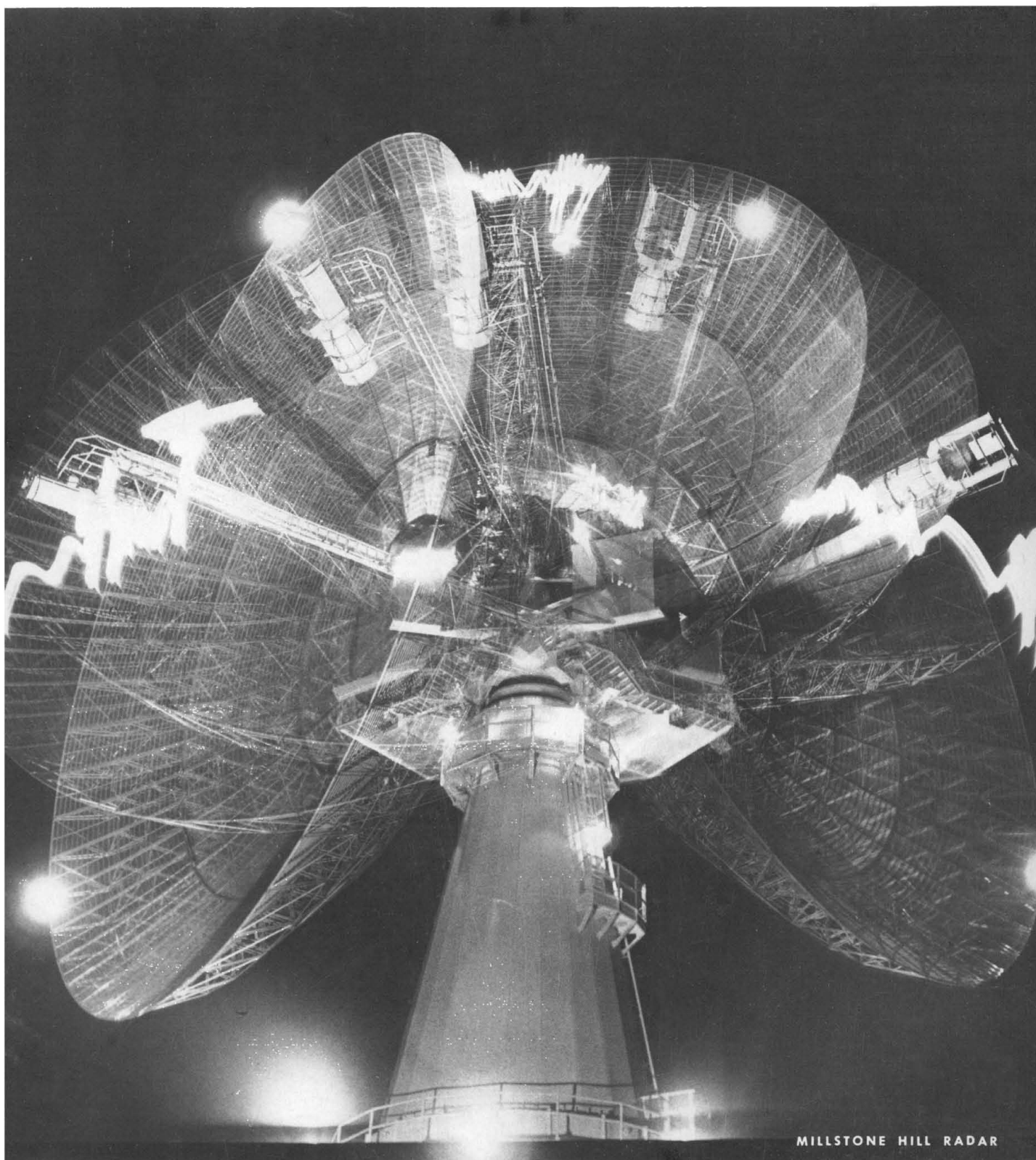


# SCIENCE

31 May 1968

Vol. 160, No. 3831

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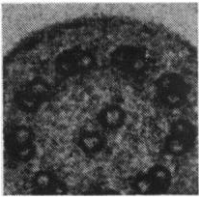
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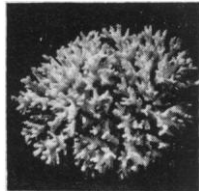
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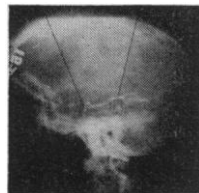
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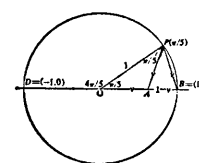
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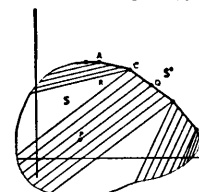
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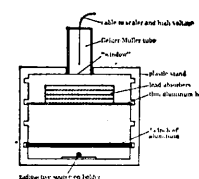
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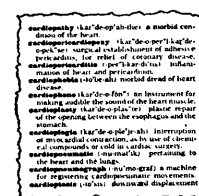
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<b>LETTERS</b>	Computer Costs: Two Alternatives: <i>M. E. Rose</i> ; Census: A Probe into Privacy?: <i>I. Crespi</i> ; <i>J. E. Betts</i> ; Who Stages Military Coups?: <i>G. W. Price</i> ; Fireflies of Thailand: <i>S. M. Seidman</i> ; Buchanan at St. John's College: <i>G. A. Green</i> ..... 947
<b>EDITORIAL</b>	Amino Acid Sequences in Proteins ..... 951
<b>ARTICLES</b>	The Rover Nuclear Rocket Program: <i>R. W. Spence</i> ..... 953 Friction of Rubber on Wet Surfaces: <i>E. M. Bevilacqua</i> and <i>E. P. Percarpio</i> ..... 959 Congress and the Science Budget: <i>H. Roback</i> ..... 964
<b>NEWS AND COMMENT</b>	French Student Revolt: An Account of the Origins and Objectives ..... 971 Financial Plight at McGill: Quebec Favors Its French Universities ..... 974 Harvard Faculty: How Can You Keep 'em after They've Seen California? ..... 977
<b>BOOK REVIEWS</b>	<i>Microbiology</i> , reviewed by <i>J. W. Moulder</i> ; other reviews by <i>A. Lang</i> ; <i>R. Bracewell</i> ; <i>F. L. Hinton</i> ; <i>H. B. Rosenstock</i> ; <i>C. F. Wilkinson</i> ; <i>R. Schaeffer</i> ; <i>E. Leach</i> ; <i>H. L. Stahnke</i> ; <i>F. O. Arntz</i> ..... 979
<b>REPORTS</b>	The Case for the Radar Radius of Venus: <i>M. E. Ash</i> et al. .... 985 Radar Determination of the Radius of Venus: <i>W. G. Melbourne</i> , <i>D. O. Muhleman</i> , <i>D. A. O'Handley</i> ..... 987 Old Faithful: A Physical Model: <i>F. Geis, Jr.</i> ..... 989 Detection of Lyman- $\beta$ and Helium Resonance Radiation in the Night Sky: <i>J. M. Young</i> et al. .... 990 <i>Ceratoscopelus maderensis</i> : Peculiar Sound-Scattering Layer Identified with This Myctophid Fish: <i>R. H. Backus</i> et al. .... 991 Superconducting Phosphorus: <i>J. Wittig</i> and <i>B. T. Matthias</i> ..... 994

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Concentration-Gradient-Driven Convection: Experiments: <i>D. G. Thomas and R. A. Armistead</i> .....	995
Tyrosine- $\alpha$ -Ketoglutarate Transaminase: Induction by Epinephrine and Adenosine-3',5'-Cyclic Phosphate: <i>W. D. Wicks</i> .....	997
Iodine Incorporated in Cell Constituents during Sensitization to Radiation by Iodoacetic Acid: <i>M. A. Shenoy, B. B. Singh, A. R. Gopal-Ayengar</i> .....	999
Yolk Protein: Structural Changes during Vitellogenesis in the Cockroach <i>Leucophaea maderae</i> : <i>V. J. Brookes and R. K. Dejmal</i> .....	999
Generalized Gangliosidosis: Beta-Galactosidase Deficiency: <i>S. Okada and J. S. O'Brien</i> .....	1002
Lactate Dehydrogenase Isozymes in Parthenogenetic Teiid Lizards ( <i>Cnemidophorus</i> ): <i>W. B. Neaves and P. S. Gerald</i> .....	1004
Vitamin A-Induced Synthesis of Alkaline Phosphatase: <i>P. A. Riley and R. I. C. Spearman</i> .....	1006
Cystathionine Synthase in Tissue Culture Derived from Human Skin: Enzyme Defect in Homocystinuria: <i>B. W. Uhlenendorf and S. H. Mudd</i> .....	1007
3-Acetylpyridine: Effects in vitro Related to Teratogenic Activity in Chicken Embryos: <i>A. I. Caplan, E. Zwilling, N. O. Kaplan</i> .....	1009
Circadian Activity Rhythm of the Deer Mouse, <i>Peromyscus</i> : Effect of Deuterium Oxide: <i>R. B. Suter and K. S. Rawson</i> .....	1011
Mixed Lymphocyte Reaction: An in vitro Test for Antilymphocytic Serum Activity: <i>M. R. Schwarz, R. W. Tyler, N. B. Everett</i> .....	1014
Neurohumoral Interaction in the Rat Amygdala after Central Chemical Stimulation: <i>G. Singer and R. B. Montgomery</i> .....	1017
Junctional Physiology and Motor Nerve Distribution in the Fast Adductor Muscle of the Scallop: <i>D. Mellon, Jr.</i> .....	1018
Receptive Field Organization of the S-Potential: <i>A. L. Norton et al.</i> .....	1021
<i>Technical Comments</i> : Archaeological Excavations in the Calico Mountains, California: Preliminary Report: <i>L. S. B. Leakey, R. D. Simpson, T. Clements</i> ; Cold Flour Beetle: Reminiscence or Change of Bias: <i>J. A. Deutsch; A. Routtenberg, T. M. Alloway, W. F. Hill</i> ; Submarine Trenches and Deformation: <i>W. M. Elsasser; R. von Huene, D. W. Scholl, J. B. Ridlon</i> .....	1022


<b>MEETINGS</b>	Neuronal Spike Trains: <i>M. J. Wayner and Y. Oomura</i> ; Calendar of Events (Courses) ..	1025
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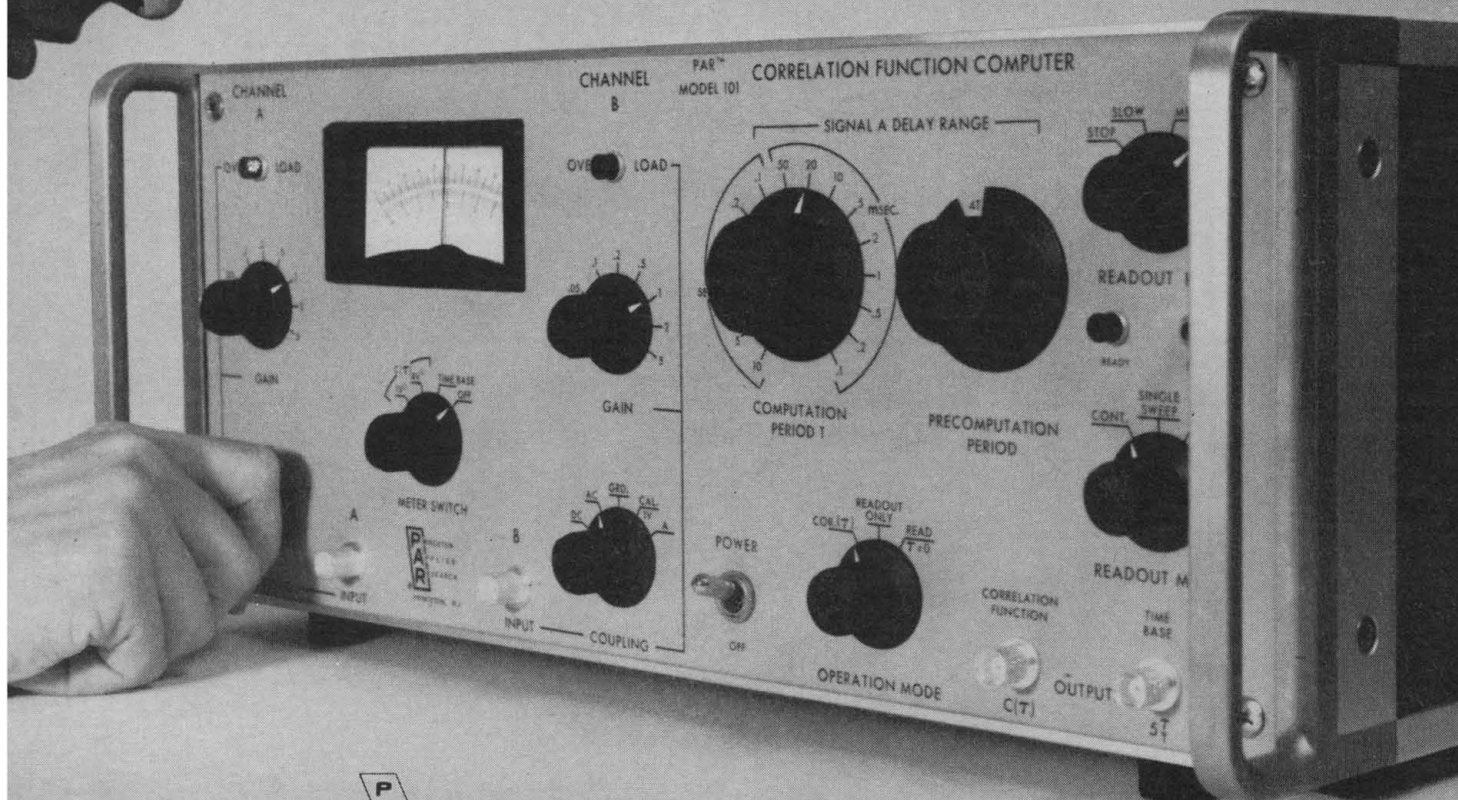
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vast undercount. According to figures quoted in a House hearing, pretests for the 1970 census show a declining response to the questionnaire: Louisville (1964), 84 percent; Cleveland (1965), 75 percent; New Haven (1967), 72 percent; and North Philadelphia, under 40 percent. This form requires an 8th-grade education and a minimum of 33 minutes to complete, provided the respondents have the information and willingness to cooperate.

2) Among many Americans there is growing resistance to the built-in harassment of the proposed 1970 census. I predict refusals to answer the utility questions and those of a very personal nature will be high if the threat of fine and jail is not removed. That all questions justify mandatory response is wholly unjustifiable.

3) The crux of the issue is: Which is more important, the number of toilets, and so forth, in America or a complete headcount? I suggest that the Census Bureau will get a hodgepodge on both unless alternative ways to get detailed population, household, and employment data are developed. May I advance this proposal for your readers' consideration: defer many of the questions to a sample household survey to be conducted every 2 years, leaving the decennial census to serve its constitutional function—a headcount of the population for apportionment purposes.

Census policy has concerned itself exclusively with the user community which, over the years, has caused the decennial questionnaire to grow like topsy. I represent more than a trivial group in Congress and the nation when I urge reform on behalf of the statistical givers, their privacy, and their tolerance.

JACKSON E. BETTS

*House of Representatives,  
Washington, D.C. 20515*

### Who Stages Military Coups?

Scott (Letters, 29 Mar.) mars an otherwise thoughtful discussion of draft policy by saying "One alternative, a large professional army, is so potentially dangerous from the viewpoint of a possible military coup and dictatorship that it should not even be considered." Is there any reason to believe this? Has any correlation been shown between the absence of conscription and the incidence of coups? I think not. Nor is this surprising. After all, coups are usually

staged by colonels and generals, who are nearly always professionals even in conscript armies.

For that matter, why should we assume that professional soldiers are any less committed to their nation's institutions than are civilians or conscripts? We might more easily suppose the reverse, since they have chosen to risk their lives in their nation's service. The occurrence of a military coup is no evidence that the military are any more disaffected or megalomaniacal than other elements of the society; the obvious explanation is that they are the element with the best chance of succeeding in a coup, and therefore the most likely to try. I suggest that the military coup is a symptom of a sickness of the whole society, and not of anything peculiar to military professionalism.

GEORGE W. PRICE

*1439 West North Shore Avenue,  
Chicago, Illinois 60626*

### Fireflies of Thailand

My thanks to *Science* and the Bucks for the very interesting report on fireflies ("Mechanism of rhythmic synchronous flashing of fireflies," 22 Mar., p. 1319). How resourceful are the male fireflies of Thailand thus to enhance the signal-to-noise ratio for reception of the female response!

STANLEY M. SEIDMAN

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### Buchanan at St. John's College

The announcement of the death of Scott Buchanan (12 Apr., p. 174) incorrectly identified him with St. John's University; it should have read St. John's College, in Annapolis, Maryland. Buchanan was dean of St. John's and Stringfellow Barr was its president in 1937 when they introduced its "radically traditional" curriculum involving the "great books." During recent years these men have been fellows of the Center for the Study of Democratic Institutions in Santa Barbara, California. Buchanan's lively mind and trenchant wit will be greatly missed by all whose lives touched his.

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EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Phone: 202-387-7171. Cable: Advancesci. Washington. "Instructions for Contributors" was published 29 March 1968; copies can be obtained from the editorial office. ADVERTISING CORRESPONDENCE: Room 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE 6-1858.

## Amino Acid Sequences in Proteins

One of the most important research activities today is the determination of amino acid sequences of proteins. The results are leading to improved biological classification and insight into the mechanisms of evolution. The results will provide new evidence concerning the compositions of the proteins of organisms that lived billions of years ago and will furnish valuable clues to the understanding of present-day metabolic diseases.

One of the most significant studies thus far made is a detailed examination of cytochrome *c*. Comparison of the amino acid sequences in variants of this protein obtained from such diverse forms as yeast and man showed that, in many positions in the molecules, the amino acids were identical. The extent of differences among the various specimens was related to differences in the forms studied. When specimens of cytochrome *c* from more animals have been examined and when other kinds of protein have likewise been studied, an important new dimension will be added to phylogeny.

Understanding of mechanisms of evolution has already been enhanced through sequence studies of the globins. In a lower vertebrate, the lamprey, hemoglobin consists of a single protein chain of molecular weight 17,000. Apparently in higher animals the gene for this protein was duplicated. The two genes evolved separately so that they could code for two different chains,  $\alpha$ - and  $\beta$ -hemoglobins. Later the gene for the  $\beta$ -chain evolved further, so that, in addition to  $\beta$ -hemoglobin chains,  $\gamma$ - and  $\delta$ -hemoglobin chains are produced.

Neurath, Walsh, and Winter\*, in their studies of proteases, have found the same type of behavior, and they describe their view of this important phenomenon as follows: "The principal mechanism for increasing the size of the genome in the population is the process of gene duplication. . . . The utility of this process lies in the fact that the original function of the duplicated gene is preserved, thus freeing the new gene from selection pressure." Comparison of amino acid sequences in proteins is a means for determining the extent to which this mechanism has been employed in evolution.

Another type of difference in proteins is introduced by single mutations. Already more than 22 variants of  $\alpha$ -hemoglobin and 43 variants of  $\beta$ -hemoglobin have been found in humans.† One of these, a change from glutamic acid to valine in the 6-position of  $\beta$ -hemoglobin, results in sickle-cell anemia.

A host of additional proteins are being examined, and the number of sequences determined has been doubling each year. Techniques for the determination of sequence continue to improve. Especially notable is the Edman Sequenator.‡ In this device, phenyl isothiocyanate reacts with the terminal  $\alpha$ -amino group of a protein or peptide. The modified  $\text{NH}_2$ -terminal residue is then selectively removed, the chain being thus shortened by one unit. Repetitive cycles with identification of the removed amino acid derivative have established sequences of more than 40 amino acids.

Even with improved methods, the research will not be completed soon. There are countless organisms, and each contains unnumbered proteins. Further progress in this important field will depend on the quality of the intuitive judgment with which scientists select materials for study.

—PHILIP H. ABELSON

\* H. Neurath, K. A. Walsh, W. P. Winter, *Science* **158**, 1638 (1967). † M. O. Dayhoff and R. V. Eck, *Atlas of Protein Sequence and Structure 1967-68* (National Biomedical Research Foundation, Silver Spring, Md., 1968). ‡ P. Edman and G. Begg, *European J. Biochem.* **1**, 80 (1967).



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