BRIEF REPORT

J. L. van Soest: Estimation of the age of a fairy circle (Lycopodium complanatum L. var. chamaecyparissus (A. Br.) Döll)

During a period of years I have measured the dimensions of the above mentioned fairy circle in the heath land of Doornspijk (Gelderland), where it is mainly accompanied by *Calluna vulgaris* (L.) Hull. As it does not deviate very much from the ideal shape of a circle, I can give, for the purpose of this paper, only the diameters, being in 1947: 6.0 m, in 1951: 7.0 m, in 1955: 8.1 m and in 1964: 11.25 m, all in mean value. The circle is closed, the vegetation at the margin is very rich, showing many hundreds of spikes, inside it is extremely poor.

The dynamic behaviour, with the diameter as a function of time, presents an exponential curve with surprising exactness, such that an extrapolation towards the year of coming into being seems to be possible, under the assumption that the process of development was statistically homogeneous.

The mathematical form is $D = D_0 \times 2^{at}$, in which D is the diameter in meters, D_0 the original diameter in the "beginning", supposed to be 0.1 m, t is the time in years ago to the moment of originating, a is a constant, to be calculated from the following measurements:

$$6.0 = 0.1 \times 2^{at_1} \tag{1}$$
$$7.0 = 0.1 \times 2^{a(t_1+4)} \tag{2}$$
$$8.1 = 0.1 \times 2^{a(t_1+8)} \tag{3}$$
$$11.25 = 0.1 \times 2^{a(t_1+17)} \tag{4}$$

in which t_1 means the time in years before 1947.

Divide (2) and (3) by (1) and use (4) as a check afterwards:
$$2^{4a} = {}^7/_6 \quad \text{and} \quad 2^{8a} = 8.1/6;$$
or:
$$2^{8a} = ({}^7/_6)^2 = 1.36 \quad \text{and} \quad 2^{8a} = 1.35,$$
which shows nice agreement; assuming as a mean value 1.355, one gets $a = 0.055$; by substitution into (1):
$$t_1 = 108 \text{ years.}$$

Checking this result by substituting t_1 into (4) one gets:
$$11.25 = 0.1 \times 2^{a(108+17)},$$
giving $a = 0.055$ in agreement with the value derived above.

The moment of originating of the fairy circle thus is $1947 - 108 = 1839$, a date that, of course, may be wrong for a few years.

The diameter, extrapolating towards future, thus can be given as:
$$D = 0.1 \times 2^{0.055 \, (T-1839)},$$
in which T is the date, in which D will be measured.

D will be doubled in a period of $1/0.055 =$ nearly 18 years.