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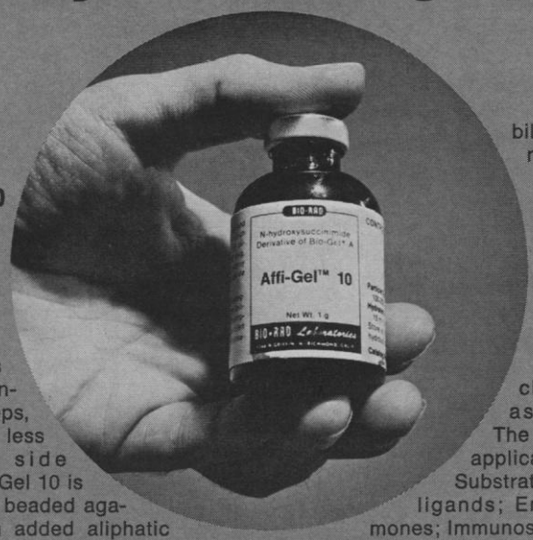

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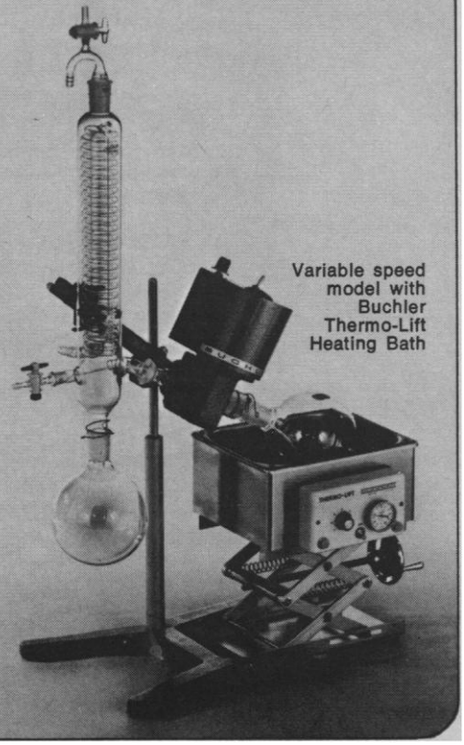

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Scientist in the Senate

Constance Holden (News and Comment, 18 May, p. 720) wrote that there is only one scientist in Congress—Mike McCormack (D–Wash.), a chemist. Locke White, Jr., writes (Letters, 3 July, p. 112) that another scientist, James D. Martin (R–N.C.), former associate professor of chemistry at Davidson College in North Carolina, is also in Congress. I would like to bring to your attention a third scientist in Congress, Senator Dewey F. Bartlett (R–Okla.). Bartlett was a practicing geologist in Oklahoma for many years until he became governor of Oklahoma, and then senator. He is still an outstanding geologist.

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PCB Formation

Although Thomas H. Maugh II's report "DDT: An unrecognized source of polychlorinated biphenyls" (Research News, 11 May, p. 578) deals with vapor-phase photolysis, it gives the misleading impression that such a reaction pathway is novel and ignores earlier published research. DDT [1,1,1-trichloro-2,2-bis(*p*-chlorophenyl)ethane] was certainly recognized as a source of polychlorinated biphenyls (PCB's) by 1969.

It is correct that Guenzi and his associates (*1*) did not observe the formation of PCB's or DDMU [1-chloro-2,2-bis(*p*-chlorophenyl)ethylene] by photolysis of solid DDT or DDT in hexane after irradiation at 253 nanometers. However, in 1969 we clearly showed that DDMU, dichlorobenzophenone, and dichlorobiphenyl were products of DDT or DDE [1,1-dichloro-2,2-bis(*p*-chlorophenyl)ethylene] photolysis in methanol at 260 nm (*2*). Moreover, we investigated the photolysis of dichlorobenzophenone and reported that 4,4′-dichlorobiphenyl (a PCB) was one of the photoproducts. Our proposed reaction schemes were supported by the identification of many products derived by a series of radical reactions. Among the products was 3,6-dichlorofluorenone, which we had reported as a major photolysis product of DDE in 1969 (*3*). We also found that photooxidation of this compound to 3,3′-dichlorobiphenyl-2-carboxylic acid oc-

curred. Subsequent decarboxylation of this acid could yield traces of PCB's, as could the decarbonylation of trichlorobenzophenone (also reported by us as a photolysis product). The experimental work reported in the two publications cited indicated clearly that some PCB's were products of DDT photolysis. The suggestion that a proportion of the PCB's in the environment might result from photodecomposition by DDT was voiced by Peakall and Lincer (*4*) in 1970. However, they were of the opinion that, since PCB's extracted from biological material resembled the more highly chlorinated members of this class, it was highly unlikely that PCB's found in the environment were derived from other chlorinated pesticides. Nisbet and Sarofim (*5*) stated that a large proportion of the PCB isomers with four or fewer chlorine atoms are missing from animal samples indicating that these have been degraded in the environment.

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2. J. R. Plimmer, U. I. Klingebiel, B. E. Hummer, *Science* **167**, 67 (1970).
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4. D. B. Peakall and J. L. Lincer, *BioScience* **20**, 958 (1970).
5. C. T. Nisbet and A. F. Sarofim, *Environ. Health Perspect.* Experimental Issue No. 1 (1972), p. 21.

Malignant Tumors in Monkeys

Edwin J. Andrews (Letters, 20 Apr., p. 255) and J. R. Allen and D. H. Norback (p. 256) refer to a spontaneous malignant gastric tumor in a rhesus monkey that I reported several years ago (*1*). This rhesus monkey had ingested DDT as well as Demeton during certain periods of his life. In both letters it was pointed out that the described lesion occurred in response to exposure to DDT and Demeton.

When I reported this lesion, I concluded that the development of the tumor was spontaneous rather than related to the exposure to pesticides. This same monkey had been in a poliomyelitis study and, in addition, had periodically been given 5 percent alcohol solutions. I do not think that the observation of a lesion in one animal that happens to have been exposed to DDT and Demeton should lead to the conclusion that these chemicals induce malignant tumors in monkeys.

Unfortunately, these deductions are very often made, but, unless controlled studies with more animals are conducted, one has to assume that the gastric lesion observed in this one rhesus monkey developed spontaneously. Seven additional rhesus monkeys of about the same age that we studied did not develop the same lesion even though they had also been exposed to DDT and Demeton.

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1. R. Kimbrough, *Arch. Pathol.* **81**, 343 (1966).

Correct Formulas

In his article "The 1972 Nobel Prize for Economic Science" (Research News, 3 Nov. 1972, p. 487) Paul Samuelson states that "relative factor shares in GNP" according to Sir John Hicks is

$$\alpha_i = V_i \partial Q(V)/\partial V_i$$

where V_i is an input factor of production (for example, labor) and Q is the total output. Actually this is not the "relative factor share" but the "total factor share" received by the factor V_i. Thus, the relative factor share is

$$\alpha_i = \frac{1}{Q}[V_i \partial Q(V)/\partial V_i]$$

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I am grateful to Parvin for pointing out the typographical error in the factor-share formula. The correct version of the formula appears later in my article, so no informed reader should have been misled.

Another typographical error in my article should also be corrected. The equation involving Hick's net demand functions should read

$$0 = -F[P] = -(f_j[p_1, \ldots, p_n]) \equiv -F[\lambda p]$$

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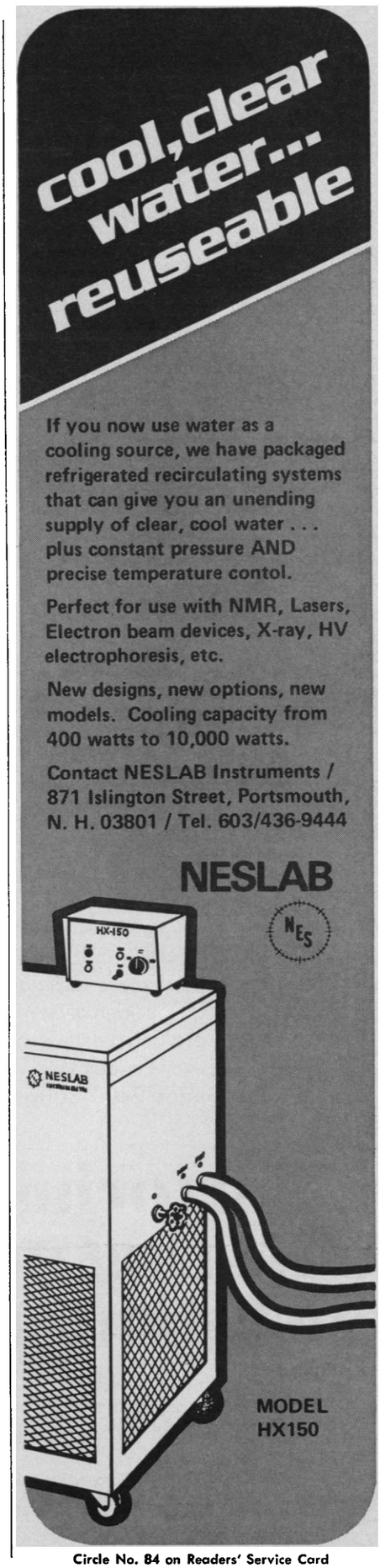

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