

All relevant data such as the number of convolutions, the distance travelled, and the time required are thus obtained at one stroke.

Increase in the quantity of air let out through the generating tube brings out generally a number of vortex rings at once. By suitably controlling the conditions of flow only two rings would be obtained.

Fig. 2 shows two stages of the rings obtained on a film kept in continuous rotation.

It was observed that the two rings were essentially different in their origin. The first one started from the very end of the tube and travelled on, the number of convolutions increasing.

The second one, however, originated at a fixed distance (as far as could be ascertained visually) away from the tube. Its progress was not so rapid as that of the first.

To the knowledge of the authors the difference is striking and further work in this connection is in progress.

R. V. BARAVE.  
V. S. DUBHASHI.

Physics Department,  
Fergusson College,  
Poona,  
July 18, 1936.

<sup>1</sup> *Phil. Mag.* 1931, 11, 1057.

#### A New Method of Oximation.

HAQ, RAY AND TUFFAIL-MALKANA<sup>1</sup> showed that anthraquinone and histazarine dimethyl ether readily gave oximes in pyridine solution. Later on, Cook, Hewett and Lawrence<sup>2</sup> prepared the oxime of *trans*-hexahydroanthrone by following an identical procedure but made no reference to the earlier work. They, however, gave publicity to the usefulness of this method of oximation in difficult cases. This method is particularly suitable for the preparation of those oximes which are formed with great difficulty.

It has now been found that flavone and  $\alpha$ -naphthylflavone react with hydroxylamine in aqueous pyridine solution under the following conditions:

A mixture of flavone (0.1 g.), hydroxylamine hydrochloride (0.15 g.) in water (0.5 c.c.), pyridine (1 c.c.) was refluxed on a sand-bath for 4 hrs. and then poured into dilute acetic acid when cold. The precipitated solids

crystallised from hot dilute acetone in colourless needles, m.p. 237°. Yield quantitative. Found: N, 5.95;  $C_{15}H_{11}O_2N$  requires N, 6.19%. Similarly,  $\alpha$ -naphthylflavone gave the substance  $C_{19}H_{13}O_2N$  (colourless needles, m.p. 181° after crystallisation from hot dilute acetone) on similar treatment. Found: N, 4.85;  $C_{19}H_{13}O_2N$  requires N, 4.8%.

The structure of these substances are under investigation but presumably they are true oximes.

K. C. GULATI.  
J. N. RAY.

The University,  
Lahore,  
July 15, 1936.

<sup>1</sup> *J.C.S.*, 1934, 1328.

<sup>2</sup> *J.C.S.*, 1936, 79.

#### Nutritive Value of Parboiled Rice.

IN recent years, considerable amount of attention has been drawn to the high nutritive value of parboiled rice. Evidence has been adduced to show that during the process of parboiling vitamin B<sub>1</sub> penetrates into the endosperm layers so that in spite of even high polishing, the anti-neuritic vitamin is not entirely lost.<sup>1-5</sup>

The basis of the general nutritive value of parboiled rice has so far remained rather obscure. The observations of McCarrison and Norris,<sup>6</sup> Joachim and Kandiah,<sup>7</sup> Codd and Peterkin,<sup>5</sup> Basu and Sarkar<sup>8</sup> and others would indeed suggest that parboiled rice is not very different in composition from raw rice derived from the same variety. Recent studies by the present authors would show that parboiled rice polished to the same degree is generally slightly richer in both Nitrogen and Phosphorus than the corresponding specimens of raw rice.

This would not however entirely account for the superior nutritive value of parboiled rice to that of raw rice.

It is well known that irrespective of the variety chosen, parboiled rice is generally darker in colour than the corresponding raw rice. The colouring matter (which is derived in part from the husk) can be removed to some extent by polishing, but the final product rarely ever attains the desired degree of whiteness. In view of this and the fact that parboiled rice is generally consumed by the poorer classes of people,

it is milled to a less extent (about 5 per cent.) than raw rice (15-20 per cent.).

It may be seen from Table I, that between 5 and 15 per cent. of polishing, a large part of the nitrogen and phosphorus of the hulled rice are lost. As already explained, this portion is generally preserved in parboiled rice so that it becomes very much richer in these two valuable constituents than polished, raw rice of commerce.

TABLE I.

*Nitrogen and Phosphorus contents of Raw and Parboiled Rice Polished to Different Degrees.*

Raw Rice			Parboiled Rice		
Degree of polishing (per cent.)	Nitrogen as mg. per 100g.	Phosphorus as mg. per 100 g.	Degree of polishing (per cent.)	Nitrogen as mg. per 100g.	Phosphorus as mg. per 100 g.

*Variety Adt. 11.*

Unmilled	1114	160	Unmilled	1138	160
1.0	1103	154	2.0	1111	148
2.0	1092	147	3.8	1092	136
3.7	1061	134	5.3	1077	127
5.5	1038	122	6.6	1064	118
7.3	1015	109	8.1	1046	107
8.8	996	98	9.2	1030	98
10.8	973	85	11.4	1000	79
12.8	949	74	13.4	971	60
15.8	914	59	15.4	939	44
19.3	871	33	18.4	894	20
24.3	830	25	23.4	841	—

*Variety Co. 9.*

Unmilled	1239	366	Unmilled	1269	360
2.0	1227	334	2.5	1252	325
3.8	1214	300	4.0	1242	298
6.3	1194	251	7.0	1220	246
7.8	1180	221	9.2	1201	201
9.3	1164	193	10.7	1188	172
11.7	1139	151	12.7	1163	124
13.4	1121	124	14.5	1105	75
14.6	1107	107	15.7	1086	55
16.3	1089	85	16.7	1070	31
18.6	1060	73	19.2	1040	20
23.6	1038	—	23.2	1009	—

Parboiled rice is generally poorer in fat than raw rice polished to the same degree. This would account for the slightly better keeping quality of the former. During parboiling, the starch gets partly gelatinised

so that, on cooking, parboiled rice tends to stiffen more readily than raw rice. This would account for the better keeping quality of cooked parboiled rice, especially when stored under water.

Parboiled rice of commerce is generally prepared out of the so-called coarse or coloured varieties of rice as also those which tend to get readily broken on milling. (The milling quality of rice is greatly improved by parboiling). The recent observations of the authors would show that some of the coloured varieties (and coarser varieties in general) have thicker bran layers and contain very much more of nitrogen and phosphorus than the superior white varieties. This may also have some bearing on the high nutritive value of parboiled rice.

A. SREENIVASAN.  
H. P. DAS GUPTA.

Department of Biochemistry,  
Indian Institute of Science,  
Bangalore,  
July 7, 1936.

<sup>1</sup> Douglas, C. E., *Empire Marketing Board Report*, 1930, No. 32.

<sup>2</sup> Aykroyd, W. R., *Jour. Hygiene*, 1932, 32, 184.

<sup>3</sup> Ghosh, S., and Dutt, A., *Ind. Jour. Med. Res.*, 1933, 20, 863.

<sup>4</sup> Acton, H. W., Ghosh, S., and Dutt, A., *Ind. Jour. Med. Res.*, 1933, 21, 103.

<sup>5</sup> Codd, L. E. W., and Peterkin, E. M., *Brit. Guiana, Dept. of Agric., Rice Bulletin*, 1933, No. 1.

<sup>6</sup> McCarrison, R. and Norris, R. V., *Ind. Med. Res. Memoirs*, 1924, No. 2.

<sup>7</sup> Joachim, A. W. R., and Kandiah, S., *Trop. Agric. (Ceylon)*, 1928, 70, 2.

<sup>8</sup> Basu, K. P., and Sarkar, S. N., *Ind. Jour. Med. Res.*, 1935, 22, 745.

### Respiration of Ripening Tomatoes.

It has been accepted by plant physiologists that in the development of fruits the intensity of respiration as measured by CO<sub>2</sub> evolution supplies a general indication of the magnitude of metabolism. In fruits, it has been found that the ontogenetic metabolic drift from adolescence through maturity to death is represented in respiration by a curve which shows two high values separated in time: one is initial and represents a high rate of respiration in young fruits, the other occurring at the onset of senescence, known as the climacteric, is generally associated with the change in