The use of the shapometer is illustrated best by a study of Fig. 1 in which a pebble is shown in one of the three principal positions. The graduations on the scale are in millimeters. The following table shows the nature of the readings.

The junior writer has found that a smaller shapometer with a range of 75 mm instead of 150 mm is advantageous for measuring particles below 40 mm. The greater ease of handling the smaller instrument insures more accurate and rapid results.

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APPARATUS TO CIRCULATE LIQUID UNDER CONSTANT PRESSURE IN A CLOSED SYSTEM

THIS apparatus is designed to circulate a liquid and to maintain a constant pressure in a sterile system, without the use of joints or moving parts in contact with the circulating liquid.

The apparatus is a single piece of glass. Pressure is maintained by the head of liquid and the liquid is raised and kept in circulation by placing the apparatus on a tilted base which is given a circular motion without being permitted to rotate. This motion carries the liquid up the coil and into the top reservoir. Gases can be introduced through the tube half way up the coil, and an internal pressure can be maintained, if desired, by the displacement of water or other fluid by the exhaust gases.

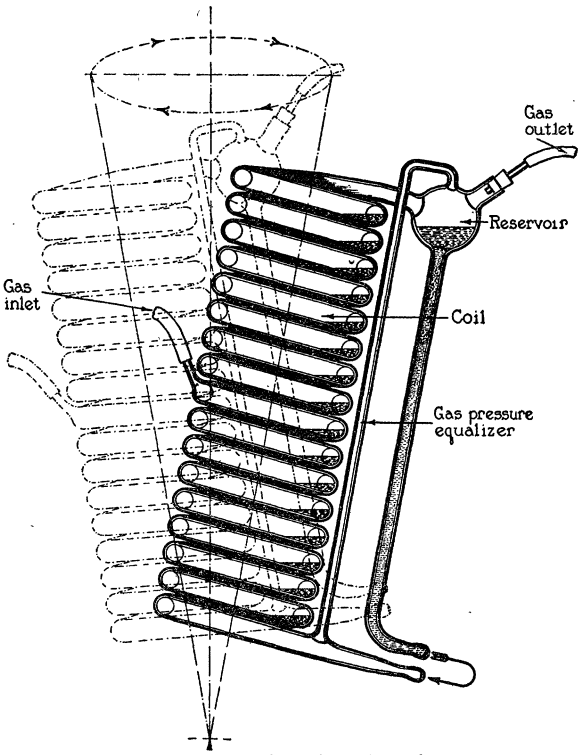

Diagram to show basic principles of apparatus.

DIVISION OF EXPERIMENTAL SURGERY,
ROCKEFELLER INSTITUTE
FOR MEDICAL RESEARCH

SPECIAL ARTICLES

GROWTH OF PLANTS UNDER CONTINUOUS LIGHT

STUDIES carried on by the writer since 1926 with plants illuminated both day and night seem of sufficient interest to report upon briefly at this time. Others who have tried somewhat similar although not exactly the same experiments[1] seem not to have secured just the results which have been so apparent in my work. Preliminary accounts of my studies were made at meetings of the Southwestern Division of the American Association for the Advancement of Science in Santa Fe, 1927, and in Flagstaff, 1928. The experiments are being continued, and a full account will be published at a later time.

Plants, chiefly annuals, have been grown in the greenhouse under natural light in the daytime and, in addition, during both day and night they have had the light of two 100-watt Mazda lamps suspended above the bench at a distance of four feet—the lamps provided with an overhead reflector. Controls, shielded from the artificial light, are growing in the same room of the greenhouse on the same bench at a distance of about ten feet. A total of nearly one hundred species have been worked with, some of them during two or more seasons if first results seemed doubtful. The list includes common garden vegetables, grains, weeds, native herbs and garden ornamentals.

In general, the experimental plants are taller than the controls at all times during the entire growth period, this increased height being due to elongation of internodes. Frequently the experimental plants are slender-stemmed and have a decumbent habit. Flowering is usually hastened under continuous light but in a few species is completely inhibited. Plants of some species reach full adult stature, come to blossom, and produce fruit and seed while the check plants are still in the rosette stage close to the ground.

The root system in plants of the experimental series is invariably less extensive than that of the controls; roots are smaller, shorter, and have fewer branches. Thickened taproots do not develop.

[1] J. Adams, *Amer. Jour. Bot.*, 12: 398, 1925. R. B. Harvey, *Bot. Gaz.*, 74: 447, 1922.