Letters

Retirement Age for Chinese Scientists

In Marjorie Sun's article "China plans sweeping reforms in science" (News and Comment, 3 May, p. 559), there is a sentence which reads "[Zhou Guangzhao] says the [Chinese] government is now trying to 'weed out old scientists' by offering them early pensions." I am sorry to say that I never made such a remark, since it runs entirely against the policy now being pursued in China.

There are very few scientists in China and even fewer experienced old scientists. We always try our best to bring the scientists' role into play. In China, the retirement age limit is 60. In the Chinese Academy of Sciences, according to regulation, scientists may retire from a leading position, such as institute director, at the age of 65 and from an ordinary administrative position at age 60. After their retirement from administration, scientists can continue to pursue their research. Those scientists who hold the title of professor or the equivalent can work in laboratories until age 70; associate professors or the equivalent can work until age 65. A few scientists who have made special contributions can work even after age 70 without an age limit if their health permits.

This policy was made under the conditions of China. It will guarantee that old scientists conduct scientific research better while young scientists make much more progress.

Thus one may see that the Chinese government does not want to reduce the number of old scientists by offering them early retirement. Instead, it tries its best to bring their role into full play by offering them late retirement.

At present, the Chinese government and the whole society of China have attached great importance to respect of knowledge and scientific personnel in order to increase the intellectuals' role. The treatment and status of the Chinese scientists have greatly improved. With the development of economic construction in China, the role of scientific and technical personnel will be brought into even fuller play in the years to come.

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As the article reported, the Chinese leadership including Zhou are trying to advance "vigorous young and middle-aged people" to active positions in the country's scientific enterprise. Zhou himself in a *Beijing Review* story said that "A task of top priority is to bring into full play the initiatives of the 45- to 55-year-old researchers" and that achievers should be promoted to senior positions.—MARJORIE SUN

Energy and Economic Activity

Cutler J. Cleveland *et al.* (Articles, 31 Aug. 1984, p. 890) imply that they have revealed an important new relationship. They postulate a causal linear link between the consumer price index (CPI) and a variable defined as the ratio of total U.S. money supply to fuel use.

These factors are tightly linked through more obvious relationships. Money demand is itself a function of the price level, its rate of change, real gross national product (GNP), and interest rates. Demand for fuel is a function of real GNP, the relationship of fuel prices to the general price level, population levels, and technology.

The consumer price index, of course, includes a fuel price component, and CPI variation responds directly to variation in its energy price component.

The CPI $= \alpha + \beta^*(M2/Qf)$ relationship is poorly specified by Cleveland *et al.* (M2 is a money stock measure; Qf is fossil, nuclear, and hydropower energy; and α and β are estimated regression coefficients.) Its implication, if correct, would be that subsidizing fossil energy use and nuclear power would reduce inflation and increase economic welfare. This is an illogical interpretation. Overall, the article properly draws attention to the problem of the global economy's interaction with finite fossil energy resources.

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I like the approach taken by Cleveland *et al.* in their article "Energy and the U.S. economy: A biophysical perspective," but I wish they had included the full spectrum of energy inputs to the U.S. economy in their analysis. Their article neglects several forms of solar energy formerly of great significance—most important, fuel wood and work animal feed. The two greatest fuel substitutions in U.S. history were those of fossil fuels for fuel wood, largely completed between 1850 and 1910, and the substitution of distillate motor fuels for work animal feed, largely completed between 1920 and 1950.

In 1850, fuel wood and work animal feed together contributed 86 percent of the energy input to the United States. Forty years later (the earliest year studied by the authors), their contribution had dropped to 49 percent, and after another 90 years it had dropped to about 2 percent (*1*). The economic significance of fuel wood and work animal feed in the early 1800's was just as great as the economic significance of fossil fuels in the late 1900's.

Cleveland *et al.* suggest there was little reduction in the ratio of energy to GNP ratio between 1890 and 1980. The facts are otherwise when the full spectrum of energy inputs is considered. The correct figures are as follows.

Year	Energy/GNP (*4*)
1890	17.6
1895	16.3
1900	15.7
1905	16.4
1910	16.1
1915	16.6
1920	17.3
1925	13.8
1930	14.0
1935	13.0
1940	11.7
1945	9.5
1950	10.1
1955	9.4
1960	9.4
1965	8.8
1970	9.5
1975	8.4
1980	7.5

From 1890 through 1920, fossil fuels were being substituted for fuel wood with essentially no change in the efficiency of furnaces and stoves. During this period the energy/GNP ratio remained roughly constant. From 1920 through 1950, distillate fuels (and internal combustion engines) were being substituted for hay and oats (and work animals). Because internal combustion engines are much more efficient than work animals, the energy/GNP ratio dropped nearly 2 percent annually during this 30-year period.

An increasing proportion of the efficiency improvement between 1920 and 1950 should be attributed to electrifica-