Comments and Communications

Photochemical *para* Rearrangement of Phenyl Ethers

THE phenylallyl and phenylbenzyl ethers rearrange upon heating to high temperatures (160°–200°) to *o*-allyl and *o*-benzyl phenols, respectively. Under the conditions specified, no *para* rearrangement has ever been noted with these ethers. Furthermore, no rearrangement (*ortho* or *para*) has ever been noted with diphenyl ether. It is, therefore, of considerable theoretical interest that the above ethers, when dissolved in isopropanol and irradiated at room temperature with ultraviolet light, give rise to the corresponding *para*-substituted phenols. Thus, diphenyl ether, when illuminated in isopropanol, gave phenol (identified as 2,4,6-tribromophenol) and *p*-hydroxybiphenyl (mp 165°; mp reported 164°–165°; benzoic ester mp 150°; mp reported 150°); the phenylbenzyl ether gave *p*-benzylphenol (mp 83°) and a small amount of phenol; and phenol allyl ether gave about equal quantities of phenol and *p*-allylphenol (mp of 3,5-dinitrobenzoate 103°–104°). The conversion yields with the last two ethers were about ten times higher than with the diphenyl ether.

Solvents (*t*-amyl alcohol, acetic acid, etc.) influence profoundly the yield of phenol but have little effect on the formation of the rearrangement product.

The work is being continued. A discussion of the mechanism of this interesting and unusual reaction will appear shortly.

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Liberal Arts Colleges and the National Academy of Sciences

SEVERAL recent studies have analyzed the origins of American scientists, using the Ph.D. degree as the basis of achievement.[1] Liberal arts colleges led all other types of institutions in the proportion of graduates receiving this type of recognition. A check on leadership at a much higher level of scientific achievement may be made by noting the origins of members of the National Academy of Sciences, which is generally considered to be the most distinguished body of scientists in the nation. Only about one in a thousand of the members of the American Chemical Society has been elected to the academy, and the proportion of engineers thus honored is even lower.

Table 1 lists the liberal arts colleges where members of the National Academy received their bachelor's degrees. The roster of the academy used in this study included members elected in April 1952, and the biographical data have been taken from *American Men of Science*. Institutions that grant the Ph.D. degree or that have professional schools of engineering, medicine, and other applied sciences are not included. The liberal arts status of the colleges has been determined from the *College Blue Book* (6th ed., 1950).

TABLE 1

MEMBERS OF THE NATIONAL ACADEMY OF SCIENCES HOLDING BACHELOR'S DEGREES FROM LIBERAL ARTS COLLEGES

Institution	No. degrees	Institution	No. degrees
Albright	1	Illinois Wesleyan	1
Allegheny	1	Lake Forest	1
Amherst	6	Lebanon Valley	1
Beloit	1	Mount Union	1
Bucknell	1	Nebraska Wesleyan	1
Butler	2	Oberlin	2
Carlton	1	Ohio Wesleyan	1
Colby	1	Pacific	1
College of Charleston	1	Pomona	3
College of Wooster	5	Redlands	1
Cornell College	1	Roanoke	1
Davidson	1	Southwestern College (Kan.)	2
Denison	1	Transylvania	1
Depauw	2	Trinity College	1
Dickinson	1	University of the South	1
Drury	1	Ursinus	1
Earlham	2	Washington and Lee	1
Gettysburg	3	Wesleyan (Conn.)	1
Greenville	1	Wesleyan (Ga.)	1
Grinnell	2	Whitman	1
Hamilton	1	Williams	3
Haverford	1	Wittenburg	1
Hobart	1		
Illinois College	1		

Sixty-seven of the 506 members of the National Academy of Sciences received the bachelor's degree from liberal arts colleges. This number becomes more impressive when it is noted that 64 members of the academy received their undergraduate training outside the continental limits of the U. S. Allowance should be made also for the limited enrollments of these liberal arts colleges when compared to large state-supported institutions. This limitation raises significantly the proportion of students in the smaller institution who have achieved membership in the nation's most distinguished group of scientists.

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[1] R. H. Knapp and H. B. Goodrich. *Science*, **113**, 543 (1951); H. F. Lewis. *J. Chem. Education*, **28**, 104 (1951).

Erratum

In my comment entitled "Common Names for Subspecies in Zoology" (SCIENCE, **115**, 631 [1952]), the technical names *P. sayi, P. affinis,* and *P. deserticola* should in every case read *P. c. sayi, P. c. affinis,* and *P. c. deserticola.* They are subspecies—not species.

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