SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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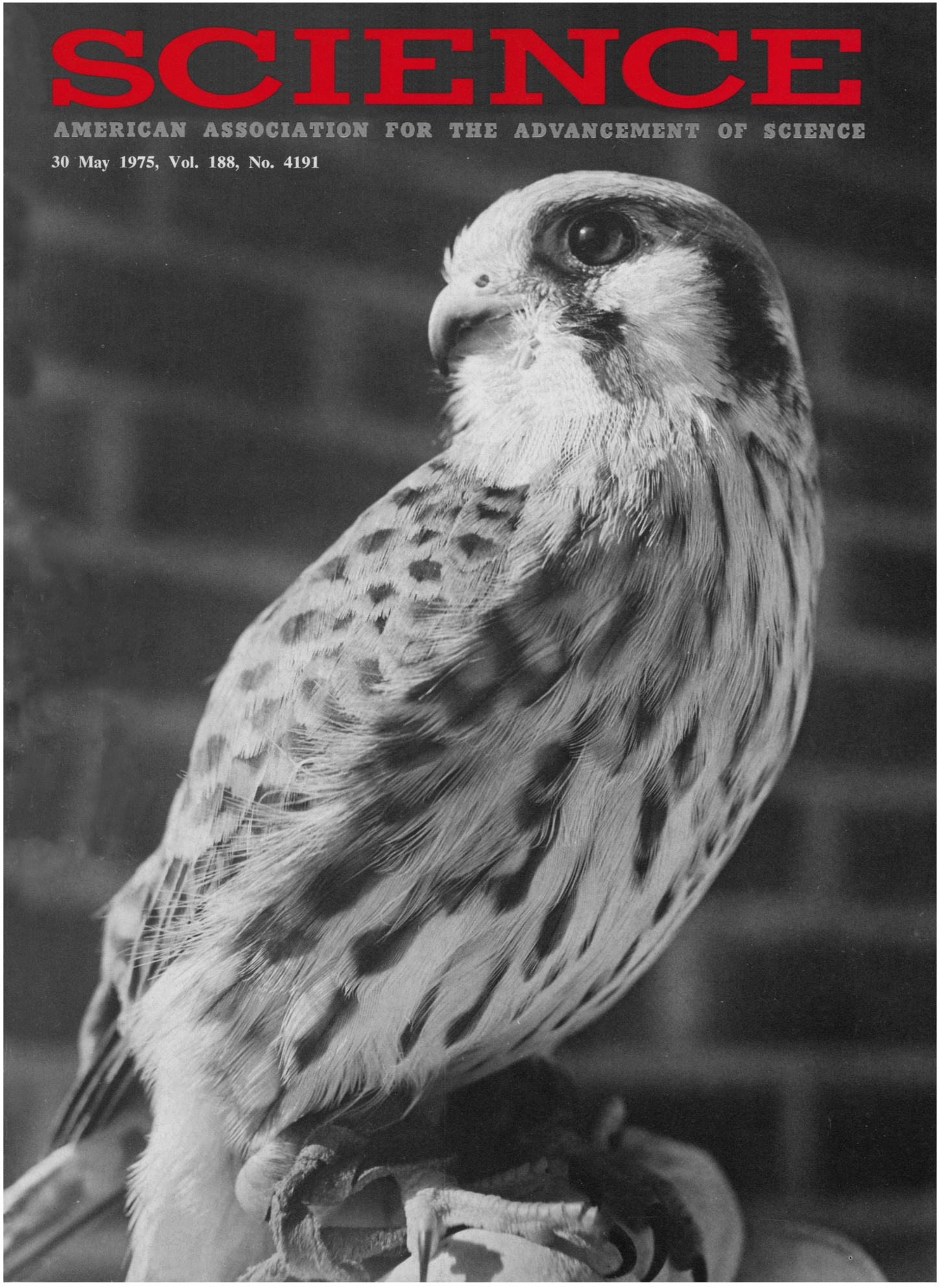

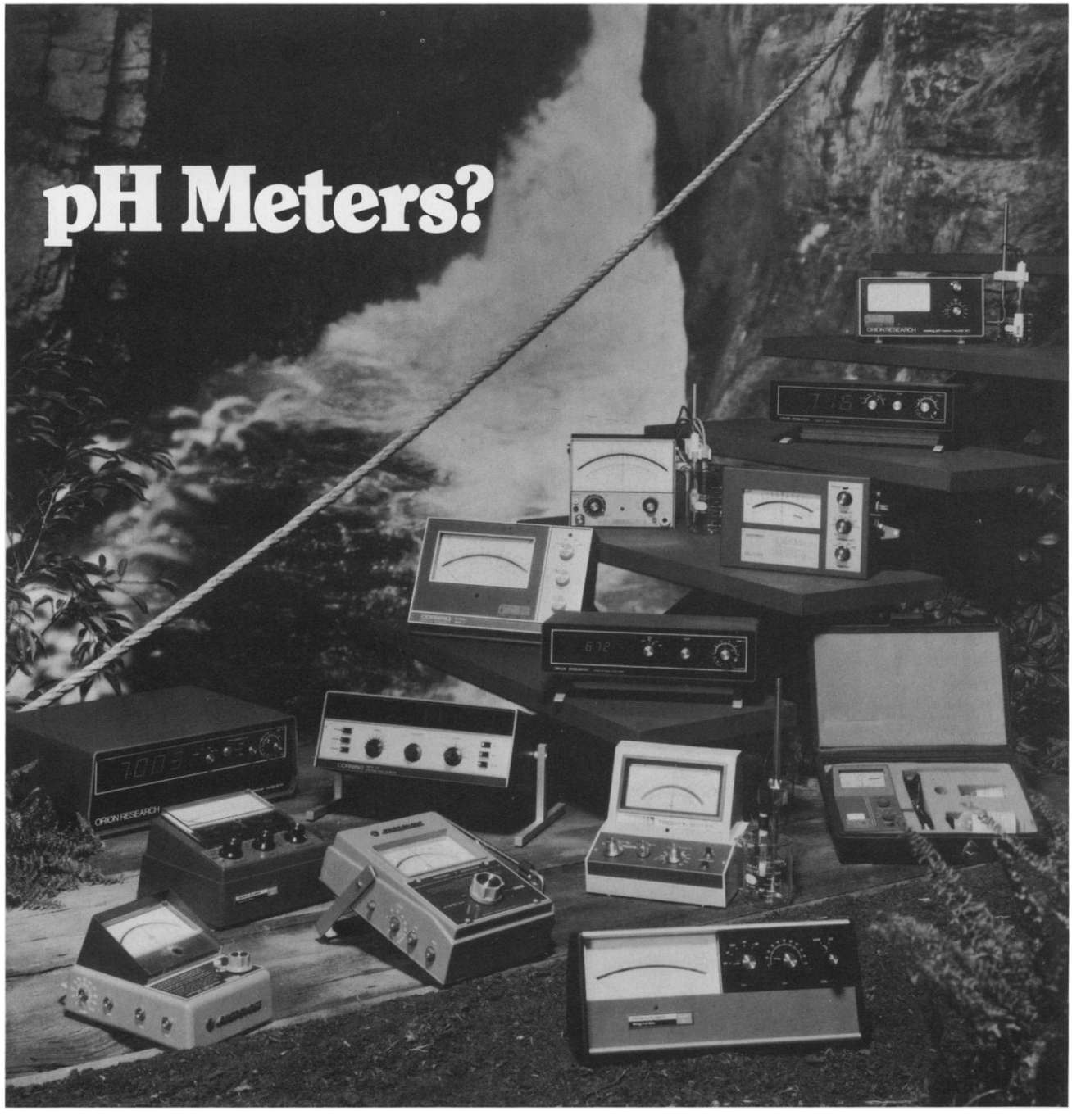

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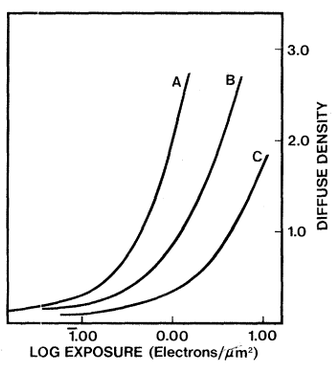

Exposure/density curves for KODAK Electron Image Plates exposed with 100 kV electrons.
Curve A represents an extended development which produces maximum speed and the most grain. Curve B is an intermediate development, for medium speed and grain; and Curve C is short development, with minimum speed but the least grain.

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SCIENCE

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress. Postmaster: Send Form 3579 to SCIENCE, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005.

COVER

"Baby," a tamed American kestrel (*Falco sparverius*). Female, 4½ years old, owned by Michael Johnson, Reston, Virginia. See page 953. [Eric Poggenpohl, *Science*]

LETTERS

Coal Price Regulation

Sunderland's letter about the cost of fuel (18 Apr., p. 204) contains a distressing suggestion that the price of coal be regulated. If one wants to encourage an increase in coal production (which certainly seems to be in the national interest), the surest and quickest way is to permit such production to be as profitable as possible. High profits in relation to the risks involved will attract new capital and vigorous new competition. The resulting increased supply will, through the normal forces of the market, reduce the price of coal.

From the standpoint of the national interest, an even more important result of increasing coal production would be to reduce our dependence on foreign energy, which might even drive down the price of oil. Rather than controlling prices and reducing profitability of coal mining, thus discouraging new investment, our federal energy policy should be directed toward increasing profitability. The entrepreneurs will see to the rest. Besides, who needs another bureaucracy?

K. O. CORLEY

Monsanto Textiles Company, Post Office Box 12830, Pensacola, Florida 32575

Iranian-American Cooperation

Constance Holden's article (News and Comment, 11 Apr., p. 128) on recently instituted agreements between the Iranian government and several American universities for the establishment of centers for higher education and research in Iran implies that this is a new trend resulting from the upsurge of the oil economy. This is not so. The Shiraz school, referred to in passing in her article, is Pahlavi University, where all teaching has been conducted in English since 1961. At that time, the Shah entered into an agreement with the University of Pennsylvania for the development of a modern, American-type university, with initial emphasis on the colleges of medicine, engineering, and arts and sciences. The site selected was Shiraz, a relatively small, venerable, but modern, city which had the advantages of a previously established university, an adequate water supply, and the presence of Nemazee Hospital, which had just been built on spacious grounds immediately adjacent to the medical school. In addition to several Islamic mosques, Shiraz has a Zoroastrian temple, a synagogue, and a Christian church.

During the first 10 years of the Pahlavi-Pennsylvania contract, there was an extensive exchange of faculty for individual periods of from 6 months to 2 years. Faculty exchange has been reduced as departments at Pahlavi have become manned increasingly by well-qualified Iranians, but it has by no means been terminated. An active exchange program is about to be initiated with Pahlavi's School of Dentistry.

Pahlavi University's progress as a research center extends well beyond what Holden's article implies. For the past 6 years it has hosted an annual International Medical Congress. These have been attended by considerable numbers of physicians from Iran and nearby eastern countries, as well as by sizable representations from Europe and this country. Last fall, Shiraz was selected by the International Brain Research Organization as the site for an international workshop in neurosciences. The condition of the research equipment at Pahlavi is about the same, and can be just as frustrating, as anywhere else.

While Iran may still be 70 percent illiterate, just a few years ago the figure was approximately 90 percent. Through a remarkably well-organized program of teaching in the villages, this trend toward literacy will certainly continue. Every encouragement should be given to the currently expanded, but by no means new, programs of Iranian-American educational cooperation. Among other things, Iran can undoubtedly become increasingly a major stabilizing force toward the preservation of peace in the Middle East.

GEORGE B. KOELLE

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Copyright and Public Domain Policy

Nicholas Henry's article: "Copyright: Its adequacy in technological societies" (13 Dec. 1974, p. 993) can lead the uninformed and unwary reader into a thicket of misinformation and dubious conclusions. I will comment only on the several inaccuracies in his discussion of the public domain policy—which seems to him to mean public policy on copyright in publications of the U.S. government. (Actually, any published work, whether produced privately or by a public agency, that is not protected by copyright is in the public domain.)

Henry stretches his initial point untenably in asserting that Section 8 of the Copyright Act of 1909 is an outstanding recognition of the inadequacy of copyright in a technological society. Actually, the enactment of that section (which says, "No

copyright shall subsist . . . in any publication of the United States Government") was a recognition of the fact that a number of government officials had in the past made private profit on privileged publication of government documents. Thus the real purpose of Section 8 was to regulate the morality of public servants.

Henry fails to pinpoint the flaw in Section 8 that has caused so much uncertainty and difficulty through more than six decades—a flaw that has not been corrected to this day. This was the failure of the Act of 1909 to define terms—the failure to state, even generally, what is and what is not a "government publication." This question has never been clarified, either by subsequent legislation or by court law. In attempting to improvise a practical answer, both federal agencies and publishers often have been guilty of inconsistency in policy and practices.

Henry also does not point out that the difference between publishers and certain public-interest advocates is actually quite narrow. The difference is, simply stated, whether or not private copyright should be allowed in a work produced not *by*, but *for*, a government agency under a contract or grant and in a situation where the sponsoring agency decides that private publication is in the public interest with reference to the purpose of the contract or grant. This issue has been investigated and debated over and over again in recent years, mainly in connection with the pending copyright revision legislation or with proposed reform of government procurement policy. In both connections it was concluded that sponsoring agencies should have discretionary authority to allow private copyright under appropriate terms and conditions.

Specifically, the Senate Committee on the Judiciary report (*1*) on the pending copyright bill S. 1361 states, "The bill deliberately avoids making any sort of outright, unqualified prohibition against copyright in works prepared under Government contract or grant." In the same vein, the U.S. Commission on Government Procurement, after a thorough study of the matter in 1971 and 1972, came up with the following official recommendations (*2*).

RECOMMENDATION 14. Amend or repeal statutes limiting agency flexibility in dealing with the publication of works developed under Government contracts.

RECOMMENDATION 15. Enact legislation giving all agencies authority to acquire private copyrights or interests therein.

One must regret that Henry failed to report these two policy decisions, for they are of much importance to scientists. Suffice it to say that, had Henry's narrow view of public domain prevailed in the past three decades, scores of works produced under government contracts and grants would never have been published in complete and carefully edited volume form, including such monumental works as the *Radiation Laboratory Series* and the *National Nuclear Energy Series.*

After quoting the new ruling of the U.S. Office of Education (USOE) in 1965 on public domain policy, Henry then minimizes the fact that this policy was completely reversed a few years later. This was because it was discovered, as publishers had predicted, that no one would publish what anyone and everyone could publish. Further, Henry suggests that the USOE policy statement was addressed to teaching materials, when it was, in fact, concerned with research reports. Henry might also have reported that that short-lived USOE policy was directly contrary to the policies of the National Science Foundation, the Atomic Energy Commission, and several other federal agencies. Thus it was clearly misleading for Henry to imply that the USOE position was the proper one (*3*).

Henry too quickly jumps to the conclusion that, since publishers have profitably produced a few "instant paperback" editions of a limited number of government publications, such as the Warren Commission's report, they "hardly seem excluded from profit by the absence of copyright." Actually, no more than 20 of such mass market editions have been produced in the past 10 years, and several of them were profitless because the demand was oversupplied by too many different editions. Not more than one in 1000 government publications is suitable for this kind of commercial reprinting, and none of them has had professional value to the scientist.

Book publishers solidly support the prohibition of copyright in any publication that is truly a government work, which is to say "a work prepared by an officer or employee of the United States Government as part of his official duties" (*4*). Hence they solidly support the relevant section of the pending copyright revision bill, which is based on the definition just quoted. This definition, plus the legislative intent as stated in the Senate Judiciary Committee report (quoted above), should go far to remove the uncertainty and confusion that have vexed government officials and publishers for so many years.

Contrary to Henry's supposition, book publishers do not contend that commercial publication of certain kinds of government-financed works saves public funds because they assume that the Government Printing Office (GPO) operates at a loss. Rather, they argue three points in favor of

30 May 1975, Volume 188, Number 4191

SCIENCE

Energy and the Shape of Society

Most people are aware that consumption of energy is involved in many aspects of their lives. Congressmen seem to be convinced that it is important, for at least 33 committees are seeking to have jurisdiction over a piece of the energy action. Even so, the significance of energy in shaping society is probably not generally recognized. Coming shifts in energy sources will have profound effects on the economy and on the way people live. Not all these effects will be manifested quickly, although signs of change are visible. For example, long-depressed Appalachia is beginning to enjoy a revival of demand for its resources. In contrast, the prognosis for New England during the next decade is relatively bleak; the area has come to depend very heavily on cheap foreign oil. Low prices for petroleum will not return, and the region must send huge sums of money elsewhere to pay for its energy while facing serious unemployment. Some notion of the magnitude of the coming evolution may be guessed at by a brief survey of some earlier experiences.

Before about 100 years ago this nation's principal source of energy was wood, with some contribution from windmills and waterpower. Most people lived on farms. Then came a great industrial development fueled by coal. As a result the center of industrial activity of the country shifted toward Pittsburgh and the Middle West. Soon the electric streetcar came into wide use in mass transport, and this had considerable influence in determining the evolution of the shape of cities. About the time of World War I, use of oil began to have significant impact on the economy and on living patterns. Cheap and abundant gasoline made possible a mobile society and ultimate shifts in the location of housing developments. Machinery powered by oil products led to a profound revolution in agriculture and a great outflow of people from rural areas.

In about 1950 natural gas came to have an important role in the economy. Because of its low cost and superior quality as a fuel, it determined the location of vast new petrochemical complexes. Texas and other Gulf states enjoyed great prosperity and booming construction. Areas dependent on coal did not fare well; oil and gas were priced so low as to depress the price and inhibit the use of coal. Appalachia experienced 20 years of stagnation.

Today Appalachia can look toward a different future. Coal is now in demand at prices that are bringing in much money. Moreover, in future additional large chemical complexes devoted to liquefaction and gasification of coal will be constructed. This will upgrade employment opportunities by increasing the need for chemical engineers and trained technicians and operators.

Other regions will also be affected by the changing energy picture. Energy costs have become an important factor in many industrial processes and will accordingly be significant in determining which regions prosper and which decay. It is too early to forecast the decline of a state, such as Louisiana, but the prognosis for the Gulf states has changed. Not so long ago natural gas could be obtained at a cost of less than $0.10 per million Btu. Some long-term contracts are still honored at prices in the vicinity of $0.25. However, gas from new discoveries is selling in the intrastate market for about $1.75 per million Btu. In contrast, coal in Appalachia and in parts of the Middle West can be bought as low as $0.50 per million Btu. In some of the Rocky Mountain states, this figure is about $0.25. The corresponding price of energy from imported oil is about $2.

It is too early to sketch further the detailed outlines of coming social and economic adjustments. However, it seems evident that the coastal areas of this country are entering an era in which they will be handicapped relative to some interior states. What happens will, of course, depend on many factors, including attitudes of the states toward industrialization and availability of other vital materials, such as water. It will also depend on the extent to which nuclear energy is employed. In any event, we have passed a great bend in the road and are moving toward changes comparable to some of those that occurred in the United States earlier in the twentieth century.—PHILIP H. ABELSON