ical activities, combination with avidin, activity in stimulating the aspartic acid deaminase system, behavior on paper chromatograms as determined by bioautographic procedures, behavior toward commercial enzymes, and rates of hydrolysis.

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The Function of the Cups of *Polyporus conchifer*

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No special significance has been ascribed previously to the curious cup-shaped structure developed at the base of the fruit-body of *Polyporus conchifer* (Schw.) Fr. Growing upon dead branches of elm, the fungus is widely distributed in North America. As generally collected in the autumn, the fruit-body is small, white, grey, or pale-brown, thin-textured, and shelving. The fertile pileus is usually semicircular or kidney-shaped in outline and about 1 × 4 cm in size. The underside of the flat pileus bears a layer of pores within which basidia are developed.

At the base of the fruit body on the upper side is a small vaselike structure, 4–6 mm in diameter and 5 mm deep. This has generally been described as "sterile," and, as far as the present writer has been able to discover, only Lloyd (*1*) has ever commented upon the unusual nature of a polypore which produces cups in addition to the regular shelving pileus.

It appeared probable that the cups of *Polyporus conchifer* might serve to disperse some kind of reproductive structures and be similar to the splash cups of the Nidulariaceae, liverworts, and mosses to which attention has been drawn recently (*2*). Observations just completed have revealed that special spores are, in fact, disseminated by raindrops falling into the cups of *P. conchifer*.

Fruit-body formation begins during the late summer with the development of the cupulate portion. The cups always grow only on the upper sides of elm branches. In the autumn, the flat pore-bearing portion develops as an outgrowth from one side of the cup. The fungus discharges basidiospores throughout the autumn, but by spring the flat pileus has broken away from the cup entirely. The cups without their spore-bearing pilei are remarkably like those of *Crucibulum vulgare* Tul.

Cups examined from early February 1951 at intervals of 2 weeks until July were always empty, whatever material they had contained evidently having been dispersed. On August 10, large numbers of new cups were found in several stages of development. Some new cups grew from within the old, but most of them developed independently. Every new cup collected at this time contained small dark-brown granules of various sizes, mostly split off from the inside of the cup at the base of the youngest cups, but formed from the inner rim of older cups.

When a drop of water was placed in a fungus cup under the binocular microscope, the dark masses were seen to swell rapidly and almost instantly. One would judge that some hydrophilic colloid is present, because of the rapidity with which the dark masses absorb water. The contents of the cup became cloudy as absorption of water progressed, and when the cloudy drop was transferred to a slide and examined it was found to consist of a suspension of countless minute rod-shaped spores, 3 μ in diameter and 3–8 μ in length.

Transferred to a hanging drop of nutrient agar, the spores germinated in 24–36 hr at room temperature, and the germination percentage was very high. Very young germ tubes bore clamp connections, from which it seems likely that the spores are binucleate. Although the actual process of their formation has not yet been studied, their occurrence mostly in chains and their rod shape suggest that they are oidia.

By allowing small drops of water to fall 8 ft into fresh cups in the laboratory, oidia were observed to be splashed as much as 4 ft from the cups.

It is clear that the cups of *Polyporus conchifer* are special organs for the dissemination of oidia by rain. This occurs mostly before the shelf portion of the fruit body has formed and therefore before basidiospore discharge has begun. The reproductive period of the fungus is thus greatly extended: oidia are splashed from the cups in summer, and basidiospores are shed from the pilei in the autumn.

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Volatile Silica Affecting Plant Ash Analyses

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In a study on the mineral metabolism of plants, the following experiment was performed. Three g of the seed of a kind of turnip, *Brassica ceruna,* were spread on moist filter paper, 11 cm in diameter. The paper was supported in a moist chamber by 4 horizontal

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cotton threads. The seeds germinated on the paper, and after 2 weeks were placed in a covered crucible, dried, and then carbonized at 300° C. Finally, they were ashed in a muffle furnace at 750 ± 5° C for 5 hr. After weighing the total ash, the sample was again heated for 5 hr until the weight was constant. The seed samples were weighed in sets of four, 2 samples being used for the germination, and 2 kept dry, but all 4 were finally ashed at the same time. A new set was started every 2 days. Three series were run, using different lots of seeds. The results based on 3 g of seed are given in Table 1.

TABLE 1

		Seedling Ash		Seed Ash			
Series	No. determinations	Arithmetic mean (mg)	Standard error	Arithmetic mean (mg)	Standard error	Difference (mg)	Standard error of the difference
A	15	124.1	0.25	122.9	0.25	1.2	0.35
B	102	130.0	0.23	127.2	0.27	2.8	0.35
C	12	132.5	0.51	129.9	0.41	2.6	0.65

In all but 2 sets the ash from the seedlings was more than that of the seeds, the maximum difference being 4.7 mg. Suitable control determinations were made to insure that no inorganic substance could get onto the paper as dust, from the water, or in any other way. The cotton threads were extracted with hydrochloric acid and were practically ash-free. The filter paper itself contained 1.1 mg ash/sheet, but a few determinations made with ash-free paper (0.05 mg/sheet) gave the same result.

Further observations point to a volatile form of silica as the cause of the difference. When the tarry deposits which collected on the crucible covers during carbonization were carefully scraped off without touching the porcelain, and then ashed separately, an unfused amorphous residue was obtained in which the presence of silica could be demonstrated. One g of tar from the seedlings gave 0.8 mg residue, one g from the seeds 3.9 mg. The loss occurred during the carbonization. When the ashing was carried out at 530° C, the difference in ash weight was as large as at 750° C.

Quantitative silica determinations gave 37.7 mg SiO_2 from 1 g seedling ash and 27.3 mg from 1 g seed ash.

Phosphorus determinations were made on each of 10 samples. The seedlings contained 54.2 mg P_2O_5, standard error 0.09; the seeds 54.5 mg, standard error 0.16, both based on 3 g of seed. This indicates that the difference in total ash weight is not due to mechanical loss of ash particles during the ashing.

Political developments in China have made it impossible to bring this study to a conclusion, but the facts so far established seem to us to justify the publication of the results. Since the loss of silica is not consciously controlled in the usual ashing procedure, an unknown systematic error is thereby introduced which makes a high precision in plant ash analysis impossible. In cases where ash analyses are expressed as percentages of the ash weight, this difference would introduce a noticeable error.

We have no suggestions to offer on how to control this loss.

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Silicone Water-Repellents for General Use in the Laboratory

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The purpose of this paper is to call attention to the great savings of time and effort and improvements in precision that may be effected in a variety of common laboratory operations with the aid of water-repellent silicone films of molecular thinness applied to laboratory glassware and other apparatus. Indeed, in many volumetric and gravimetric analytical operations, the improvements in speed, accuracy, and convenience are such that when one has once made use of the silicone coatings he would be extremely loath to return to a silicone-less existence.

Water-repellant silicone coatings have been found invaluable in speeding the use and enhancing the precision of pipettes, burettes, and other volumetric ware, by making drainage complete and eliminating rinsing, washing, and drying. On beakers, flasks, and other analytical apparatus, the coatings similarly simplify operations and improve analytical accuracy. Additional uses are found in absorption spectrophotometry, flame photometry, viscometry, electrochemical pH measurement, and the handling of blood.

The water-repellent properties of certain classes of organosilicon compounds and their application to the coating of glassware and the like have already been widely discussed (*1–7*). Substituted chlorosilanes such as methyltrichlorosilane, dimethyldichlorosilane, lauryltrichlorosilane, and many others, and more recently alkoxysilanes such as ethyltriethoxysilane, have been found most useful for forming water-repellent coatings on glass and other materials. The action is a hydrolytic one, in which the adsorbed molecular film of water on the surface reacts with the silane, liberating hydrogen chloride (from a chlorosilane) or ethanol (from an ethoxysilane) and leaving integrally attached to the surface a film of polymerized substituted siloxane. The polar Si—O bonds apparently exhibit an affinity for the similarly constituted structure of the glass surface, and the organic radicals, directed outward, provide the water-repellency.

Silanes suitable for this application are produced by Anderson Laboratories, Inc., Adrian, Mich.; Dow Corning Corp., Midland, Mich.; The General Electric Co., Pittsfield, Mass.; and The Linde Air Products Co., New York. In addition to the pure compounds,