

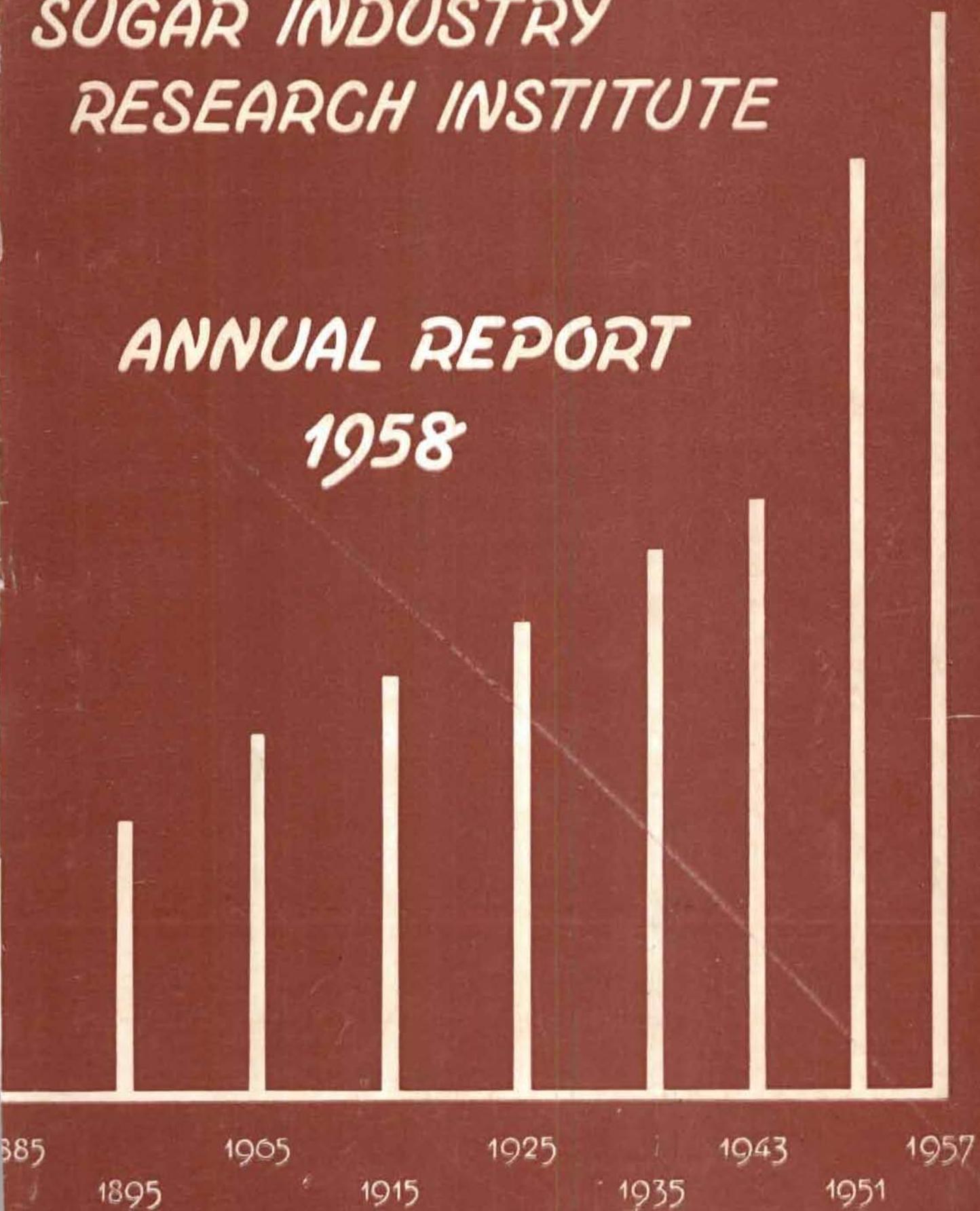
MAURITIUS

SUGAR INDUSTRY

RESEARCH INSTITUTE

ANNUAL REPORT

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C. Basalt Dust

The free soils of the super-humid zone of Mauritius have been formed as a result of intensive weathering of basalt. These soils fall into the humic ferruginous latosol group which is characterized by low nutrient status. As less weathered basalt derived soils are fertile, d'Hotman (1947) suggested that the application of massive dressings of crushed basalt to the mature soils would rejuvenate them and increase their fertility. Previous experimental results were available from Germany which showed that crushed basalt was beneficial to plant growth and d'Hotman assumed the effect to be nutritional.

Experiments were therefore laid down in which cane grown on plots receiving 36 tons of basalt powder per acre in the furrow at planting was compared with the control. The results showed that increases in cane yields obtained by the basalt treatment were of the order of 12% and that the improvement was almost permanent.

Foliar analyses showed that only calcium and silica uptake were increased by the basalt treatment, although it was still felt that the effects of the basalt were nutritional.

After these experiments a trial was laid down by the Sugar Research Station (1952), in which plots receiving 0, 90 and 180 tons of basalt per acre were compared. The plots were well supplied with phosphate, potash and nitrogen and therefore major fertility effects were eliminated. The results showed that the 90 ton treatment gave 10% yield increase whilst the 180 ton treatment gave almost a 20% increase and again it was shown that the improvement was long lasting.

Foliar analyses, as was to be expected showed no major nutritional effect and moreover the original observations on calcium uptake were not confirmed.

In 1955 a trial was laid down by the S.I.R.I at Rose Belle. Heavy fertilizer treatment was given to all plots and basalt was applied at the rates of 0, 45, 90 and 180 tons per acre. The results are given in table 31.

Table 31. Rose Belle (Cascade) Trial.
(Tons of cane/arpent).

Tons of crushed basalt applied at planting	0	45	90	180
Virgins	15.5	23.1	27.9	31.1
1st Ratoon	39.2	44.8	47.1	49.6
2nd Ratoon	32.7	36.9	37.9	36.5
Increase in 3 crops		+17.4	+25.5	+29.8

Foliar analyses again showed no difference in the uptake of major nutrients, and in addition, trace elements trials carried out on the same soil have given no response. The weight of the third leaf also remained unchanged, thus showing that the increase in yield was not due to better growth of individual canes, and therefore the number of canes, in other words the degree of tillering, must account for the difference in yields. Shoots counts confirmed that the heavy dressings of basalt give 10% more shoots than the control plots.

From the data obtained therefore, it is reasonable to suppose that the effect of basalt is of a physical nature allowing probably a better aeration of the roots and optimum conditions for the development of the stool.

It is somewhat ironical that the only yield increase due to a non-nutrient soil treatment on record in Mauritius should be with an inert inorganic material.

The conclusions made imply that the physical conditions of some of our latosols are not optimal for cane growth and the best method for correcting this fault must be considered.

Deep cultivation with the addition of heavy dressings of phosphate to counteract the subsoil dilution effect will almost certainly prove beneficial, in that the cultivation will provide the necessary soil conditions for optimum growth. Massive dressings of organic materials worked into the soil at the same time should help to stabilize the structure if this is inherently weak.

D. Lime and Sand.

The practice of applying large dressings, 5 tons or more per acre, of lime and sand on cane land has long since disappeared, nevertheless in view of the importance of calcium and magnesium as plant nutrients and the known effects of lime on structure, pH and on the availability of various heavy metal nutrients, studies on these materials continue.

The only positive effect on yield following lime application so far described locally, comes from the work of Feillafé (1954) in which a large yield response to small applications on the gravelly soils of the superhumid zone was obtained.

As has already been pointed out the effects of lime treatment are manifold and the reason for this response has not yet been elucidated.

Current practice of applying one ton of guano phosphate at planting is equivalent in terms of calcium to a lime application of half a ton, and it is unlikely therefore that calcium as a nutrient will ever be a limiting factor to cane growth in Mauritius, and moreover those soils which may have been low in calcium will now be amply supplied. In view of the low pHs of some of the soils of the super-humid zone and the continual use of sulphate of ammonia, small dressings of one to two tons of lime could reasonably be applied. The value of sand depends upon its fineness of grinding, and as local samples are coarse, it would be preferable to use lime rather than this material.

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2. DESCRIPTION OF THE PALMYRE IRRIGATION EXPERIMENT.

G. MAZERY.

The object of this experiment is to compare under dry conditions, spray irrigation with surface irrigation on gravelly and free soils from the agronomic and economic standpoints and to determine the relative merits of the 100% portable and semipermanent spraying systems.

Layout. The experiment comprises approximately 56 arpents of gravelly soil («*Mapou*»

series) and 65 arpents of free soils, («*Richelieu*» series). In each case half the area is irrigated by spray and half along the furrow by the surface method, as practiced in Mauritius. The layout of experimental fields is shown in fig. 38. For each method of irrigation comparable fields were selected concerning cane varieties and crop cycle. The experiment as originally planned will last for three years.

AREA UNDER SUGAR CANE

SUGAR PRODUCTION, 100,000 TONS

