INDUSTRIAL OUTLOOK.

A Method of Preparing Palmyra Jaggery for Refining.

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THE production of Jaggery in India is an age "old institution, a cottage industry" to be fostered and one which may rightly take its place in the internal economy of the country.

The sale of this commodity to factories for refining purposes is of increasing importance and it is in the interests of the producer and refiner alike that unnecessary loss should not occur during the interval between the purchase of the raw material and the manufacture of the finished white sugar.

Inversion of sucrose during this interval benefits neither producer nor manufacturer, yet the present system is to stock the raw material in godowns, more or less open to the elements, for a period of six to nine months to allow the mother liquor or runnings to drain from the crystals.

That such inversion does occur has been demonstrated, but the considerable loss involved has scarcely been appreciated.

In an attempt to determine the causes of deterioration, a series of experiments were initiated. These consisted in submitting samples of jaggery to pressure in desiccators containing (1) concentrated sulphuric acid, (2) 40% formaldehyde, (3) distilled water. Pressure was continued for a period of three months.

The result calculated on the basis of 100% solids are given below :—

	Original Jaggery	Jaggery pressed over H_2SO_4	Jaggery pressed over HCHO	Jaggery pressed over H_2O
Pol.	86·02	89·74	64·90	17·32
Invert sugar	2·74	1·77	1·25	16·03
Soluble ash	3·90	2·06	1·38	2·44
Insoluble matter	3·74	4·93	19·84	31·43
Other non-sugars	3·60	1·50	12·63	32·78
R.V.	63·78	77·67	56·75	— 10·91
Weight of original jaggery ..	354·80	354·8	354·8	354·8
Weight of final jaggery	..	334·1	97·6	31·4
Percentage of Solids removed ..	..	5·8	72·5	91·1

It is obvious from these results that if jaggery is pressed under perfectly dry conditions, it not only does not deteriorate during a period of several months, but by the elimination of the impurities in the mother liquor, the refining value of the raw material is increased considerably.

Since however it would be difficult to maintain these conditions on a commercial scale, the effects of pressure for a short period only were investigated.

A screw press of the type used in bagasse analysis, was employed and the jaggery was analysed after six hours continuous pressure. The results obtained may be summarised as follows :

(1) Over 11% of the original weight of jaggery was expressed as 'runnings'. This is a fair average figure for the quantity usually removed during storage for six months or more.

(2) 7·1% only of the original sucrose present in the jaggery was removed in the runnings.

(3) 54% of the invert. sugar passed out of the jaggery.

(4) 33·5% of the soluble ash was found in the runnings.

(5) The refining value of the jaggery calculated to 100% dry matter increased from 66·10% to 73·94%.

Finally, a jaggery pressed during a period of a few hours would be superior to that

ordinarily melted and thus would be considered an excellent raw material for the refinery.

The type of large-scale equipment required for this purpose is a hydraulic press with interleaves of metal between the cakes of jaggery. One press at each centre for the purchase of jaggery would deal with the material as it arrives, the treated jaggery being sent on to the refinery for immediate melting and the runnings being resold direct to the ryots.

ASTRONOMICAL NOTES.

Planets during January 1939.—Mercury is a morning star and will be at greatest elongation (22° 49′ W.) from the Sun on January 3. Venus will continue to be a bright object conspicuously visible in the eastern sky for nearly three hours before sunrise; the stellar magnitude will be about −4·2. On January 30, the planet reaches greatest elongation from the sun (46° 56′ W.). Mars is moving slowly eastwards in the constellation Libra and can be observed in the latter part of the night. On January 15, there will be a close conjunction of the planet, with the Moon the distance between them being only about one-third of a degree.

At sunset, Jupiter will be low down in the western sky, while Saturn will be visible as a first magnitude star slightly west of the meridian. The ring ellipse is beginning to widen, the angular dimensions of the major and minor axes being 39″·4 and 5″·9 respectively. Uranus will be on the meridian at about 7 p.m. and can be easily located, being only about a degree north of the fifth magnitude star σ Arietis; on January 22 it will be at one of the stationary points of the geocentric orbit. The moon will closely approach the planet on January 1, and again on January 29.

Jupiter's Satellites X and XI.—From observations secured at Mt. Wilson, Dr. Paul Herget has derived an orbit for J. XI (*U.A.I. Circ.* 730) which indicates that the satellite is moving round the primary in a retrograde direction. The eccentricity is 0·21 and the period 692·5 days. The elements of the orbit computed for J. X. agree very closely with those of the sixth and the seventh satellites of Jupiter. These newly discovered objects are extremely small bodies having probably diameters not exceeding 5 miles.

The Variable Star R Coronæ Borealis.—This is a peculiar variable star which is normally of constant brightness (6th magnitude) but occasionally becomes faint, abruptly dropping several magnitudes in brightness. After an interval which is never uniform, the star gets brighter and resumes its original brightness. On 1938 October 30, the star was observed to have declined to magnitude 9·4 and on November 2 to magnitude 10·5 (*U.A.I. Circular* 731). The last minimum occurred in December 1934 when the star's magnitude dropped to 10·4.

T. P. B.

ANNOUNCEMENT of the brightest stellar object ever discovered has been made by Dr. Fritz Zwicky, astrophysicist of the California Institute of Technology in association with Dr. Walter Baade of the Mount Wilson Observatory staff. This brilliant supernova, tentatively called *I.C. 4182*, was located by means of the 18-inch Schmidt Telescope at the Palomar Observatory. It is apparently of a luminosity about 400,000,000 times that of the sun.—*Sky*, 1938, **3**, 30.