



HUMAN CENTRIFUGE MACHINE—With which flight surgeons in an eastern laboratory will reproduce the acceleration conditions corresponding to all the known or desired flight maneuvers. With such test it will be possible to make certain that the speed and maneuverability of a new plane will not exceed a pilot's physical limitations. The boom will turn as rapidly as 54 revolutions a minute, and will be able to reach this speed in only five seconds from a standstill. It will decelerate in the same length of time, thus simulating even more than the severest operating conditions now encountered in a plane. Normal tests will average from 15 to 20 seconds running time, with lower values of acceleration, since a pilot would black out before reaching 54 r.p.m. in such a short space of time as five seconds. To simulate the effects of any particular air maneuver, a flight surgeon can mark a pattern of speed changes on a chart in a heavy, wavy line. A General Electric control device then transmits the speed changes to the driving motor. Electric drive for the centrifuge machine is made by General Electric.

AGRICULTURE

Crop Control for Sugar

Scientific system developed in Hawaii makes it possible to obtain 100% of theoretical yield. Index to fertilizer program in way plant absorbs energy available.

► HERE'S GOOD NEWS for those people who are concerned about the sugar shortage. Scientific control has been developed by Dr. Harry Clements of the Hawaii Agriculture Experiment Station, whereby plantings of sugar cane in any location may be consistently made to yield 100% of the theoretical.

In the beginning of the study a field experiment was set up to show the

relative importance of soil and climate. This experiment was unique since the type of climate in the two fields differed radically although they were only a few miles apart. The temperature of the areas was the same but one had a low rainfall and high sunlight intensity, while the other was a cloudy region with moderate rainfall. To make sure that the soil for the crops was identical, dirt from one was transported to the other. When cane was grown in the two soils under the same climate conditions, the yield was the same. Yet, when cane was grown in these two soils in their respective climates the one yielded 134 tons per acre of good quality cane while the other gave only 65 tons of medium quality.

"All attempts to correlate the differences in growth," says Dr. Clements, "with soil, nitrogen, phosphorus, and calcium levels in the plant were without success, but an almost perfect correlation (.999) was obtained when the physical factors of leaf area, crop density, and sunlight were considered."

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Thus it was evident that yield and quality are dependent, largely, on the atmospheric energy absorbed by the plant.

Since the amount of atmospheric energy varies from season to season and from year to year, it is clear that the growth and quality of the plants will also vary. It follows, then, that the index to the fertilizer program lies in the plant as it integrates the influences of the atmosphere.

A system of indices has been established for sugar cane which makes possible the continual adjustment of practices to requirements.

The primary index, the sugar content of the sheaths of certain young leaves, reflects the balance existing between the metabolism of the plant and energy available. When this index is normal (about 10% sugar, dry weight) the plant is growing at the desired rate for the particular climate. If the index rises, the plant is building carbohydrates at a faster rate than it is using them, that is, it could be growing faster than it is. If the index falls below normal, the plant is growing faster than it should and hence quality suffers.

Whatever the primary index reveals is the key to program adjustments. If the index is abnormal, secondary indices for moisture, nitrogen, etc., are consulted for the cause, and correction in irrigation or fertilizer applications are made accordingly while the crop is still in the fields.

Using this program, much of the guess work in crop management is eliminated. Economically the program pays for itself many times over in savings of fertilizers and water, not to mention the high yields of good quality crops.

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● RADIO

Saturday, October 10, 1:30 p.m. EWT

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Ralph I. Lloyd, president of the American Academy of Ophthalmology and Otolaryngology, will tell of some important eye diseases, and describe interesting results being obtained in their treatment.

Tuesday, October 6, 7:30 p.m., EWT

Science Clubs of America programs over WRUL, Boston, on 6.04, 9.70 and 11.73 megacycles.

One in a series of regular periods over this short wave station to serve science clubs, particularly in the high schools, throughout the Americas. Have your science group listen in at this time.

Monday, October 5, 9:15 a.m., EWT

Science at Work, School of the Air of the Americas over the Columbia Broadcasting System, presented in cooperation with the National Education Association, Science Service, and Science Clubs of America.

"What is Science" is the opening program of this series.