very convenient for daily measurements. However the weighing machine, which was originally designed for a quite different purpose, did not permit adequate "guarding" of the test plants, but by lowering it into the ground and increasing the cropped area of the house more valuable results were obtained.

ACKNOWLEDGEMENTS

The work described was carried out under the supervision of Mr. L. G. MORRIS. Mr. J. D. POSTLETHWAITE was responsible for the culture of the plants, and with Mr. R. I. EDWARDS assisted in taking the measurements. This paper is published by permission of the Director, National Institute of Agricultural Engineering, (Beds., England).

REFERENCES

PENMAN, H. L.: *Proc. Roy. Soc.* 193 A (1948) 120.
THORNTHWAITE, C. W.: *The Geogr. Rev.* 38 (1948) 55.
VRIES, D. A. DE and R. H. A. VAN DUIN: *Neth. J. Agr. Sci.* 1 (1953) 27.
WIJK, W. R. VAN, D. A. DE VRIES and R. H. A. VAN DUIN: *Neth. J. Agr. Sci.* 1 (1953) 53.
— —, — —: *Neth. J. Agr. Sci.* 2 (1954) 105.

DIE ÖSTERREICHISCHE LYSIMETERANLAGE

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Im Bundesversuchsinstitut für Kulturtechnik und Technische Bodenkunde in Petzenkirchen, Niederösterreich, ist seit einigen Jahren eine Lysimeteranlage in Betrieb. Ihre Merkmale sind:

1 1 m^2-flächige Kästen, 1,30 m tief, auf Böden in *natürlicher* Lagerung gefüllt. Die Füllung erfolgte ähnlich wie bei Stechzylindern, jedoch durch Überschieben eines vorbearbeiteten Bodenkörpers. Der Kastenboden wird mit Hilfsnuten unter Abschneiden des Bodenkörpers eingetrieben und verschweisst. An die im Boden befindlichen Schlitze werden zur Abfuhr des Sickerwassers mit groben Sand gefüllte Rinnen angeschweisst und der Kasten sodann in den vorbereiteten Schacht eingesetzt.

2 Die Kästen haben vorne einen mit Glas abgedeckten Schauschlitz, um den Boden beobachten zu können.

3 In 5 cm, 15 cm, 30 cm, 50 cm, 100 cm Tiefe sind Thermoelemente eingebaut, die täglich dreimal abgelesen werden.

4 In den gleichen Tiefen werden Feuchtemesser eingesetzt.

5 Um die im natürlichen Boden vorhandene Bodenfeuchte auch im Lysimeter zu erreichen, kann bei Feuchtigkeitsmangel durch eine über dem Kastenboden eingebaute Filterkerze Wasser auf kapillarem Wege von unten aus zugeführt werden.

6 Jeden Morgen 7^h früh werden die Kästen gewogen. Hierzu wird eine Waage auf einem Geleise über die Kästen geschoben und diese gewogen. Genauigkeit 0.1 mm Niederschlag.

7 Aus Differenz Niederschlag − (Abfluss + Bodengewicht [Speicherung]) wird die Verdunstung ermittelt.

8 Neben der Lysimeteranlage, die derzeit für 6 Kästen ausgebaut ist, aber jederzeit erweitert werden kann, werden im gewachsenen Boden in den gleichen Tiefen bereits jetzt die Temperaturen und später auch die Bodenfeuchten laufend registriert.

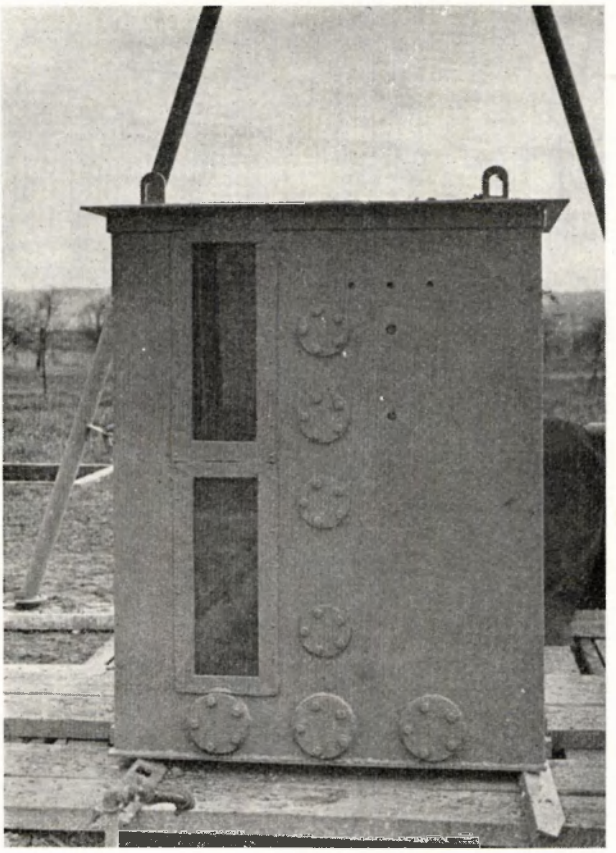

FIG. 1. LYSIMETER BOX.

Short description of the Austrian lysimetric installations

The research- and experimental activities regarding irrigation and drainage are based on the following equation of Hydrologic Cycle: precipitation (N) + Ne (fog) + external afflux (W_f) + T_o (superficial dew) + T_B (accretion from condensation-absorption of soil air) = A_o (surface runoff) + A_u (underground discharge) + V (evapotranspiration) + change in soil moisture ($F_\triangle$) [= initial soil moisture (F_A) – final soil moisture (F_E)] + S (uncontrolled percolation); all values are measured in mm of water-hight. In order to assess the meteorological values there are also built up – in addition to the Austrian experimental installations – agricultural meteorological stations. Two lysimeter installations serve for research purposes additionally, one of them by weighing lysimeters at the Federal Research Institute for Engineering Sciences and Soils at Petzenkirchen; the other one is a lysimetric installation for ground-water at Fussach near Bregenz, serving for the volumetric determination of evapo-

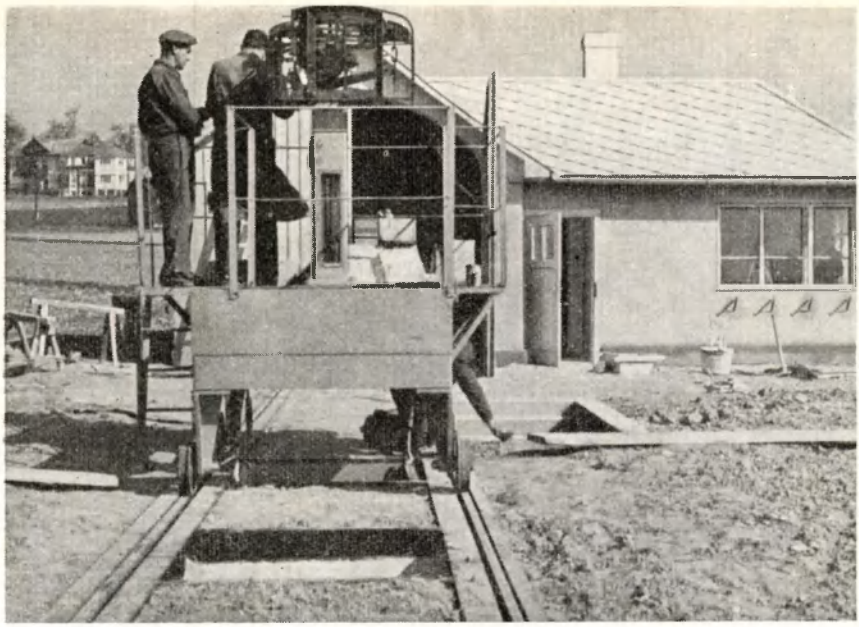

FIG. 2. VIEW OF MEASURING INSTALLATION OF THE LYSIMETER.

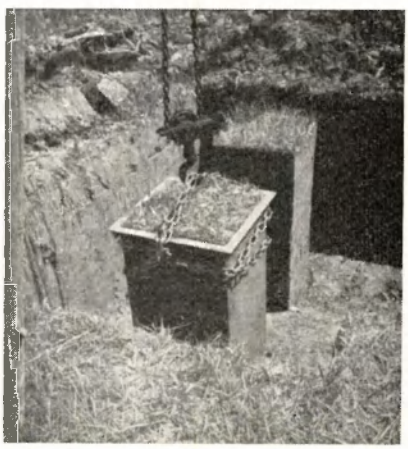

FIG. 3. GROUNDWATER LYSIMETER.

ration. The apparatus of Petzenkirchen consists presently of 6 lysimeters, which may become enlarged. The boxes (1 × 1 × 1.30 m) (Figure 1) contain soil-monoliths showing the natural structure and overgrown with grass. After the filling the bottom of the box with screwed grooves is brought up to the box itself with the help of lifting-jacks and — after having out off the monoliths — becomes welded on and subsequently the grooves are removed. Regarding removal of the seapage-water two channels, filled with rough sand, are screwed on to the two slots of 10 cm width each at the bottom and then the

box becomes inserted in the prepared manhole. The manholes are separated by doors from the observation-gallery. In order to control the soil as well with the eyes as with the microscope there is an observation-hole in front of the boxes. In a depth of 5, 15, 30, 50 and 100 cm electrical thermometers and devices are installed to measure the temperature and moisture respectively. A filter-device inserted in the upper-side of the lysimeter-bottom makes it possible to supply water by capillar means. The precision of the lysimetric scale is of 0,1 mm (Figure 2). In order to control the lysimetric values measurements and records of the temperature and the soil moisture are carried out at the same depht in the field near-by the lysimetric scale. *The ground-water lysimetric device* at Fussach (Figure 3) consists of boxes (0.5 × 0.5 × 1.30) filled with grass-grown monoliths; these boxes are then inserted in impermeable shafts of concrete. There one keeps ground-water levels of 30, 60, 90 and 120 cm below the surface. Every morning at seven o'clock the + or the − of the evaporation is measured in mm at the floating indicator with respect to a zero-line. The hygrometers to be inserted in future will possibly assess more correctly these values. The vigour of evaporation is measured by spherical evaporators after RAMSAUER at every meteorological station in a hight of 1 and 2 m above the ground (figure 4).

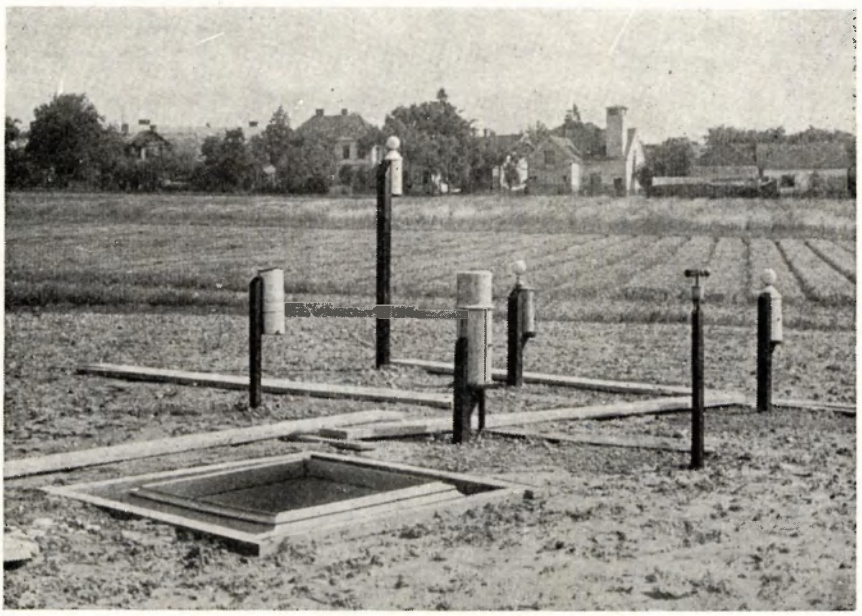

FIG. 4. SPHERICAL EVAPORATORS.