

Field of Doctorate Specialization as a Function of Size of High-School Graduating Class

In the course of an intensive study of the science doctorates of 1957 and 1958, an interesting relationship was observed between size of graduating class in high school and field of doctorate specialization. The science doctorates were grouped into three broad classifications: physical sciences (including mathematics, physics, chemistry, geology, and engineering); biological sciences (including, along with other biology fields, agriculture, biochemistry, biophysics, and research degrees in the medical sciences); and behavioral sciences (all fields of psychology and anthropology). Those scientists who had graduated from public high schools in the United States were then classified by size of high-school graduating class. The numbers of individuals by class size in public high schools, and by major field, are shown in Table 1.

It is clear that the percentage of physical-science specialists goes up with class size, that the percentage for the biological sciences drops precipitously, and that the percentage for the behavioral sciences climbs slowly but rather consistently. The numbers are large enough to insure that these trends are reliable.

The reasons for this differential in field of doctorate specialization are un-

doubtedly complex and only partially understood at this time. There is an obvious relationship between size of high school and urban concentration; small public high schools are most characteristic of agricultural regions. For this reason, the regional variations in public-high-school origins were examined. It was found that the biologists tend to come with disproportionate frequency from the agricultural regions, and the behavioral scientists, from areas of greatest urban concentration. (These two regional characterizations are negatively but imperfectly correlated.) The physical scientists, on the other hand, show far less regional variation in high-school origins. Table 2 shows the regional distributions of the public-high-school origins of scientists in these three major fields. (In numbers of individuals Tables 1 and 2 do not agree because of missing data in some cases.)

One may hypothesize that greater contact with life forms in the more rural schools leads to greater interest in the biological sciences (including agriculture) among the graduates of smaller high schools. Greater urban concentrations, on the other hand, expose people to more social problems, conflicts in cultures, and so on, and one may hypothesize that these contacts are a partially determining factor in the higher concentration of people from these areas in the behavioral sciences. The availability of science and mathematics courses prerequisite to careers

in the physical sciences may be another powerful influence. Research now under way on the high-school backgrounds of these people may throw considerable light on this third factor. Meanwhile, class size and regional variations for those who received doctorates in 1959 are being checked.

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Enzymatic Factors in Experimental Galactose Cataract

Abstract. In the rat lens, glucose-6-phosphate dehydrogenase activity is specifically inhibited by galactose-1-phosphate, both in vitro and in vivo. In galactose-fed animals this inhibition occurs prior to the apparent inhibition of soluble protein synthesis in the ocular lens.

Kalckar *et al.* (1) have recently demonstrated a relative or absolute lack of the enzyme galactose-1-phosphate (gal-1-P) uridyl transferase in the red blood cell and liver of individuals suffering from congenital galactosemia. Similar findings were observed in the cataractous lenses removed from a galactosemic infant (2). Schwarz and Golberg (3) found that this ester accumulates in the lens capsule and epithelium of rats maintained on a 30-percent galactose diet. They noted that the concentration of gal-1-P in these lenses was approximately 10 times the amount present in the normal lenses, and that the amount of ester present in these cataractous lenses was of the same order as that found in galactosemic red cells. Since the lens is dependent on glucose as its main source of energy, an accumulation of gal-1-P in the lens may be a precipitating factor in the development of human and experimental galactose cataract.

Kinoshita (4) has shown that the hexose monophosphate shunt is of considerable importance in lens metabolism. In order to investigate the possibility that galactose phosphate might directly inhibit this pathway of glucose metabolism, the enzymes glucose-6-phosphate (G-6-P) and 6-phosphogluconate (6-PG) dehydrogenase were assayed in the lenses of normal and galactosemic rats.

Twelve Rochester colony white male rats, 26 days of age and weighing approximately 60 gm each, were employed. Six animals were put on a cataractogenic galactose diet (5), while six others were fed a control dextrose diet (5). As soon as the rats on the galactose diet began to show the first ophthalmoscopic evidence of cataract formation (peripheral subcapsular vac-

Table 1. Size of public-high-school graduating class for individuals who received doctorates in three major fields.

Major field	No. of individuals in high-school graduating class											
	1-19		20-39		40-59		60-99		100-199		200+	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Physical sciences	170	42	355	48	269	50	376	51	646	51	1727	55
Biological sciences	196	48	316	43	209	39	266	36	422	33	817	26
Behavioral sciences	41	10	68	9	62	11	97	13	196	16	599	19
Total	407	100	739	100	540	100	739	100	1264	100	3143	100

Table 2. Regional distribution of public-high-school origins for individuals who received doctorates in science in 1957 and 1958.

Geographic region	Physical sciences		Biological sciences		Behavioral sciences		Total No.
	No.	%	No.	%	No.	%	
New England	220	48	149	33	89	19	458
Middle Atlantic	931	54	421	25	359	21	1711
East North Central	662	54	387	32	176	14	1225
West North Central	292	47	218	35	114	18	624
South Atlantic	248	47	210	40	72	13	530
East South Central	95	49	71	37	27	14	193
West South Central	210	55	127	33	47	12	384
Mountain	130	50	102	40	26	10	258
Pacific	281	52	185	35	72	13	538
Foreign	666	54	474	38	97	8	1237
Total	3735	52	2344	33	1079	15	7158