

## Fairy Rings<sup>1</sup>

DR. H. L. SHANTZ

On many well-kept lawns and greens there occur circles or circular areas where the grass is of a different color or often more rapid in growth than on the remaining portions. These areas are known as fairy rings, the name originating in the belief that they marked the paths of dancing fairies.

“\* \* \* you demy-puppets, that  
By moon-shine do the green sour ringlets make,  
Whereof the ewe not bites; and you, whose pastime  
Is to make midnight-mushrooms—”

Although we now know the cause of these rings, we still retain the old name.

The early literature is filled with references to these circles. The supposed origin, dating from the days of superstition, is found in the names which are applied to them. In England they are known usually as *fairy rings*, *fairy circles*, or *fairy greens*, and were supposed to mark the paths of dancing fairies. To have these circles on a lawn was regarded as a good omen, for here the fairies danced at night. On the continent of Europe they received a greater variety of designations. In France, for example, the terms used were *anneaux magiques*, *circles magiques*, *circles du sabbath*, *circles des fées*, *circles de sorcières*, *danse de fées*, *ronds de fées*, and *ronds de sorcières*, signifying the dancing place of fairies, sorcerers, witches, or devils, as the case might be. Often people could not be induced to enter these circles, since to do so was sure to bring disaster, but if they were entered unknowingly at night it was not necessarily a bad omen. In these circles “huge toads with bulging eyes” were to be found.

In Germany they were known as *elfenringe*, *hexenringe*, *hexenplatz*, *hexentansplatz*, *hexenkreise*, *hexentanze*, and *zauberringe*. Here also they were associated with fairies, witches, devils, and dragons. The dead grass which often occurs on the inner side of the ring was regarded as evidence of the resting place of a red-hot dragon on some previous night.

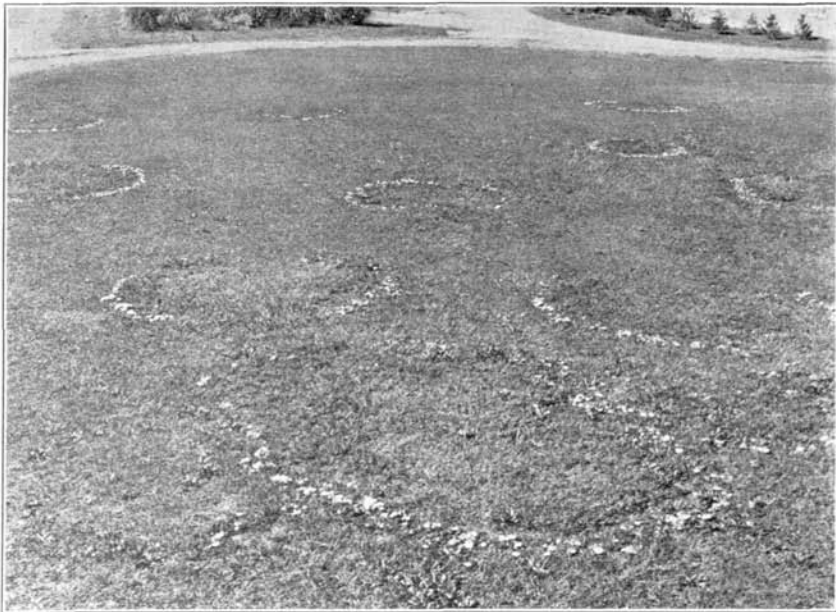
In Holland, where dairying is a prominent industry, an unusually large number of superstitions were supposed to explain the presence of these fairy rings. The terms here used were *heksenkringe*, *ko'ringe*, *tooverkringe*, *duivels karnpad*, *duivelstjeinpap*, and *tjenmolenpad*. It is not surprising that in a cattle country so many of their superstitions concerning fairy rings should also be connected with cattle and butter-making. Occasionally the cattle were the cause of them; but in most cases, while having nothing to do with causing the rings, they were often injured by them. The “fact” that the devil churned his butter there was in itself a bad omen, and for cattle to eat the taller, greener grass of these circles would surely ruin them as milk cows.

Following the period of pure superstition, which is still represented to a surprising extent, there came a period when the causes of these rings were honestly sought by scientific men. These studies began in England over two hundred years ago. Some of the investigators maintained

<sup>1</sup> For a more complete account of fairy rings see “Fungus Fairy Rings in Eastern Colorado and Their Effect on Vegetation,” by H. L. Shantz and R. L. Piemeisel, Journ. Agr. Research, vol. XI, No. 5, Washington, D. C., Oct. 29, 1917.



A small fairy ring, photographed by Ernest L. Crandall at Arlington, Virginia. An unusually large number of mushrooms are shown. Just inside the circle of mushrooms there is a zone of nearly bare ground.



A general view showing a large number of fairy rings, each marked by a circle of mushrooms. Photographed by Ernest L. Crandall, at Arlington, Virginia.

that they were caused by thunder and lightning, but when observed for a period of years were found to have a regular annual growth, and this seemed hard to explain on the basis of thunder. Ants "wrought the earth into such fineness that it became unusually favorable for the growth of vegetation and also that the hollowness of the ground afterwards produced a growth of mushrooms." Whirlwinds, haystacks, moles, and the urine of animals were assigned as causes. But gradually attention began to be centered on the mushrooms, and we now know that these are the cause of the fairy rings.

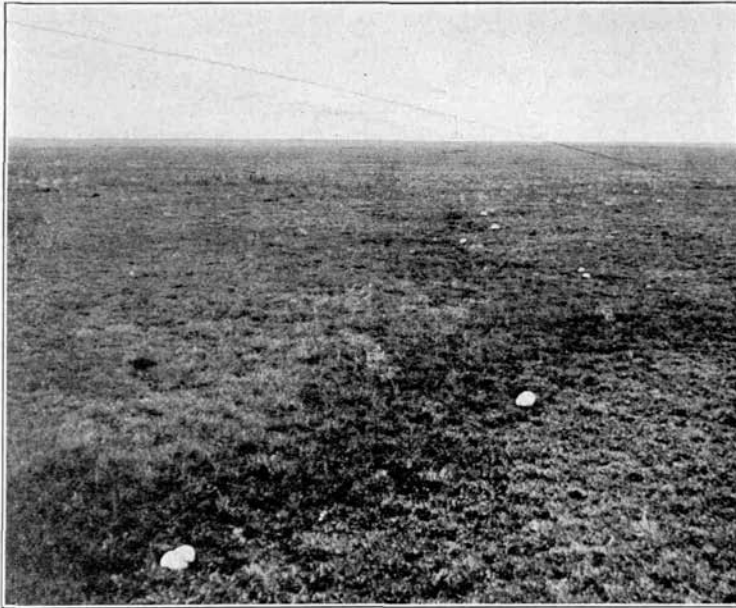
Many different kinds of mushrooms and other fleshy fungi cause fairy rings. They do not all cause the same type of ring. Some of them kill the grass, others stimulate it only slightly, while still others produce almost no visible effect upon the grass growth.

These fairy rings may be distinguished in many different ways. When the mushrooms are in fruit they are arranged in circles. At other times they may be distinguished by the appearance of the natural vegetation. The grasses in these circles are of a deep rich-green color, due to the higher chlorophyll content, and are also of more luxuriant growth. During the summer when hot dry spells occur this taller grass withers and often dies, leaving a zone of dead grass where the tall grass grew before. The following year a new zone of taller, greener grass will occur in advance of the dead grass, and in time grass again becomes established on the ground which was previously bare.

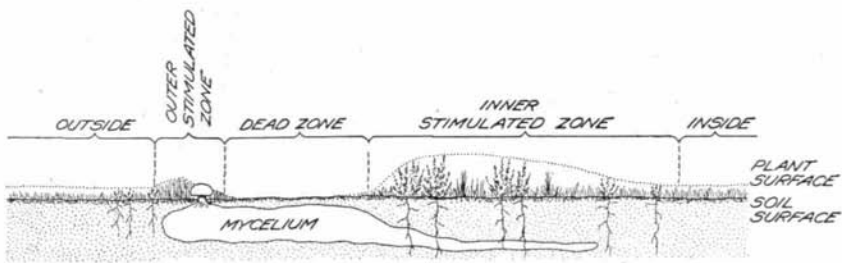
If we could see below the ground, the cause of these changes above ground would become apparent. A mushroom, as we know it in the market or as we pick it in the field, is only the fruit of the plant. When the spore of a mushroom germinates in the soil, it branches and ramifies in all directions. It consists of fine threads of growing material usually light in color and of delicate texture. These spread out only in the surface foot or two of soil. These filaments grow outward and never recede. The food on which this plant feeds is chiefly the decaying vegetable matter, which is consumed as the plant advances. This material, which furnishes the mushroom both nitrogenous and carbohydrate food, is at the same time broken down and much of it reduced to ammonia. This is taken up by bacteria and changed into nitrates, which are absorbed by the grasses. The mushroom is therefore instrumental in making available for the grasses nitrates which cause their rank green growth. This excessive growth in turn takes more water from the soil and makes it more susceptible to damage by drought.

The growth of the fungus fairy ring has been likened to the spread of a flame in dry grass. If a match is dropped in dry grass the flame spreads outward in all directions. In doing so it destroys the grass. Even if the grass could be restored rapidly a few inches behind, the flame would not strike back. We may think of the flame as representing the active mycelium which spreads outward and destroys the humus of the soil and the grass as representing the humus.

Year after year these circles become larger. At times they are intercepted and only fragments of the complete circle remain. These have a tendency to "heal over" and again become complete circles. On the high plains circles of unusual size occur. They may often be from 50 to 200 yards across. The age of these circles is estimated at from



Portion of a puffball ring over two hundred yards across and probably over four hundred years old. The grass just inside the ring of fruits is darker green than that outside. Photographed by H. L. Shantz, in Eastern Colorado.



Sketch of section through a fairy ring. This section shows the area of soil occupied by the mycelium of the mushroom. Near the left, at the outer edge of the ring the grass is stimulated. Just back of this is the dead zone, and back of this again is the re-established growth on the inside of the ring. It is stimulated by the material left by the decay of the mushroom mycelium. Jour. Agr. Research, v. XI, No. 5, 1917, Fig 4

250 to 450 years, and if some of the larger fragmentary circles are included there seems good reason to believe that they are over 600 years in age.

Fairy rings are detrimental on greens and lawns, and their eradication is a matter of considerable importance. They not only cause bare spots or patches, but irregular growth and unequal color. Since the value of a lawn is dependent largely upon the uniform appearance of the turf, the presence of even small areas influenced by fairy rings destroys the effect of the whole. Usually these dead areas are easily reseeded, but no permanent recovery can be secured in this way, since the mycelium moves on to new grass and the following year the appearance is as bad as before. The best method is to soak the ground thoroughly with sulphate of copper or Bordeaux mixture within the ring and a little beyond. This, if thoroughly done, will kill the fungus.

### **The Use of Arsenite of Soda in the Extermination of Chickweed**

C. E. WITMER, GREENVILLE (PA.) COUNTRY CLUB

Green committees have many trials and discouragements; and I want to say that THE BULLETIN is simplifying these troubles for us. We have confidence in the messages it brings, as they are actual experiences, not theories.

Not having a grass garden to resort to for inserts, we were up against the proposition of either entirely reconstructing a new green which had become infested with chickweed to the extent of about one-fourth, or else taking a chance on some radical method of exterminating the pest. On page 126 of the 1921 volume of THE BULLETIN we noticed Mr. Alan D. Wilson's article on the use of arsenite of soda for the purpose and decided to follow the procedure which Mr. Wilson recommended. We are glad to report that our experiment proved successful. Following Mr. Wilson's directions, we dissolved 1 pound of arsenite of soda (C. P.) in 10 gallons of water, and applied this over the entire surface of about 4,000 square feet with a spraying outfit costing \$8 and which the greenkeeper carried strapped to his back and operated by hand. The initial results seemed to be very disastrous, for after three days the entire green turned a dead brown color, and, to the skeptical, apparently the entire surface was destroyed. A close inspection, however, disclosed the fact that it was only the blades of the grass which were injured, and the roots were not destroyed. In ten days' time, and after two or three mowings, the grass returned to its original green color. The chickweed was dead, root and stock, and there has been no evidence of its return. We scarified the bare spots and reseeded them heavily, applying the usual spring top-dressing to the green from our mulch pile.

This application of arsenite of soda was made on April 15, and by May 26 the green looked better than ever before. The course was opened May 3, since which time the green which we thus treated has been in constant play, and there has been no variation in its putting surface, in contrast with the other greens, which nevertheless our fans say are fine. The expense of the treatment was negligible, as the arsenite of soda cost but 60 cents, and less than two hours' time was necessary for its application.