

'second ratoon' recorded the maximum per cent. volume pith and was statistically on par with plant crop. (3) Arrowed canes contained more pith than unarrowed canes in any variety and treatment.

Further investigations to determine the actual loss in tonnage due to formation of pith, when the crop is kept for long on the field, are in progress.

TABLE I  
Per cent. Volume of Pith to Total Volume of Cane

Varieties	Treatments
Co. 523 17.22	Second ratoon 10.58
Co. 527 10.74	Plant Crop 10.43
Co. 421 8.56	First ratoon 9.12
Co. 419 3.66	
Critical difference P = 0.05 1.37	Critical difference P = 0.05 1.19

TABLE II  
Percentage Volume of Pith in Arrowed and Unarrowed Canes

Variety	Plant crop.		First ratoon		Second ratoon	
	Arrowed canes.	Unarrowed canes.	Arrowed canes	Unarrowed canes	Arrowed canes	Unarrowed canes
Co. 419	7.45	2.25	8.35	1.59	10.51	0.68
Co. 421	12.13	6.73	8.27	6.70	10.31	8.92
Co. 523	22.40	17.32	18.66	13.05	21.09	15.37
Co. 527	11.30	7.08	10.53	10.74	12.81	9.51

Agricultural Research Station,  
Anakapalle, M. LAKSHMIKANTHAM.  
September 23, 1946.

### CONCENTRATION OF GRAPHITES BY FROTH FLOTATION

THERE are two types of impurities met with in graphite. One is the inherent ash which is present probably in molecular association with the carbon and is almost impossible to dislodge and concentrate the ore by any device. But the more frequent impurity which brings down the assay value of the sample is the extraneous mineral matter in fine grains which can be removed by physico-chemical methods such as flotation.

Venkateswarlu<sup>1</sup> tried bulk oil flotation on some Indian graphites. Except for this, in the available literature no systematic examination appears to have been carried out on Indian graphites. The Bureau of Mines, U.S.A.,<sup>2</sup> has worked out flotation processes for the concentration of very low grade oxidised and unoxidised graphite ores from Alabama, New York, assaying 5-10 per cent. graphitic carbon. Enrichment to 90 per cent. carbon with 70-80 per cent. recovery has been shown to be possible.

A considerable quantity of unoxidised graphite ore is mined in some localities in West Godavary District and in the contiguous parts of the Nizam's Dominions. The better grades are exported and the inferior ones used for making crude graphite crucibles at Rajahmundry. In one plant some concentration is achieved in water tanks by sedimentation of the impurities. A good part of the graphite mined which assays less than 55 per cent. carbon, is at present being discarded. This loss obviously is preventable.

The general principles of flotation are well understood in the graphite industry but successful commercial exploitation requires a detailed study of the local factors such as particle size, and pH of the natural pulp, conditioning required, the chemical composition of the mineral matter and the method of flotation to be employed.

For this preliminary investigation samples of graphites from the Godavary and Vizagapatam districts have been employed. A single stage froth flotation using pine oil was carried out in an apparatus designed for the purpose and constructed out of material commonly available in the laboratory.

The apparatus consists of a sintered glass funnel, the stem of which is passed through that of a large-sized ordinary funnel and fixed by means of a cork. The outer funnel serves to collect the overflowing froth. Air from a compressor is fed into the sintered funnel through an orifice-meter and constancy of flow is assured by means of a cock in the line. The air is well distributed in the system.

The ground ore (30 gm.) passing through 50-mesh was pulped with water (150 c.c.) and treated with pine oil (0.2 c.c.). The pulp was placed on the sintered bed and aeration started. The frothing was complete in about 12 minutes. The froth and the gangue were separately filtered, dried and weighed. Carbon percentages were determined on the crude as well as the froth and gangue by the wet oxidation method.<sup>3</sup> The results are recorded below:—

District	Sample No.	Carbon %			Recovery %
		crude	froth	gangue	
West Godavary	1	69.1	80.4	42.6	70.1
	2	26.4	58.2	18.1	20.7
	3	17.6	52.6	12.1	13.6
East Godavary	4	41.3	74.2	28.0	28.8
	5	32.1	64.1	26.9	14.0
Vizagapatam	6	14.2	36.3	9.8	16.6

It is clear that in all cases appreciable enrichment occurs even with an unconditioned coarse pulp in a single stage froth flotation in a simple apparatus. The results are encouraging as regards enrichment, but except in one case the recoveries are poor. Further investigation is necessary and is being taken up.