SCIENCE:

A WEEKLY NEWSPAPER OF ALL THE ARTS AND SCIENCES

PUBLISHED BY

N. D. C. HODGES,

47 LAFAYETTE PLACE, NEW YORK.

SUBSCRIPTIONS.—United States and Canada.....$3.50 a year.
Great Britain and Europe..... 4.50 a year.

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Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full. so that answers will go direct to them. The "Exchange" column is likewise open.

SORGHUM AND SUGAR BEETS IN KANSAS.

THE Agricultural Experiment Station at Manhattan, Kan., has been engaged for three years in a series of investigations upon sorghum, the principal aims being: (a) the attempt to find better varieties of sorghum for producing sugar; (b) to improve well-known and approved sorts; (c) to secure both early and late maturing kinds of good quality, especially the former, in order to lengthen the working season.

Bulletin 16 of this station, for December, 1890, gives the results of this work for 1890, including comparative tests of a large number of varieties, with analysis of their juice; attempts to improve seed by selection, trials of fertilizers, and a study of smut in sorghum. The same station has also established a series of experiments in the comparative culture of sugar beets, the results of 1890 being given in the bulletin referred to. The season was unfavorable to both sorghum and sugar beets, on account of both heat and drought.

Following is the station's summary of the results obtained as to sorghum.

1. The season of 1890 was very unfavorable to sorghum, owing to deficient rainfall and intense heat during the early summer, followed by cool, wet weather, culminating in an unprecedented killing frost Sept. 13. This frost was so exceptional as to date, and so erratic in distribution, its limit bearing no relation to isotherms or latitude, that it gives no ground for the conclusion that it was too far north for successful sugar manufacture from sorghum. Notwithstanding this, the tables show that the standard varieties maintained a good, though lower, standard of excellence.

2. The selection of seed with a view to improvement of varieties was almost wholly prevented by the early frost. A comparison of the results obtained for three years in selection of specially good canes lends encouragement to the hope that the standard of sugar-content may be permanently raised by this means.

3. A comprehensive experiment to test the effect of fertilizers on sorghum has shown no marked results this year, as was to be expected in view of the conditions of growth. The experiment will be continued from year to year, the same fertilizers being applied to the same plat throughout.

4. In view of the occurrence of two varieties of smut in the plats this year, caution in the introduction of new varieties is urged, lest destructive contagious diseases be brought in at the same time.

5. Crossing of varieties deteriorates the crop, so far as the experiments have gone.

The results of the experiments with sugar beets are as follows.

1. The sugar beets grown do not appear to be of as good quality as those reported to have been produced in other parts of Kansas and in Nebraska. This may have been due to the unusually unfavorable climatic conditions of last summer, or to unsuitability of soil.

2. Analysis of individual beets indicated that maturity, more than size, determined the sugar-content of the beet. A brown epidermis accompanied high per cent of sugar. As far as the observations went, a high weight of leaves, as compared with the roots, was no evidence of high sugar-content, but rather the reverse.

THE MERCURIAL PRESSURE-GAUGE ON THE EIFFEL TOWER.

THE new mercurial pressure-gauge devised by M. Cailletet and erected at the Eiffel Tower is an instrument of much scientific interest. The only instruments by which high pressures in gases or liquids can be registered with accuracy are very long vertical pressure-gauges. A gauge of this type, more than three hundred feet in height, was set up by M. Cailletet some years ago, first on the side of a hill, and afterwards in an artesian well. Several scientific men imitated this method of gauging high pressures, but the difficulty of handling and experimenting upon an instrument under conditions so unfavorable, threw considerable doubt upon the accuracy of the results obtained. The Eiffel Tower afforded a unique opportunity for setting up a pressure-gauge 984 feet high, every part of which should be accessible and open to observation. Thanks to the liberality of M. Eiffel, says *Engineering*, the task of constructing and fixing an instrument on so gigantic a scale has actually been now accomplished.

With a gauge of this height pressure up to four hundred atmospheres can be obtained, but it is manifestly impossible to use the customary glass tube. Recourse has, therefore, been had to a tube of soft steel of about one-sixth of an inch internal diameter, connected at the bottom of the tower with a reservoir containing mercury. By pumping water into the reservoir, the mercury in the tube can be gradually raised to the top of the tower.

A difficulty, however, arose from the slanting position of the columns supporting the tower, which prevented the tube being vertical. From the base of the tower to the first platform, a height of about 197 feet, the tube was therefore placed against the inclined plane of one of the rails of the lift, an iron staircase running beside it. Between the first and second platforms, which are separated by about the same interval, the apparatus was fixed to one of the helicoidal staircases. As this staircase is divided into several sections, not in the same vertical plane, on account of the obliquity of the column, the tube is similarly divided, and bends as it passes from one staircase to the other, sufficient slope being allowed for the descent of the mercury when the pressure is reduced. From the second platform to the top the tube is arranged in the same way, following the two vertical staircases, and is thus easily accessible from top to bottom.

The steel tube being opaque, the level of the mercury cannot be directly read off. Cocks with conical screws, each communicating with vertical glass tubes, are arranged at equal distances, about every ten feet, parallel with and alongside the tube. Each glass tube has a scale, carefully marked off on polished wood, which has been selected because it is very slightly affected by changes of temperature. It is adjusted by a rubber band to the metal framing, and leather rings compressed by a screw keep the cock tight. When one of the cocks is opened the interior of the steel tube is placed in communication with the corresponding glass tube. As the mercury rises in the steel tube, it penetrates into and acquires the same level in the glass tube alongside.

From the bottom of the tower to the first platform, the steel tube, as already mentioned, is in an inclined position, and the series of glass tubes placed vertically across it. These sections of glass tube are about ten feet long, each furnished with its scale and the cock communicating with the main steel tube; thus the pressure in any given glass tube is limited to its length of ten feet. The scales are marked in metres and centimetres, so that the head