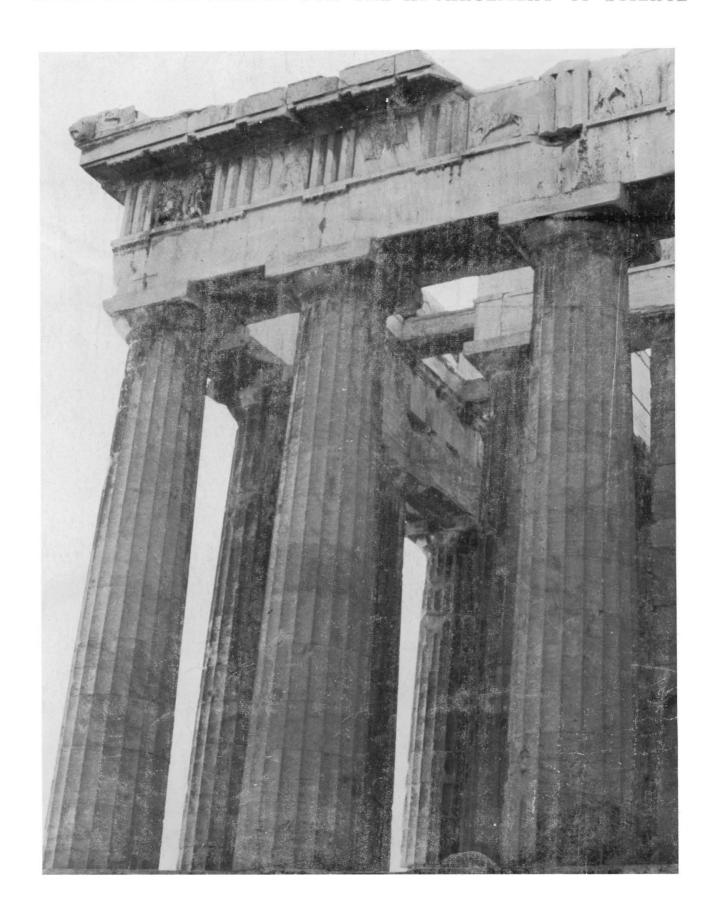
# SCIENCE

28 April 1972

Vol. 176, No. 4033

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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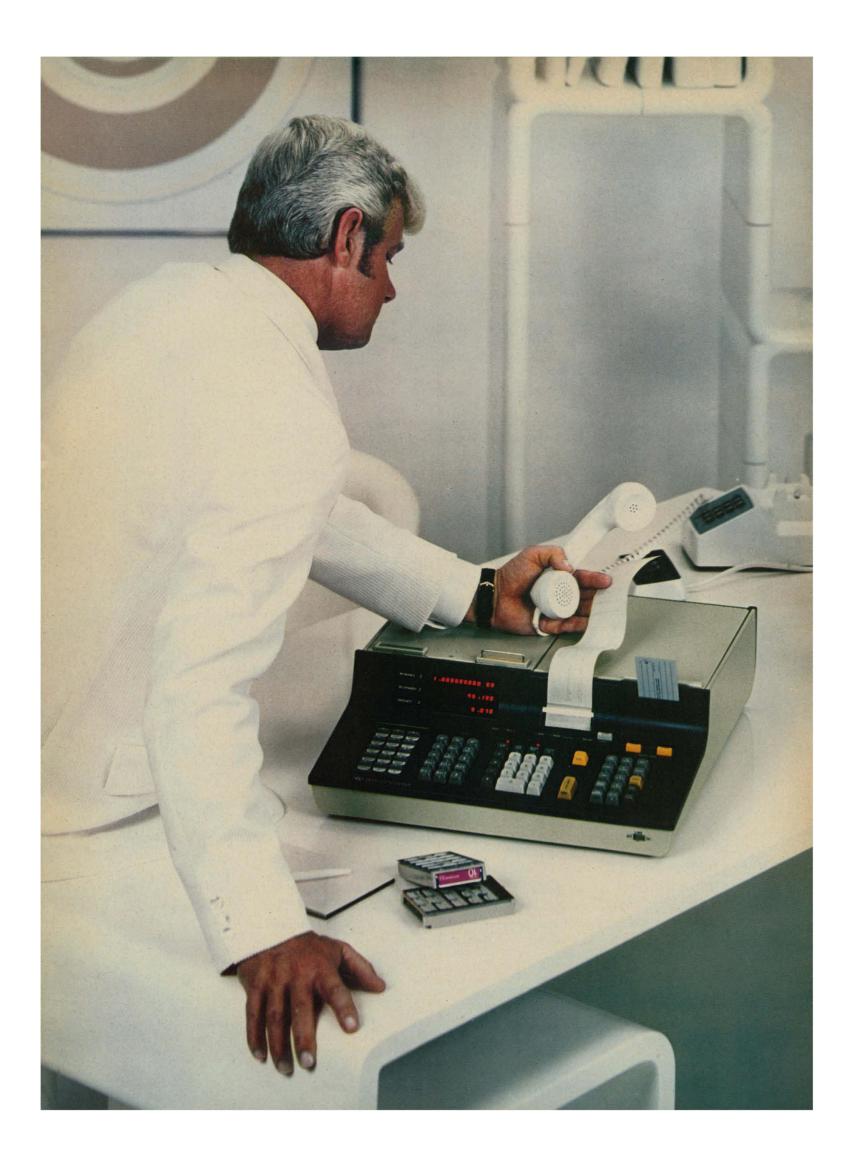
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### COVER

Parthenon in Athens, made of white marble from Mount Pentelikon. The pediment sculptures (now in the British Museum) depicted the birth of Athena Parthenos, the virgin goddess, and her battle with Poseidon for the land of Greece. Isotopic studies of such marbles reveal the localities from which they were quarried in ancient times. See page 401. [R. F. Weiss, University of California, San Diego]



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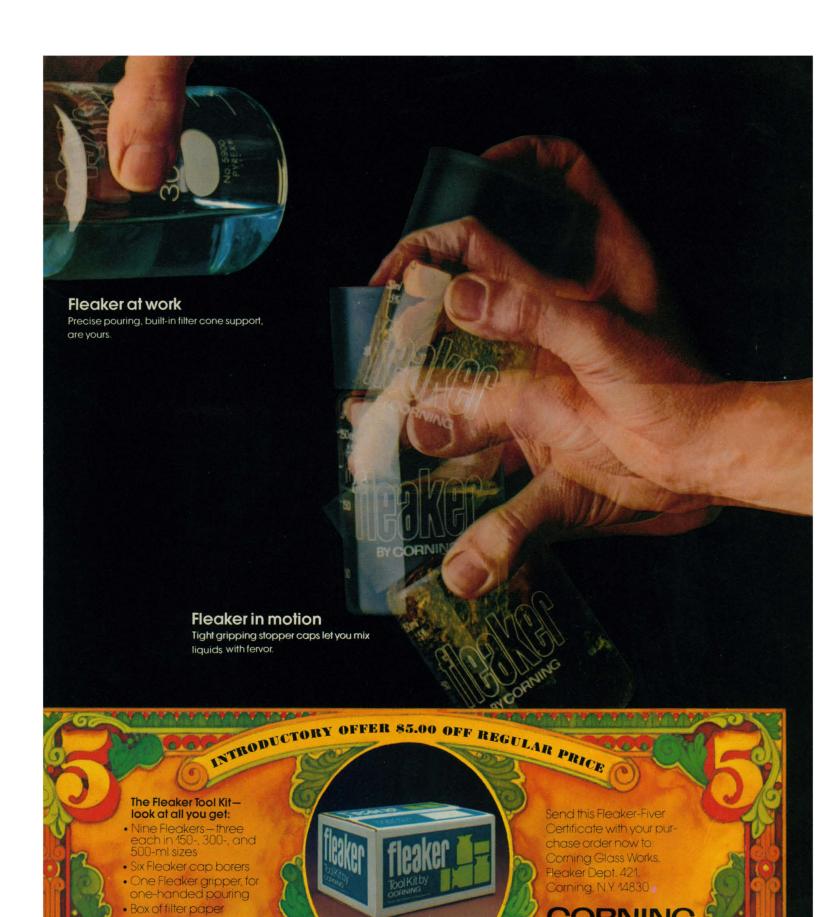
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L-Alanine [3-3H]
β-Alanine [3-3H(N)]
DL-b-2-Aminobicyclo-[2,2,1]-heptane-2-carboxylic acid [carboxyl-1<sup>4</sup>C]
L-Arginine [3-3H(N)]
L-Aspartic acid [2,3-3H(N)]
ε-Dinitrophenyi-L-lysine [phenyi-3,5-3H(N)]
L-Glutamic acid [3-3H] L-Glutamic acid [3-3H] DL-Glutamic acid [2-3H]

L-4-Hydroxyproline [<sup>3</sup>H(G)] L-Isoleucine [4,5-<sup>3</sup>H(N)] L-Lysine [4,5-<sup>3</sup>H(N)] L-Methionine [<sup>35</sup>S] L-Methionine [methyl-<sup>14</sup>C] L-Phenylalanine [3-<sup>3</sup>H(N)]

L-Pyroglutamic acid [14C(U)]

L-Tryptophan [14C(U)]

## CARBOHYDRATES

N-Acetyl-D-galactosamine [3H(G)] N-Acetyl-D-mannosamine [acetyl-3H] N-Acetyl-D-mannosamine [3H(G)] N-Acetylneuraminic acid [4-14C]
L-Fucose [1-14C]
L-Fucose [6-3H] D-Glucosamine hydrochloride [¹⁴C(U)] Glycerol [¹⁴C(U)] Glycerol [2-³H(N)] myo-Inositol [14C(U)] Lactose [D-galactose-14C(U)] D-Mannosamine hydrochloride [6-3H(N)] D-Mannosamine hydrochloride [14C(U)] 3-O-Methyl-D-glucose [methyl-3H] Sucrose [fructose-1-3H(N)] D-Xylose [3H(G)]

# **CATECHOLAMINES**

L-3,4-Dihydroxyphenylalanine [³H(G)] L-3,4-Dihydroxyphenylalanine [¹⁴C(U)] 4-Hydroxy-3-methoxy-DL-mandelic acid [7-3H(N)] L-4-Hydroxy-3-methoxyphenylalanine [phenylalanyl-14C(U)]

5-Hydroxytryptamine binoxalate [1,2-3H(N)] 5-Hydroxytryptophol [1-14C] L-Norepinephrine [7-3H(N)]

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Colcemid [ring C-methoxy-3H(N)]
Ecdysterone [3H(G)]
5-Ethyl-5-(1-methylbutyl) barbituric acid [3H(G)]
Ethyl methanesulfonate [ethyl-1-3H]
5-Ethyl-5-phenylbarbituric acid [3H(G)]
Lysergic acid diethylamide [3H(G)] Lysergic acid diethylamide [3H(G)] levo-Methadone [1-3H] Thyrotropin Releasing Hormone [L-proline-2,3-3H(N)] Vitamin A, (all trans) [1-3H(N)]

# LIPIDS AND FATTY ACIDS

Arachidonic acid [5,6,8,9,11,12,14,15-3H(N)] 8,11,14-Eicosatrienoic acid [ $2^{-14}$ C] L-Glycerol 1-phosphate, disodium salt [ $^{14}$ C(U)] Isopentenyl pyrophosphate, trilithium salt [ $1^{-14}$ C] Linoleic acid [ $^{14}$ C(U)] Malonyl coenzyme A [malonyl- $2^{-14}$ C] Phosphatidyl inositol (algae) [ $^{14}$ C(U)] L-Phytol [ $^{14}$ C(U)] Prostaglandin-A<sub>1</sub> [ $5,6^{-3}$ H(N)] Prostaglandin-F<sub>1</sub> $\alpha$  [ $5,6^{-3}$ H(N)] Prostaglandin-F<sub>2</sub> $\alpha$  [ $9^{-3}$ H(N)] 8,11,14-Eicosatrienoic acid [2-14C]

# MISC. BIOLOGICAL CHEMICALS

δ-Aminolevulinic acid hydrochloride [5-14C] Spermidine trihydrochloride [3-aminopropyl-3-3H(N)] Spermine tetrahydrochloride [3-aminopropyl-3-3H(N)]

## **NUCLEOSIDES**

Adenosine [2-3H] Deoxyguanosine [8-14C] Thymidine [6-3H] Thymidine [methyl-3H] Uridine [5,6-3H] Uridine [14C(U)]

# **NUCLEOTIDES**

Adenosine 3',5'-cyclic phosphate, ammonium salt [3H(G)]

Adènosine 5'-triphosphate, tetra (triethylammonium) salt  $[\alpha^{-32}P]$ Àdenosine 5′-triphosphate, tetra

(triethylammonium) salt [γ-32P] 5-Bromo-2'-deoxyuridine 5'-triphosphate,

tetrasodium salt [6-3H(N)]

Cytidine 5'-monophosphate sialic acid

[sialic-4,5,6,7,8,9-14C]

Cytidine 5'-triphosphate, tetra (triethylammonium) salt [α-32P

Deoxycytidine 5'-monophosphate, diammonium salt [5-3H]

Deoxycytidine 5'-triphosphate, tetrasodium salt [5-3H]

Deoxyguanosine 5'-triphosphate, tetrasodium salt [3H(G)]

Deoxyguanosine 5'-triphosphate, tetrasodium salt [8-14C]

Guanosine 3',5'-cyclic phosphate, ammonium salt [3H(G)]

Guanosine 5'-triphosphate, tetra

(triethylammonium) salt  $[\alpha^{-32}P]$ Guanosine 5'-triphosphate, tetra

(triethylammonium) salt [γ-32P]

Guanosine 5'-triphosphate, tetrasodium salt [8-14C] 3'-Phosphoadenosine-5'-phosphosulfate,

tetrasodium salt [35S]

Thymidine 5'-triphosphate, tetra

(triethylammonium) salt  $[\alpha^{-32}P]$ 

**Uridine diphosphate glucose** [glucose-1-3H]

Uridine 5'-monophosphate, diammonium salt [5-3H] Uridine 5'-triphosphate, tetra (triethylammonium)

salt [α-32P] Uridine 5'-triphosphate, tetrasodium salt [5,6-3H]

# **PURINES AND PYRIDIMINES**

Adenine [2-3H] 5-Fluoroorotic acid, monohydrate [2-14C] Thymine [methyl-3H] Uracil [5,6-3H]

# 1251 AND 203Hg LABELED COMPOUNDS

Albumin (bovine serum) [125] Angiotensin I (5-L-isoleucine) [tyrosyl-125] Angiotensin II (5-L-valine) [tyrosyl-125] Bradykinin (8-tyrosine) triacetate [8-tyrosyl-125]] Human growth hormone [125]] lodine-131 (High volumetric concentration)
4-lodoantipyrine [125]
5-lododeoxyuridine [125]
Methyl mercury choride [203Hg] Phenyl mercury acetate [203Hg]

# REAGENTS

Butyryl choline iodide [butyryl-1-14C] Carbamyl phosphate, dilithium salt [14C] Dansyl chloride 5-Dimethylamino-1-naphthalenesulfonyl chloride [methyl-3H] 2,4-Dinitrofluorobenzene [3,5-3H]
N-Ethyl maleimide [ethyl-2-3H]
α-Ketoglutaric acid, sodium salt [1-14C]
α-Ketoglutaric acid, sodium salt [14C(U)] L-Lactic acid, sodium salt [14C(U)] Methyl mercury chloride [14C] Sodium ferrocyanide decahydrate [14C] Succinic anhydride [1,4-14C]

# **STEROIDS**

Chenodesoxycholic acid [3H(G)] Cholic acid [2,4-3H] Cnoiic acid [2,4-3H]
Corticosterone [1,2,6,7-3H(N)]
Dihydrotestosterone [4-14C]
17-α-Ethynylestradiol [3H(G)]
Glycocholic acid [cholic-3H(G)]
Glycocholic acid [glycine-1-14C]
Hydrocortisone [1,2,6,7-3H(N)] 25-Hydroxyvitamin D<sub>3</sub> [26,27-3H] Progesterone [1,2,6,7-3H(N)] Testosterone [1,2,6,7-3H(N)] Testosterone  $[1\alpha, 2\alpha^{-3}H(N)]$ 



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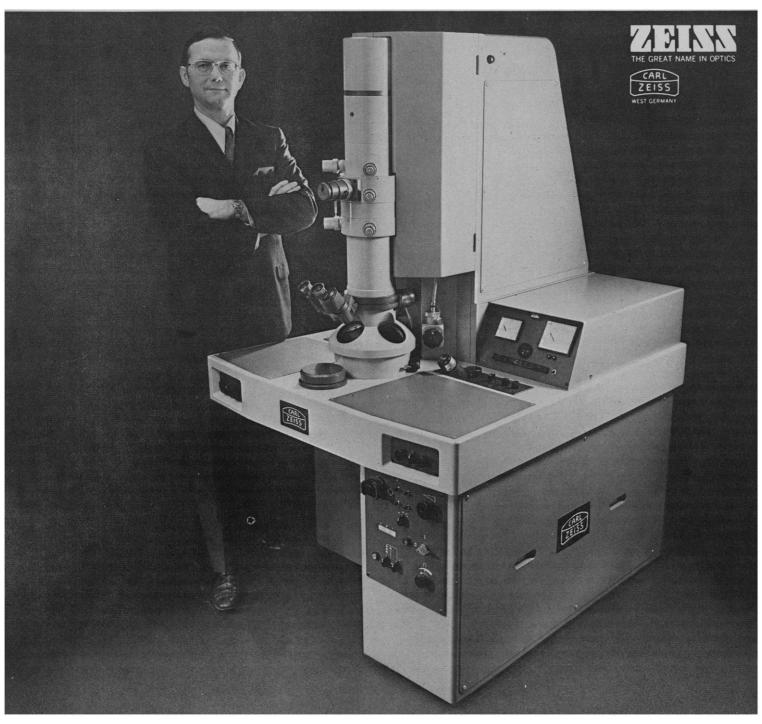
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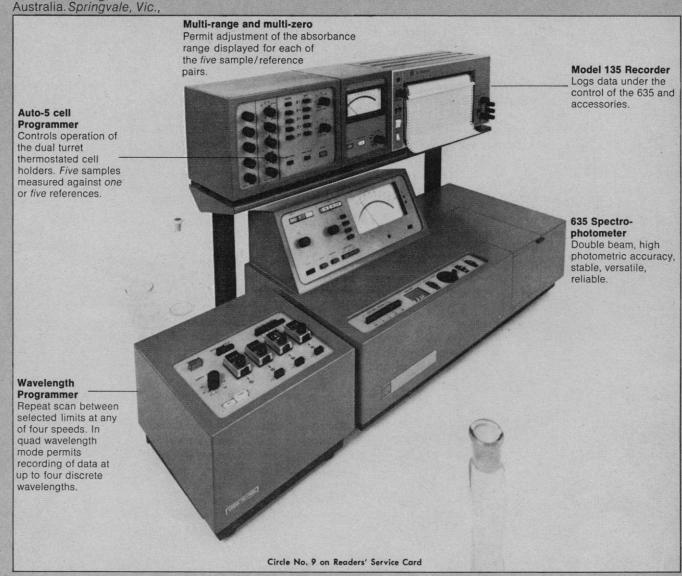
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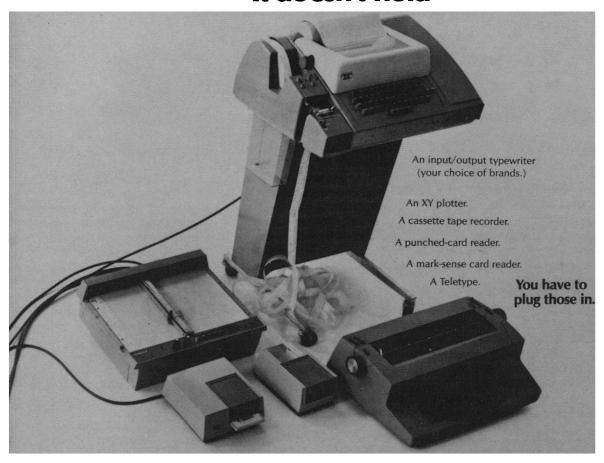
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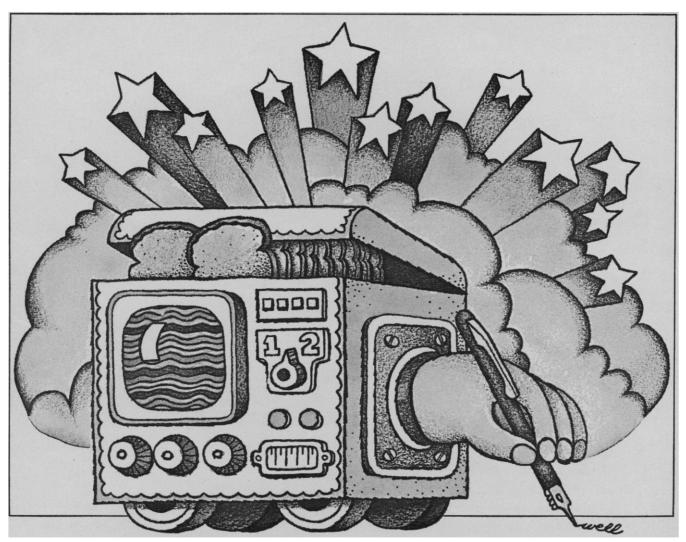
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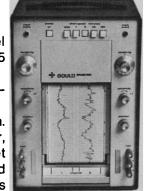
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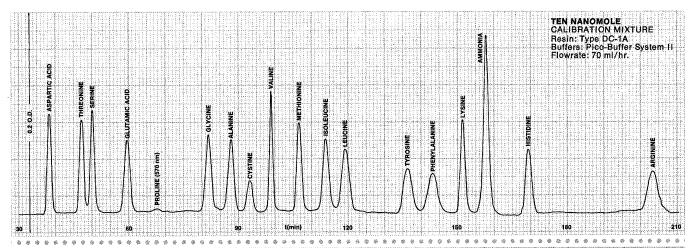
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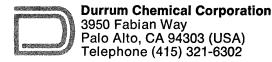
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ing of the hypotheses of the day. This point of view is now sweeping through the discipline, and is being widely adopted in the current generation of graduate students. To many archeologists, then, salvage archeology, conceived of as digging simply for the sake of digging, has now come into very grave disrepute.

A recent article by Thomas F. King (2) summarizes the conflict that has arisen between the intellectual goals of many archeologists and the immediate practical necessities of salvage projects.

The simplest solution to the conflict between the interests of new archeologists and salvage-support organizations, King points out, is to disengage; but a mutual withdrawal will obviously have most unfortunate results. The salvage archeology agencies can find enough trained persons to carry out necessary excavations, but they will lose essential intellectual and material support from the academic community; and the academic archeologists, in a short time, will lose all the sites to the forces of destruction.

King says that the salvage agencies should yield to the point of view of the new archeology and be reorganized accordingly. The best solution, he suggests, is for salvage agencies and theoryoriented archeologists together to work out, for given geographical regions, large-scale long-range research projects in which salvage is incorporated within a deductive research program. Given the present self-righteous, more-scientific-than-thou attitude of new archeologists, which is so clearly expressed throughout King's article, however, it is doubtful that cooperation between academics and salvage program administrators in the face of the immediate crisis of destruction described by Davis can be achieved in time.

Meanwhile, given the present atmosphere within the profession, it seems likely that new archeologists and their graduate student followers (who, incidentally, may perhaps be the last generation to see an undisturbed archeological site in certain areas) will continue to be explicitly disdainful or even fearful of undertaking fieldwork without specific deductive hypotheses to test; or before the millenarian development "more sophisticated" theory and methodology with universal application. One scholar (3) has already called for a moratorium of at least 5 years on all professional archeological excavations in the State of Oregon, despite the horrendous rate of destruction of Oregon sites which he himself documents, for fear that, with the presently perceived deficient state of theory and methodology in archeology, excavation even by professionals will ruin the remaining sites for the truly scientific and anthropological analyses which are expected to come from the new archeology.

The crisis in American archeology that Davis describes, then, has caught professional archeologists in a bind between idealism and reality. It looks as if the result could be paralysis and loss

RUTH GRUHN

Department of Anthropology, University of Alberta, Edmonton, Alberta, Canada

### References

See B. K. Swartz, Amer. Antiquity 32, 487 (1967); L. R. Binford, ibid. 29, 425 (1964); in New Perspectives in Archaeology, S. R. Binford and L. R. Binford, Eds. (Aldine, Chicago, 1968); J. M. Fritz and F. T. Plog, Amer. Antiquity 35, 405 (1970); G. Kushner, ibid., p. 125.

p. 125. 2. T. F. King, Amer. Antiquity 36, 255 (1971). 3. T. M. Newman, Tebiwa 14, 1 (1971).

If the destruction of archeological sites is to be prevented, more assistance is needed from professional archeologists. If the archeologist becomes involved at the planning and early stages of development projects, site destruction, as well as salvage, can be avoided. Archeologists may have to serve in dual capacities to achieve these ends. One young archeologist in southwestern Colorado served as the rod man on a seismograph crew so he could direct the survey line away from archeological sites.

Enforcement and conviction of archeological looters occurs under present laws and works best with the cooperation of the archeologist. The Bureau of Land Management (BLM) in California, with the help of the FBI and a college student, convicted a man under the Antiquities Act for stealing a bedrock mortar valued at \$1000 from public lands. The FBI recovered a Mayan stela worth \$350,000 from a collector, under laws that deal with interstate transportation of stolen goods. Convictions have been obtained by the BLM and the Forest Service under state antiquity laws in Utah.

There is a need to stress all aspects of the preservation of archeological sites and their proper recreational use. Popular articles extolling preservation should be written by professional archeologists. Talented students should be encouraged to work for the government in the archeological preservation

field. Finally, museums need to adopt an accessions ethic for the purchase of archeological materials from the United States, as well as from foreign countries.

LLOYD M. PIERSON

U.S. Department of the Interior, Bureau of Land Management, Denver Federal Center, Building 50. Denver, Colorado 80225

The antiquities market should be exploited rather than suppressed. There is obviously reason enough for all museums to want all the "goodies" of any ancient civilization, but knowledge and preservation might both be improved if the sale of these art objects were sponsored by the government, scientifically controlled, and if their ultimate sale price went to finance the proper excavation of such items. The purchaser would prefer a pedigree to go with his purchase, and the object would probably land in a museum anyway, if proper tax credits are continued.

Like many social proposals, the idea of retaining historical items as part of the public property of the country is idealistic, but human morality often suffers from the effects of greed.

FREDERIC JOHNSON

111 North Odem Avenue. Sinton, Texas 78387

# **Smoking at Scientific Meetings**

A. B. Pardee's suggestion (Letters, 17 Mar., p. 1194) that smokers be separated from nonsmokers at scientific meetings is fine, so long as the nonsmokers are not downwind from the smokers.

W. W. G. SCHARLACH Post Office Box 6367,

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## **Proximate Cause**

James S. Dwight, Jr. (Letters, 11 Feb., p. 581), of the California Department of Finance, objects to the implication that Governor Reagan denied faculty salary increases for 2 years in a row, since Governor Reagan did recommend an increase for 1970–71. Dwight concedes that no increase was recommended for 1971–72. But it must be remembered that, in addition to failing to recommend an increase, Reagan vetoed a 1971–72 10 percent

faculty pay raise for our university and state college systems which had been passed by the legislature. Later in the legislative session, when a second bill authorizing a 7.5 percent increase was passed, he also vetoed that. What galls is Dwight's remark on the limited authority of the governor's office, "The governor proposes, but the legislature ultimately disposes." It was Governor Reagan alone who disposed (twice) of our 1971–72 pay increase, and by doing so he and he alone was responsible for our being denied a salary increase for two consecutive years.

RICHARD H. O'CONNELL Department of Psychology, San Fernando Valley State College. Northridge, California 91324

# Crystal Structure of UpA

Although we referred to the paper of Seeman et al. (1) on the crystal structure of uridylyl (3',5') adenosine hemihydrate (UpA) in our report on the same structure (3 Dec., p. 1020), the relationship between these two structural determinations was not made clear. Herein, we wish to clarify the matter.

Seeman et al. studied the crystal structure of UpA independently from us and in parallel. Although different conditions were used in crystallizing the UpA, the two structures were, indeed, identical. In retrospect, it is apparent that the Seeman group completed the structure analysis prior to us. Their original paper in Nature New Biology was submitted on 24 May 1971, at which time our structure determination was only partially complete. However, their paper did not appear in print until after our paper had been submitted to Science (31 August 1971). In addition, Seeman et al. reported the structure of UpA at the American Crystallographic Association meeting, which took place on 15 to 20 August 1971 at Ames, Iowa. At that time, our structure had been solved and was being refined, as was reported by M. Sundaralingam at the meeting.

J. Rubin
T. Brennan
M. Sundaralingam

Department of Biochemistry. University of Wisconsin, Madison 53706

### Reference

N. C. Seeman, J. L. Sussman, H. M. Berman,
 S. H. Kim, Nature New Biol. 233, 90 (1971).



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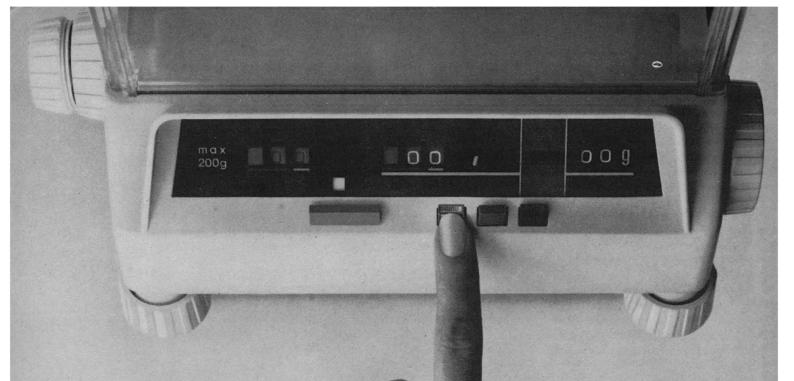
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# The President's Message on Science and Technology

The nation's first presidential message on science and technology, which went to the Congress late last month, affirms many of the policies long advocated by the scientific community. For example, the President specifically stated that all federal departments and agencies will support basic research. He also called for stronger efforts to improve the scientific and technological basis for setting federal standards and regulations in antipollution efforts and public health. By virtue of presidential endorsement, such statements become national policies and constitute directives to the federal agencies.

The message is a landmark. It represents the foundations for a coherent science policy for the United States and clear-cut recognition that science policy is an integral part of our overall national policies. The message is therefore enormously important to those who comprise the nation's scientific and technological enterprise. It is backed by budget actions, among them a proposed 12 percent increase in university R & D support and a \$700-million increase in R & D related to domestic concerns such as energy, transportation, and environment.

The nation's new R & D thrusts point toward problem-solving on the domestic front as the fastest growing component of the fiscal 1973 budget (some 15 percent this year as opposed to a 9 percent growth in defense R & D). To power these thrusts, the President called for the creation of new partnerships among the various sectors of our society so that domestic R & D can be really effective. Cooperation between the federal government and universities is already well established. It must be augmented by cooperative arrangements with industry and local governments. These new elements are needed to crystallize the results of research for the benefit of society and to broaden the all-too-narrow base of university R & D support.

The message also proposed that the federal government stimulate private investment in R & D through cost sharing, patent licensing, encouraging research associations, and making venture capital more readily available to small, innovative companies. These federal catalysts, along with the forging of new partnerships, will give the R & D enterprise of the 70's a different look. We foresee a new synthesis of science and technology, one in which enhanced fundamental research will, as always, provide new potential for development, but where applied research and development will also stimulate and enhance fundamental work.

Also recognized in the message is the expanding role and need for international cooperative efforts. In addition to the traditional camaraderie of individual scientists, international problem-solving is seen as a new source of cooperation among nations, particularly in meeting environmental, health, and energy problems common to all. The President clearly intends that the United States shall take the initiative in many of these cooperative efforts.

Finally, the message is pro-science and pro-technology. It recognizes that search for knowledge and exploration of the unknown are fundamental human drives in the best traditions of American life. It states clearly that we as a society require more—rather than less—technology to improve both our standard of living and our quality of life. The President projects a bright future for science and technology, but his message challenges us to meet that future not only in the interests of our disciplines but also of our society and the world community.

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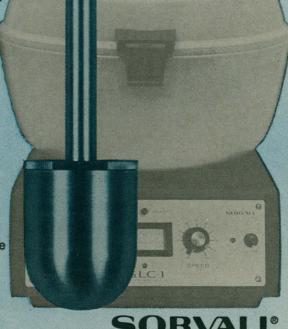
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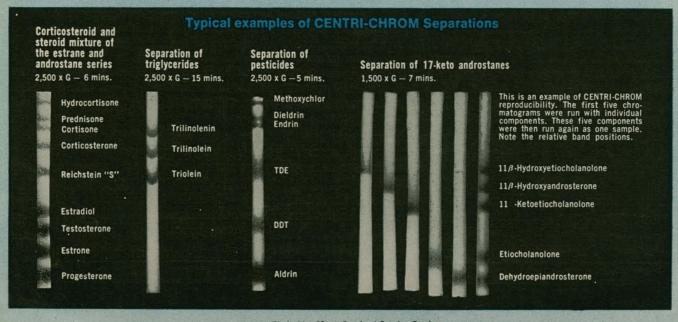
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(Continued from page 400)

Human Evolution. David Pilbeam. Macmillan, New York, 1972. x, 208 pp., illus. Paper, \$3.25.

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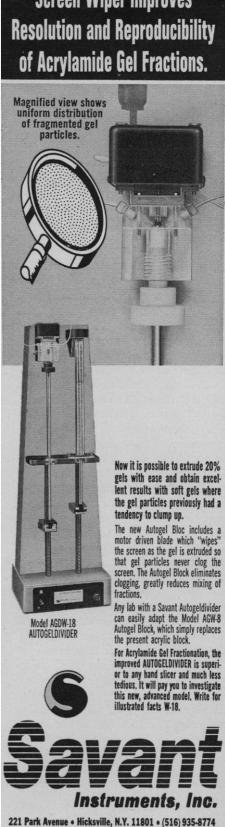
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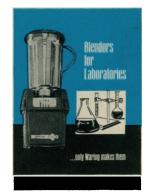
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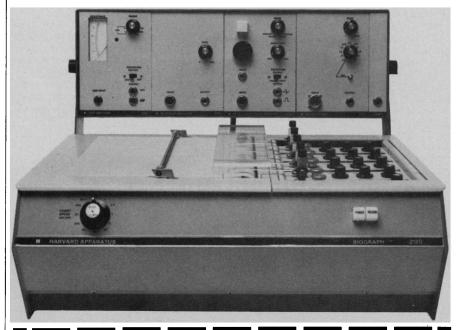
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