Letters

Productivity of Organic Farms

Science recently published an article (News and Comment, 5 Sept, p. 777) describing our report (*1*) in which we compared organic and conventional farms in the Midwest. Samuel R. Aldrich (Letters, 10 Oct., p. 96) criticizes us for presenting our crop production data on the basis of income per acre of cropland, rather than income per farm. His analysis of our data concludes that the conventional group realizes 30 percent more income, whereas we conclude that the incomes of the two groups are approximately equal. The discrepancy arises because the group of conventional farms has an average of 32 percent more cropland, although the average total size of the two kinds of farms (including permanent pasture, feedlots, woodlots, building sites, and so forth) is about equal.

Although all the farms studied produced livestock as well as crops, we were concerned only with crop production. We did not include other kinds of income from the non-cropland. Therefore, since the two groups had different amounts of cropland, there is no method for comparing them other than on the basis of income per acre of cropland, which is almost equal for the two groups.

It is possible that Aldrich's unusual way of comparing crop production incomes reflects a misunderstanding of what we mean by cropland. Since the rotation systems in use on organic farms sometimes require cropland to be in hay, temporary pasture, or soil improvement crops, one should include such land in computing income per acre of cropland. This is exactly what we did. We use "cropland" to mean all land that is ever cropped, regardless of whether or not it was actually cropped in the year we studied (1974). Aldrich, however, mistakenly uses the word "harvested" to refer to this land, overlooking the fact—made explicit on page 25 and again on page 38 of (*1*)—that harvested cropland is only a subset of cropland. Our use of the word "cropland" is identical to that of the Department of Agriculture's Economic Research Service in its inventory of U.S. cropland (*2*).

Aldrich also says that we should charge an equal amount for phosphorus and potassium against the incomes of both groups, since organic farmers are depleting the soils' reservoirs of these nutrients if they don't apply fertilizers to replenish them. However, as he then goes on to mention, the organic farmers in fact do buy phosphorus (in the form of rock phosphate), and so are not necessarily depleting their soils. The cost of this rock phosphate was included in the organic farmers' operating costs. If the organic farmers should be applying as much K as the conventional ones, this would add only $2 per acre to their operating costs. This is just enough to cancel the slightly higher average income we found for the organic group ($134 per acre compared to $132 per acre for the conventional group). Actually, there is no a priori reason to expect, as Aldrich apparently does, that the amounts of either P or K needed by the two groups should be exactly equal, since the mix of crops raised on the two kinds of farms differ. Still, there could be some difference in the depletion of P or K by organic farmers compared to that by conventional farmers; however, this can only be quantified by additional research. Furthermore, research on the comparative effects of the two systems on soil fertility should not be limited just to possible depletion of macronutrients; many other substances and soil characteristics may also be affected differentially. Indeed, our report urges just such a broader investigation of how the two management systems affect soil fertility [item 5 of our list of suggested research topics (*1*, p. 55)].

Finally, Aldrich states that our results would have been different had the study been concerned with any of the 20 years before 1974. We agree. In fact, the study was undertaken as one component of a more general investigation of alternative production techniques that might enable farmers to adjust to the dramatic supply problems and price increases for energy and energy-intensive fertilizers and agricultural chemicals that began occurring between the 1973 and 1974 growing seasons. There seems little basis for expecting that agriculture will ever again find itself with the abundance of low-priced energy and fertilizers that characterized the previous two decades.

WILLIAM LOCKERETZ
Center for the Biology of Natural Systems, Washington University, St. Louis, Missouri 63130

References

1. W. Lockeretz, R. Klepper, B. Commoner, M. Gertler, S. Fast, D. O'Leary, R. Blobaum, "A Comparison of the Production, Economic Returns, and Energy Intensiveness of Corn Belt Farms That Do and Do Not Use Inorganic Fertilizers and Pesticides" (Center for the Biology of Natural Systems, Washington University, St. Louis, Mo., 1975).
2. H. T. Frey and R. C. Otee, *Cropland for Today and Tomorrow* (Agricultural Economic Report No. 291, Economic Research Service, Department of Agriculture, Washington, D.C., 1975), p. iii.

Affirmative Action

The remarks concerning affirmative action by Caspar Weinberger as reported by Barbara J. Culliton (News and Comment, 22 Aug., p. 618) require comment.

It is indeed sad to contemplate the spectacle of this nation's greatest universities, with their law schools, computer science departments, and other intellectual resources, in a state of confusion and befuddlement over the question of what to do about affirmative action. One might get the impression that the campuses are reeling under the onslaught of hordes of "unqualified" minorities and women, aided and abetted by the merciless minions of the Department of Health, Education, and Welfare (HEW).

The reality of the situation is quite different. In 1968, women and Blacks made up, respectively, 19.1 percent and 2.2 percent of college faculties; by 1972, the figures were, respectively, 20 percent and 2.9 percent (*1*). The numbers have not changed appreciably in the last 3 years and thus would hardly constitute a mass invasion. It appears that universities like to report the number of minorities as a percentage of the total faculty of the entire institution in order to disguise the abominable records of individual divisions, such as colleges of science. The larger numbers of minorities and women traditionally found in the colleges of nursing, libraries, home economics, and ethnic studies obscure examples such as departments of chemistry, where women constituted 2.6 percent and Blacks 0.6 percent of the faculty of Ph.D.-granting institutions in 1972 (*2*).

Former Secretary Weinberger mentions that many people in HEW "have tended to a strict application of the rules" on this issue. In fact, the attitude of HEW has been to conciliate and compromise rather than

to enforce the law. To quote the U.S. Commission on Civil Rights, "... Clearly, the promise of equal employment opportunities has not been achieved in institutions of higher education; HEW's failure to enforce the Executive Orders has played no small role in frustrating this objective" (*3*). The General Accounting Office has also found that HEW negotiated and conciliated with colleges over prolonged periods rather than requiring them to prepare acceptable affirmative action plans, and has failed to penalize those that don't (*4*).

HEW has dragged its collective feet to the extent that it had to be ordered by a federal court to impose sanctions on ten states that had been in flagrant violation of the law for years (*5*). A suit has recently been filed alleging lack of enforcement of affirmative action by HEW and the Department of Labor (*6*).

Weinberger says that the regulations call for "good faith attempts" rather than strict quotas. However, in the area of affirmative action, the courts have held consistently that "good" or "bad" faith is not the keystone, but rather that the results of policies are what count (*7*). Any recruiting or promotion requirement that has a disparate effect on minorities must be validated as an "essential business necessity," but universities often refuse to do this, and HEW has not pushed the matter. Although academicians may hold as an article of faith that publishing is a valid predictor of future job performance, it is not proven. There are other facets to the job of being a "qualified" faculty member besides doing research (such as teaching and counseling), and these may not be predicted well by the amount of publication (*8*).

Where were the cries of horror and the concern for quality in years past, when the hiring pattern in major universities consisted of "you hire my graduate students and I'll hire yours," a system which perpetuated the old-boy network to the exclusion of women and minorities? It seems to me that universities are being hypocritical if they complain about the possibility of having to hire a *possibly* unqualified minority (without any validation of the standards used for qualification) when, in fact, the percentage of minority faculty members has not increased perceptibly in the last few years.

BERNARD ORTIZ DE MONTELLANO
Society for the Advancement of Chicanos and Native Americans in Science, Post Office Box 3831, Albuquerque, New Mexico 87110

References

1. A. E. Bayer, *Teaching Faculty in Academe: 1972–73* (American Council on Education, Washington, D.C., 1973).
2. Committee on Professional Training, American Chemical Society, *Chem. Eng. News* **53**, 38 (28 April 1975), p. 39.
3. U.S. Commission on Civil Rights, *The Federal Civil Rights Enforcement Effort—1974* (Government Printing Office, Washington, D.C., 1975), vol. 3, p. 305.
4. Denver *Post*, 28 August 1975, p. 14.
5. Adams *v.* Richardson, 480 Fed. Rep., 2nd ser. 1159 (U.S. Dist. Ct., D.C., 1973).
6. Women's Equity Action League *v.* C. A. Weinberger, 74-1720 (U.S. Dist. Ct., D.C., filed 26 November 1974).
7. Spurlock *v.* United Airlines, 475 Fed. Rep., 2nd ser. 216 (1972); Griggs *v.* Duke Power Co., 401 U.S. 424 (1971); Local 189 United Papermakers and Paperworkers *v.* United States, 416 Fed. Rep., 2nd ser. 980 (1969).
8. J. R. Hayes, *Science* **172**, 227 (1971).

Hepatitis B Vaccine

In the interest of a more complete representation of the present state of development of a vaccine against the ubiquitous and debilitating hepatitis B virus (HBV), I would like to add some relevant information omitted from Thomas H. Maugh's article (Research News, 11 April, p. 137). Maugh reports that two groups of investigators, one from the National Institutes of Health and one from the Merck Institute, have independently developed a new vaccine against HBV, a vaccine containing hepatitis B surface antigen (HB_sAg) isolated from chronic asymptomatic carriers of HBV.

In 1974, a group from the State Institute of Hygiene, Warsaw, Poland, headed by A. Nowoslawski and myself, developed a vaccine based on the same principle as that of the American investigators. To isolate HBV-derived antigens (HB_sAg, HB_cAg) from the serums of chronic asymptomatic carriers of HBV, we used immunoabsorption column chromatography, followed by formalin inactivation of HBV-derived antigens.

The vaccine has been tested for immunogenicity in humans with both acute and chronic hepatitis B and in patients convalescing from hepatitis B infection (*1*). Safety controls for the first batch of vaccine have been established in chimpanzees, and challenge experiments have been performed, also in chimpanzees, here at the Wistar Institute. Additional batches of vaccine will be available soon, and their protective effect will be checked in humans in HBV endemic areas.

WITOLD J. BRZOSKO
Wistar Institute, 36th Street at Spruce, Philadelphia, Pennsylvania 19104

References

1. W. J. Brzosko, B. Kassur, L. Babiuch, J. Cianciara, "Skin reactivity to HB_sAG in patients with various forms of hepatitis B and convalescents from hepatitis B," vol. 2, part 1, pp. 227–228, of preprints of the 6th International Congress of Infectious and Parasitic Diseases, held in Warsaw, 23–27 September 1974.