in an attempt to prevent drying out. This proved quite effective, as the heaps remained moist and heated immediately. Daily records of the temperatures were kept and showed a considerable rise in temperature, followed by a decline. The heap without the molasses showed the highest temperature. At the end of a month the heaps were turned. At this point it was decided to see whether the further addition of velvet beans would appreciably affect the process; each heap was therefore split in two, and re-weighed, and to one-half of each heap the green matter was added. The heaps were also watered, as mentioned, although it was not intended to do so originally. The heaps were covered as before, and again a considerable rise in temperature was recorded. Higher temperatures were recorded by those with the extra green stuff, the highest being that which also had no molasses. After another six weeks the heaps were again turned, no water being added this time, and again after another month, when water was added. This was in May, after which they were left.

Decomposition was much better in this series than during the first, the quickest being in the heaps without molasses, and of these in the one with extra green material added. At the beginning of September, thirty weeks after making the heaps, they were weighed and analysed. At this date they were ready for use. The details are as follows:—

Heap 1.

The materials used were:—

2,880 lbs. trash of 74.6 per cent. dry matter	= 2,148	lbs. dry matter.
600 lbs. velvet beans of 24.2 per cent. dry matter	= 145	lbs. dry matter.
1.5 gals. molasses	= 17	lbs. dry matter.
150 gals. water	—	
	2,310	lbs. dry matter.

At the first turn, when divided into two, the materials used for each heap were:—

Heap 1A.

	Analysis on dry basis.					
	Per cent. N.	Per cent. K_2O.	Per cent. P_2O_5.	Lbs. N.	Lbs. K_2O.	Lbs. P_2O_5.
1,074 lbs. dry matter in trash	0.52	0.28	0.20	5.58	3.01	2.15
72.5 lbs. dry matter in velvet beans	2.89	1.73	0.51	2.10	1.25	0.37
8.5 lbs. dry matter in molasses	0.42	4.65	0.03	0.04	0.49	—
1,155 lbs. dry matter	0.67	0.41	0.22	7.72	4.75	2.52

Compost made.—1,936 lbs. compost were made of 46.9 per cent. dry matter = 908 lbs. dry matter.

	Per cent. N.	Per cent. K_2O.	Per cent. P_2O_5.	Lbs. N.	Lbs. K_2O.	Lbs. P_2O_5.
This contained	0.77	0.47	0.25	6.99	4.27	2.27

Heap 1B.—With extra velvet beans added.

	Analysis on dry basis.					
	Per cent. N.	Per cent. K_2O.	Per cent. P_2O_5.	Lbs. N.	Lbs. K_2O.	Lbs. P_2O_5.
1,074 lbs. dry matter in trash	0.52	0.28	0.20	5.58	3.01	2.15
72.5 lbs. dry matter in velvet beans	2.89	1.73	0.51	2.10	1.25	0.37
8.5 lbs. dry matter in molasses	0.42	4.65	0.03	0.04	0.49	—
75 lbs. dry matter in extra velvet beans	2.44	0.93	0.45	1.83	0.70	0.34
1,230 lbs. in dry matter	0.78	0.44	0.23	9.55	5.45	2.86

Compost made.—1,697 lbs. compost was made of 44.8 per cent. dry matter = 760 lbs. dry matter.

	Per cent. N.	Per cent. K_2O.	Per cent. P_2O_5.	Lbs. N.	Lbs. K_2O.	Lbs. P_2O_5.
This contained	0.92	0.58	0.27	6.99	4.41	2.05

Heap 2.

The materials used were:—

2,880 lbs. trash of 74.6 per cent. dry matter	= 2,148	lbs. dry matter.
600 lbs. velvet beans of 24.2 per cent. dry matter	= 145	lbs. dry matter.
150 gals. water	—	
	2,293	lbs. dry matter.

At the first turn, when dividing, the materials used in making were:—

Heap 2A.

	Analysis on dry basis.					
	Per cent. N.	Per cent. K_2O.	Per cent. P_2O_5	Lbs. N.	Lbs. K_2O.	Lbs. P_2O_5.
1,074 lbs. trash	0.52	0.31	0.17	5.58	3.33	1.83
72.5 lbs. velvet beans	2.89	1.74	0.51	2.09	1.26	0.37
75 lbs. extra velvet beans	2.44	0.86	0.46	1.83	0.65	0.35
1,221.5 lbs. dry matter	0.77	0.43	0.21	9.50	5.24	2.55

Compost made.—1,727 lbs. compost were made of 47.1 per cent. dry matter = 813 lbs. dry matter.

	Per cent. N.	Per cent. K_2O.	Per cent. P_2O_5.	Lbs. N.	Lbs. K_2O.	Lbs. P_2O_5.
This contained	0.92	0.54	0.26	7.48	4.39	2.11

Heap 2B.

	Analysis on dry basis.					
	Per cent. N.	Per cent. K_2O.	Per cent. P_2O_5.	Lbs. N.	Lbs. K_2O.	Lbs. P_2O_5.
1,074 lbs. trash	0.52	0.31	0.17	5.58	3.33	1.83
725 lbs. velvet beans ...	2.89	1.74	0.51	2.09	1.26	0.37
1,146.5 lbs. dry matter	0.67	0.40	0.19	7.67	4.59	2.20

Compost made.—1,792 lbs. compost was made of 45.3 per cent. dry matter = 812 lbs. dry matter.

	Per cent. N.	Per cent. K_2O.	Per cent. P_2O_5.	Lbs. N.	Lbs. K_2O.	Lbs. P_2O_5
This contained	0.82	0.47	0.27	6.66	3.82	2.19

These heaps, then, made compost of nitrogen content varying from 0.7 per cent. to 0.9 per cent.; it will be noted, however, by examining the figures, that during the process of manufacture there has been a loss in total nitrogen. The highest nitrogen heaps, of course, were those with the two additions of velvet beans.

This series, then, showed that compost could be made from cane trash and green matter alone, provided they are kept damp; it seemed also that weathered trash was better than fresh trash. Another advantage of allowing the trash to lie for some time before using it in this case was, the fact that it had not decomposed so far before being used, as the compost made earlier. It is generally recognised that the material should be bulky, and not earthy, the latter condition being that now of the first-made heaps. After these latter had been analysed, they were all heaped together to lie till they could be used. At this stage, in September, the percentage analysis of this compost heap was:—

Dry matter.	Ash.	N.	K_2O.	P_2O_5.
60.1	83.0	0.40	0.34	0.19

Thus the compost from the second series was very much better.

COST OF MANUFACTURE.

Account was kept of the labour used in collecting the trash, carting it to the site of the heaps by means of a wagon and eight mules, building the heaps, cutting the green matter, carting it and other materials, and turning the heaps. This worked out at about 6/6 per ton of compost when ready to use. On a plantation scale this would probably be reduced somewhat. It should be pointed out here that the longer the compost lies after it is ready for use, however, the lighter it gets, and therefor the cost per ton increases—another point in favour of not making the material too early.

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CONCLUSION.

The conclusions one would draw, then, from all these experiments are, that it is possible to decompose cane trash, and at the same time utilize other by-products, e.g., filter cake; but compost can also be made with trash and green stuff alone. For use in September, as in this case, the best compost was that made in February from old trash. On a farm scale this might involve collecting trash from the field into heaps till it is required for making the compost heaps, or till green stuff was available. It is doubtful if, without a good deal of expense, trash from one crop could be converted into compost for use in the same season's planting.

Finally, whether the whole procedure of making compost is economically sound is a debatable point; it would require further experimentation to determine whether, for example, any advantage is gained by collecting the trash off the ground, mixing it with green stuff, and after spending 6/6 per ton for labour on it, putting it back again, compared with ploughing-in the trash and sowing the green stuff to be ploughed-in later on. There might be some justification for the process, however, if the compost is made from trash from good fields and put back into the poorer ones, or into poor spots in the same field, although even this does appear somewhat like robbing Peter to pay Paul.

SUMMARY.

Experiments are described in which sugarcane trash was decomposed into compost by means of the addition of green material, either as velvet beans or sunn hemp, with or without the addition of filter cake, or molasses.

It was found that trash and green material alone made a good compost, when built into heaps consisting of alternate layers of the two materials, and kept damp.

It was found that decomposition was greatly facilitated when the heaps were provided with shelter against wind, and when trash which had been lying in the field for some time was used.

It was also found that if the compost is left too long in the heap once it had been made, it breaks down to a material of the consistency of earth, with a loss of organic matter, and a resulting increase in the cost per ton by the time it is used.

The labour costs of making the compost amounted to about 6/6 per ton.

Chemical analyses are given of the materials used, and of the resulting composts. These show that while there may be an increase in the percentage of the various plant-foods resulting from the process, there is a loss in the total plant-food.

These investigations were carried out by members of the botanical, agricultural and chemical staffs of the Experiment Station.