9/20/77 [3]

Folder Citation: Collection: Office of Staff Secretary; Series: Presidential Files; Folder: 9/20/77 [3]; Container 42

To See Complete Finding Aid:
http://www.jimmycarterlibrary.gov/library/findingaids/Staff_Secretary.pdf

THE WHITE HOUSE
WASHINGTON

September 20, 1977

Stu Eizenstat

The attached was returned in the President's outbox. It is forwarded to you for your information.

Rick Hutcheson

RE: LETTER FROM ARTHUR BURNS ON TAX-REFORM LEGISLATION

THE WHITE HOUSE
WASHINGTON

	FOR STAFFING
	FOR INFORMATION
/	FROM PRESIDENT'S OUTBOX
	LOG IN/TO PRESIDENT TODAY
	IMMEDIATE TURNAROUND

ACTION	FYI	
		MONDALE
		COSTANZA
	/	EIZENSTAT
		JORDAN
		LIPSHUTZ
		MOORE
		POWELL
		WATSON
		LANCE
		SCHULTZE

	ENROLLED BILL
	AGENCY REPORT
	CAB DECISION
	EXECUTIVE ORDER

Comments due to Carp/Huron within 48 hours; due to Staff Secretary next day

		ARAGON
		BOURNE
		BRZEZINSKI
		BUTLER
		CARP
		H. CARTER
		CLOUGH
		FALLOWS
		FIRST LADY
		HARDEN
		HUTCHESON
		JAGODA
		KING

	KRAFT
	LINDER
	MITCHELL
	MOE
	PETERSON
	PETTIGREW
	POSTON
	PRESS
	SCHLESINGER
	SCHNEIDERS
	STRAUSS
	VOORDE
	WARREN

THE WHITE HOUSE

WASHINGTON

9-20-77

To Chairman Arthur Burns

I have read your letter with care, and it will be helpful to me as we make decisions on tax reform proposals.

Thank you -

Jimmy

Stu
info
F

CHAIRMAN OF THE BOARD OF GOVERNORS
FEDERAL RESERVE SYSTEM
WASHINGTON, D. C. 20551

September 19, 1977

The President
The White House
Washington, D. C.

Dear Mr. President:

I understand that during the next two or three weeks you will be making a series of major decisions about tax-reform legislation. While tax policy is outside the framework of my official responsibility, I am taking the liberty of writing to you on the subject because of my conviction that the course decided upon could make a crucial difference to our Nation's ability to sustain progress toward full employment.

I am convinced that the vigor of general economic activity during the next several years will depend critically on whether the climate for capital formation can be improved. So far in this recovery, both consumer spending and housing activity have performed quite satisfactorily. What we have conspicuously lacked is normal strength in business capital investment.

Not only has the volume of business investment been disappointing, but -- what is even more significant -- the bulk of such investment has consisted of relatively short-lived assets (trucks, office equipment, and light machinery, for example) that promise quick returns. Businessmen have been reluctant to undertake investment projects where payback cannot be expected for many years. In fact, the decline of industrial construction that began in the winter of 1974-75 continued through the first quarter of this year, and the recovery since then has been unimpressive.

The reasons for businessmen's hesitancy in initiating major investment projects are complex, but a fundamental reason in my judgment is a pervasive feeling of uncertainty about how the economic environment is likely to evolve over the next five to ten years.

A strong residue of caution in businessmen's attitudes has carried over from the last recession -- in part, because the present generation of businessmen had come to believe that government's ability to manage aggregate demand had effectively eliminated the possibility of a serious cyclical decline. Learning otherwise was for many a very sobering experience. Moreover, the sense of unease has been deepened by the world-wide character of the recession and by the fact that so much of the world economy is still markedly sluggish. I also find a good deal of apprehension about the possibility that the quantum change in energy prices may be affecting the industrial world's growth potential to a more serious extent than was originally thought likely.

Added to these concerns is the fact that businessmen have had great difficulty in evaluating the implications -- especially the cost implications -- of the major program initiatives you have taken this year. I strongly suspect that the practical capacity of businessmen to assimilate new policy inputs into their planning framework has been stretched pretty far. In fact, I seldom meet with a businessman or banker these days who does not, in one way or another, voice concern about his inability to make meaningful projections of corporate costs and earnings for the years immediately ahead.

The state of mind that widely prevails in the business world was reflected in comments made at a meeting of my Board on September 9 with the Federal Advisory Council of the Federal Reserve System -- a statutory body of private bankers, one from each Federal Reserve District. The Council members, who engage in extensive sampling of business thinking in their respective Districts before attending these periodic meetings, put exceptionally heavy emphasis this time on the element of confidence as a conditioning factor in the economic outlook. They concluded a formal

report on economic conditions to the Board with the following observation:

> "Despite the favorable economic statistics, the Council believes there is general skepticism among businessmen regarding the Nation's political and regulatory environment that threatens the continuation of the expansion and has become a major, albeit abstract, economic consideration."

From long experience, I well know that businessmen and bankers often exaggerate problems -- especially when they talk to government officials; and I certainly do not mean to suggest that the mood of worry which now prevails is justified by the objective facts of the economy's performance. But the mood indisputably exists, and I would strongly urge you to give it thoughtful attention both in formulating and in presenting your proposals for change in tax statutes. Nothing would be more unfortunate at this juncture than a new disturbance to business confidence; nothing would be more beneficial than an initiative whose effect was to encourage positive business attitudes and willingness to take investment risks.

That background of considerations underscores the importance of a tax package that is unambiguously positive in its implications for profitability. Anything less than that -- or anything which suggests protracted Congressional deliberations of uncertain outcome -- could be inimical to the creation of new job opportunities.

Because of the crucial importance I attach to strengthening investment activity, I would have some preference in principle to weighting any tax-revision package in the direction of lowering levies that fall directly on businesses and investors. As a practical matter, great difficulty would be encountered in trying to develop a political consensus that would support such action. In any event, I recognize that profitability -- and, in turn, capital investment -- can be helped both by the reduction of taxes paid directly by businesses and by more generalized tax reduction that works to sustain and strengthen broad economic performance.

Therefore, if tax revenues are to be given up in some reasonable amount, there is much to be said for a package of tax proposals akin in spirit to those made by President Kennedy in the early 1960's -- featured by a schedule of broadly distributed tax reductions for both businesses and consumers. I would only add that if there is to be a general tax reduction, the need is for uncomplicated reduction -- that is, something that can be easily understood by taxpayers. The alternative of selective lowering of taxes, apart from being complicated, usually assumes more knowledge about specific effects than anyone, fiscal experts included, possesses.

Within a framework of broadly distributed tax reduction, there would still be some room for actions consistent with the pledge you have made to achieve a more equitable, a more simple, and a more efficient tax system. But I doubt the practical wisdom of pursuing a quest for abstract equity (a highly subjective matter) very far at this time.

The greatest service we could render to our citizenry through a tax bill would be to stimulate job-creating investment; that obviously won't happen if investment incentives are dulled. I would be especially concerned about making sure that any reformulation of capital-gains taxation avoids the appearance of an opening move toward the taxation of existing capital or wealth. That is a concern which my incoming mail shows to be very much on people's minds. A carefully structured reformulation of capital-gains taxation -- one that among other things allowed fully for inflation -- is certainly possible, but I would emphasize the need for great care.

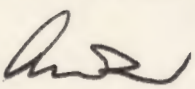
Any restructuring of capital gains taxation should meet several tests. First, it should be sensitive to the importance of encouraging equity investment. Second, it should aim at increasing the mobility of capital -- that is, the willingness of investors to switch from one asset holding to another. Third, it should seek to encourage saving -- or at least not discourage it. Fourth, it should be calculated to disperse the clouds that now overhang securities markets and business attitudes -- a need that emphatically cautions against doing anything that would risk depressing existing asset values.

Finally, and what I think may be most important of all, the approach to capital-gains taxation should keep alive the American dream of upward mobility by means of successful entrepreneurship. There are literally thousands of highly successful business firms and farming operations in our country that would never have been launched had it not been for the opportunities afforded by preferential capital-gains treatment. Even with existing capital-gains treatment, the disincentives to mobilizing and employing high-risk venture capital have become enormous. An end to preferential treatment of capital gains could spell an end to the much-shrunken venture capital market in America. If the marketplace for venture capital dries up because of unwise policy, no amount of government stimulus will restore the lost dynamism and growth potential. We need to weigh very carefully, I think, the risks of aggravating an already worrisome situation.

I recognize that over-all tax reform could be so structured as to minimize the danger of undesirable results. But that will be exceedingly difficult to achieve in practice. Avoiding the fallacy of averages is especially important. An arithmetical demonstration that investors as a group -- or businesses as a group -- will be either better off or no worse off under some proposed changes in tax law can be highly misleading. People and businesses do not pay taxes out of a group pocketbook. They pay individually, which means, of course, that a computed average tax burden may mean little when it comes to assessing the effect of a particular tax on attitudes and incentives. While the point is obvious, I have seen it repeatedly neglected over the years.

What I am stressing, Mr. President, is that complex tax legislation can easily generate unexpected results. I believe it is essential that you be thoroughly satisfied that your tax-reform proposals will assist capital formation -- and be so perceived -- before you unveil them.

Sincerely yours,



Arthur F. Burns

Copy to:
Messrs. Blumenthal, Lance, Schultze

THE WHITE HOUSE
WASHINGTON

September 20, 1977

The Vice President
Stu Eizenstat
Charles Schultze

The attached will be submitted to the President today. This copy is forwarded to you for your information.

Rick Hutcheson

LETTER FROM ARTHUR BURNS ON
TAX REFORM LEGISLATION

THE WHITE HOUSE
WASHINGTON
September 20, 1977

Jim King
Frank Presss

The attached was returned in the President's outbox. It is forwarded to you for appropriate handling.

Rick Hutcheson

cc: Hamilton Jordan
Tim Kraft

RE: NATIONAL MEDAL OF SCIENCE NOMINATIONS

THE WHITE HOUSE
WASHINGTON

	FOR STAFFING
	FOR INFORMATION
X	FROM PRESIDENT'S OUTBOX
	LOG IN/TO PRESIDENT TODAY
	IMMEDIATE TURNAROUND

Press memo only to Press + King; include my note for Kraft and Jordan

ACTION	FYI	
		MONDALE
		COSTANZA
		EIZENSTAT
	/	JORDAN
		LIPSHUTZ
		MOORE
		POWELL
		WATSON
		LANCE
		SCHULTZE

no Tabs

	ENROLLED BILL
	AGENCY REPORT
	CAB DECISION
	EXECUTIVE ORDER

Comments due to Carp/Huron within 48 hours; due to Staff Secretary next day

		ARAGON
		BOURNE
		BRZEZINSKI
		BUTLER
		CARP
		H. CARTER
		CLOUGH
		FALLOWS
		FIRST LADY
		HARDEN
		HUTCHESON
		JAGODA
/		KING

/	KRAFT
	LINDER
	MITCHELL
	MOE
	PETERSON
	PETTIGREW
	POSTON
/	PRESS
	SCHLESINGER
	SCHNEIDERS
	STRAUSS
	VOORDE
	WARREN

THE WHITE HOUSE
WASHINGTON

9/16/77

Mr. President:

The Presidential Personnel Office recommends that no award be given to Professor Wilson at this time - "to recognize Wilson at this time would be asking for criticism from women's groups and minority groups." Jordan agrees.

A high-lighted copy of a recent Time cover story relating to Wilson is attached for your information at Tab C.

With regard to an awards ceremony, Tim Kraft suggests late November or December, rather than September or October.

✓ give award to all 15 nominees

____ give award to all but Wilson

✓ approve ____ disapprove awards ceremony in November/December.

---Rick

THE PRESIDENT HAS SEEN.

THE WHITE HOUSE

WASHINGTON

September 1, 1977

Proceed ☐
all 15
J. C.

MEMORANDUM TO: THE PRESIDENT

FROM : Frank Press FP

SUBJECT : National Medal of Science Nominations

The National Medal of Science was established by Congress in 1959 as the nation's highest award for outstanding contribution to knowledge in science and engineering. The legislation provided that the awards would be made by the President. Executive Orders issued by your predecessors have established a Presidentially-appointed committee to oversee the nomination process and recommend those scientists and engineers most outstanding on the basis of their achievements. Since the first award by President Kennedy in 1962, the Medal has been awarded to 117 scientists and engineers at ceremonies in which 10-15 Medals have been presented.

In 1976 the Committee reviewed approximately 650 nominations from the National Academies of Sciences and Engineering, colleges and universities and scientific and engineering societies. The Committee reported its 1976 recommendations to President Ford at the end of December. President Ford decided to defer action so that you would have the opportunity to consider the nominations and hold an award ceremony early in your Administration.

I have reviewed carefully the nominees for the National Medal of Science, first as a member of the Committee in 1976 and now as your Science and Technology Adviser. The list of fifteen names is well balanced among physicists, chemists, biologists, mathematicians, and engineers. Each of the proposed recipients is a distinguished and original scientist. The list of nominees appears in TAB A, ~~the report of the selection committee in TAB B. A list of previous recipients is in TAB C.~~

You should be aware that there may be some criticism of one nominee, Professor E. O. Wilson of Harvard University. Wilson did pioneering work on the organization of insect societies and the evolution of socially desirable behaviors among insects. For this work he was honored by election to the National Academy of Sciences at the unusually young age of 40, some 8 years ago. In recent years he has published a book entitled Sociobiology: A New Synthesis, which has drawn rave notices from many scientists and severe criticism from a few. The criticism is based upon extrapolation of his observations and his hypotheses to such

complex human behaviors as aggression, juvenile delinquency, and altruism. In my judgment, Wilson should not be denied recognition because of any controversy surrounding speculations mostly attributable to others. A concurring opinion from Dr. Don Kennedy, Commissioner of Food and Drugs and an expert in the field, appears in TAB B. Dr. Philip Handler, President of the National Academy of Sciences, supports the Wilson nomination. However, Dr. Richard Atkinson, Director of the National Science Foundation, recognizing the debate, would defer an award at this time.

Since its inception in 1962, all medals were awarded personally by the President at a brief annual ceremony in the White House. I recommend that you continue this tradition and make the award at an appropriate ceremony at the end of September or in early October.

ACTION

Approve list of nominees for National Medal of Science as submitted ✓

Further review required _____

LIST OF 1976 NOMINATIONS AND
SUMMARY CITATIONS FOR THE NATIONAL MEDAL OF SCIENCE

NAME	CITATION
Morris Cohen Institute Professor Department of Metallurgy and Materials Science Mass. Institute of Technology Cambridge, Massachusetts	For original research and advancement of knowledge of the physical and mechanical metallurgy of iron and steel, and especially for his work on the martensitic transformation in the hardening of steel.
K. O. Friedrichs Professor Emeritus Curant Institute of Mathematical Sciences New York University New York, New York	For bringing the powers of modern mathematics to bear on problems in physics, fluid dynamics, and elasticity.
Peter C. Goldmark President Goldmark Communication Corp. 98 Commerce Road Stamford, Connecticut	For contributions to the development of the communication sciences for education, entertainment, culture and human service.
Samuel A. Goudsmit Department of Physics University of Nevada Reno, Nevada	For the major discovery, together with George E. Uhlenbeck, of the electon spin as the source of a new quantum number.
Roger C. L. Guillemin Department of Neuroendocrinology Salk Inst. of Biological Studies San Diego, California	For demonstrating the presence of a new class of hormones, made in the brain, that regulate the function of the pituitary gland, thereby making possible improved diagnosis and treatment of numerous endocrine disorders.
Herbert S. Gutowsky Department of Chemistry University of Illinois Urbana, Illinois	In recognition of pioneering studies in the field of nuclear magnetic resonance spectroscopy.
Erwin W. Mueller Department of Physics 104 Davey Laboratory Pennsylvania State University University Park, Pennsylvania	For his invention of the field-emission microscope, the field-ion microscope, and the atom-probe microscope, which helped to resolve the atomic structures of solids.

Keith R. Porter
Department of Molecular, Cellular and Developmental Biology
University of Colorado
Boulder, Colorado

For a multitude of fundamental contributions to the elucidation of the fine structure of cells by electron microscopy coupled with dynamic approaches, which has inaugurated a new era of cell biology integrating structure and function into a comprehensive and unified picture of the life of cells.

Efraim Racker
Section of Biochemistry, Molecular and Cell Biology
Cornell University
Ithaca, New York

For major contributions to understanding of the subcellular mechanism whereby oxidative and photosynthetic energy is transformed into the specific form of chemical energy utilizable by living cells.

Frederick D. Rossini
Department of Chemistry
Rice University
Houston, Texas

For contributions to basic reference knowledge in chemical thermodynamics.

Verner E. Suomi
Professor of Meterology and Environmental Studies and Director of the Space Science and Engineering Center
University of Wisconsin
Madison, Wisconsin

As a distinguished meterologist and inventor, he has provided a new view of the dynamics of our atmosphere which already has brought substantial benefits to the people of this nation and the world.

Henry Taube
Department of Chemistry
Stanford University
Stanford, California

In recognition of contributions to the understanding of reactivity and reaction mechanisms in inorganic chemistry.

George E. Uhlenbeck
Professor of Physics
Rockefeller University
New York, New York

For the major discovery, together with Samuel A. Goudsmit, of the electron spin as a source of a new quantum number.

Hassler Whitney
Professor of Mathematics
The Institute for Advanced Study
Princeton, New Jersey

For founding, and bringing to maturity, the discipline of Differential Topology.

Edward O. Wilson
Museum of Comparative Zoology
Laboratories
Harvard University
Cambridge, Massachusetts

For his pioneering work on the organization of insect societies and the evolution of social behavior among insects and other animals.

COMMISSIONER OF FOOD AND DRUGS
Rockville, Maryland 20852

June 8, 1977

Mr. Philip M. Smith
Executive Office of the President
Office of Science
and Technology Policy
Washington, D.C. 20500

Dear Phil:

Thank you for your inquiry about E. O. Wilson in regard to the National Medal of Science nomination. As you requested, I'm supplying you with some pros and cons.

Pros

Wilson is an authentic genius; he has undertaken a remarkable series of researches on the social organization of insects, on animal behavior, and on theoretical population ecology.

His more recent book on "Sociobiology" is in fact a splendid integrative work. Much of it involves nothing more or less than a synthesis of data on the social behavior of animals, their ecological outcomes, and the natural selection theory that is necessary to account for these. In the first and last chapters of the book, Wilson does speculate about the applications of sociobiology theory to human populations.

Cons

It is on the grounds of the material in those two chapters of Sociobiology that Wilson has come under attack. Most of the controversy has been generated by critics of the extreme left, especially from the

Boston Chapter of Science for the People. Members of this group, including Wilson's Harvard colleague Richard Lewontin, a distinguished population geneticist, have accused Wilson of espousing "biological determinism." By this they mean that he seeks to account for the ills of human societies by appealing to "innate" human qualities instead of to the inequities of the socio-economic system. They and others have additionally accused Wilson of displaying, in particular, "sexist" prejudices because of some speculative material contained in these chapters with regard to sex roles.

I myself believe that the criticisms have been overdone. Certainly Wilson suggests no political outcomes of his work, and the tone is generally studiously scholarly throughout. He has had much more support from his academic colleagues than have his attackers.

There would, on the other hand, be strong criticism of the Award from the radical left. Such criticisms would surely be reinforced by the proposed citation, which heavily emphasizes the human applications of his work and neglect the broad scholarly base.

My own recommendation would be that the Award should go forward, but that the citation should emphasize his fundamental contributions, and stress the boldness of the interdisciplinary systhesis represented by Sociobiology. Its potential applications to human social problems should be used, if at all, as an addendum at the very end.

Sincerely yours,

Donald Kennedy

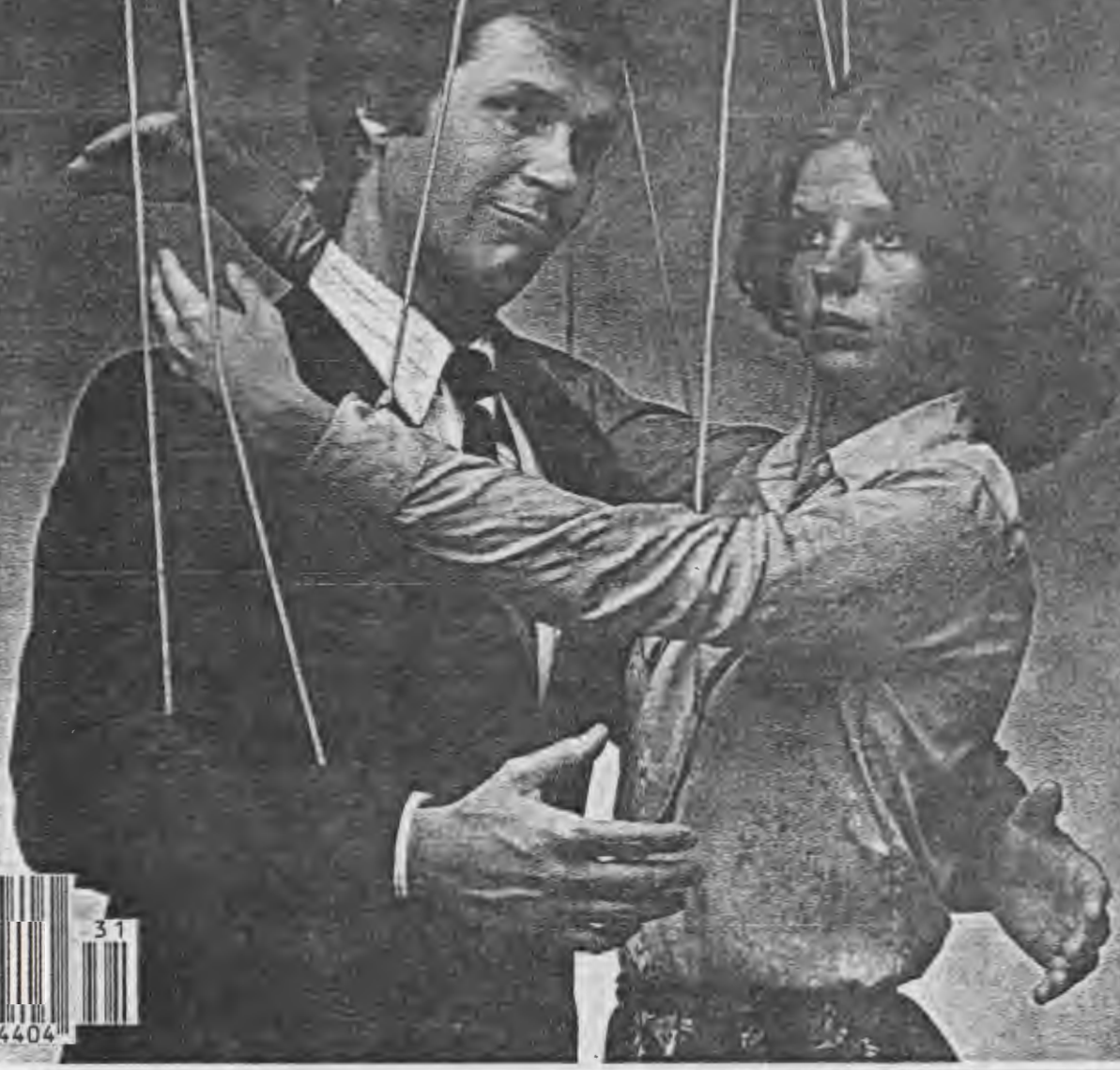
AUGUST 1, 1977 $1.00

TIME

Rubens at 400

Why You Do What You Do

SOCIOBIOLOGY: A New Theory of Behavior



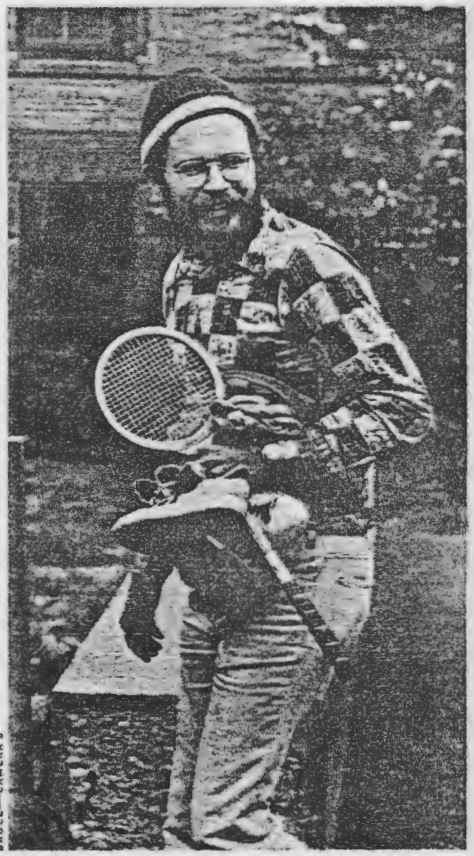
0 31 724404

COVER STORY

Why You Do What You Do

SOCIOBIOLOGY: A New Theory of Behavior

SOCIOBIOLOGIST EDWARD WILSON STUDYING COLONY OF ANTS IN HIS LABORATORY



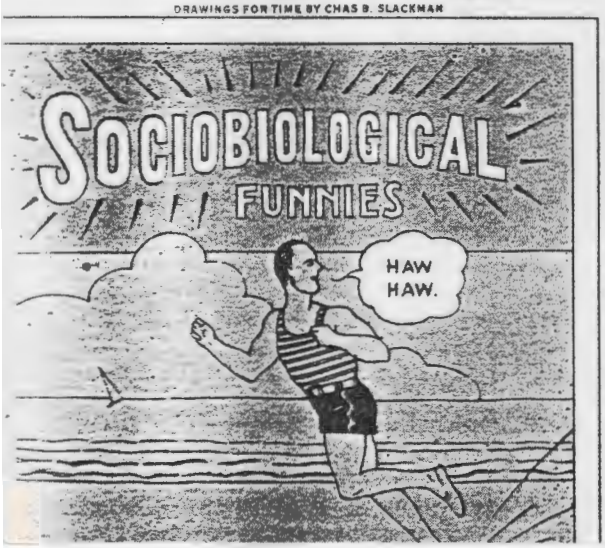
BRUCE—CAMERA 5

ROBERT TRIVERS IN CAMBRIDGE
Inflammatory doctrine.

The concepts are startling—and disturbing. Conflict between parents and children is biologically inevitable. Children are born deceitful. All human acts—even saving a stranger from drowning or donating a million dollars to the poor—may be ultimately selfish. Morality and justice, far from being the triumphant product of human progress, evolved from man's animal past, and are securely rooted in the genes.

These are some of the teachings of sociobiology, a new and highly controversial scientific discipline that seeks to establish that social behavior—human as well as animal—has a biological basis. Its most striking tenet: human behavior is genetically based, the result of millions of years of evolution. Some sociobiologists go so far as to suggest that there may be human genes for such behavior as conformism, homosexuality and spite. Carried to an extreme, sociobiology holds that all forms of life exist solely to serve the purposes of DNA, the coded master molecule that determines the nature of all organisms and is the stuff of genes. As British Ethologist Richard Dawkins describes the role and drive of the genes, they "swarm in huge colonies, safe inside gigantic lumbering robots, sealed off from the outside world, manipulating it by remote control. They are in you and me; they created us body and mind; and their preservation is the ultimate rationale for our existence ... we are their survival machines."

DRAWINGS FOR TIME BY CHAS B. SLACKMAN



Sociobiologists—whose growing ranks include some 250 biologists, zoologists and social scientists—argue that without consideration of biology, the study of human culture makes no sense. Indeed, sociobiology has significant implications for most areas of human concern—from education to relations between the sexes. Says Harvard Physicist Gerald Holton: "It's a breathtaking ambition ... as if Sigmund Freud had set out to subsume all of Darwin, Joyce, Einstein, Whitehead and Lenin." Robert Trivers, a Harvard biologist and leading sociobiology theorist, makes a bold prediction: "Sooner or later, political science, law, economics, psychology, psychiatry and anthropology will all be branches of sociobiology."

These and other claims by proponents of sociobiology have made it one of the most inflammatory doctrines to emerge from the campuses in decades. Since 1975, when Harvard Zoologist Edward Wilson's mammoth 700-page book *Sociobiology: The New Synthesis* brought the new science to public attention, the controversy has spread beyond Harvard—where it originated—dividing faculty departments and disrupting academic conventions. Angry opponents denounce "so-so biology" as reactionary political doctrine disguised as science. Their fear: it may be used to show that some races are inferior, that male dominance over women

is natural and that social progress is impossible because of the pull of the genes.

By far the most vocal critics have been Marxist and other scholars with political points to make. University of Chicago Anthropologist Marshall Sahlins dismisses sociobiology as "genetic capitalism"—an attempt to defend the current structures of Western society as natural and inevitable. Jerome Schneewind, a philosopher at Manhattan's Hunter College, calls it "mushy metaphor ... a souped-up version of Hobbes." Harvard Evolutionary Biologist Richard Lewontin is earthier; he thinks sociobiology is "bullshit."

Edward Wilson has been picketed, and at Harvard, the left-wing Committee Against Racism has called sociobiology "dangerously racist." The committee also charged that the new science would give comfort to the supporters of Psychologist Arthur Jensen, a leading proponent of another controversial theory: that racial differences in IQs have a genetic basis. Wilson angrily called that attack "slander," and even Lewontin came to his defense, conceding that "sociobiology is not a racist doctrine." But he added, "Any kind of genetic determinism can and does feed other kinds, including the belief that some races are superior to others."

Opponents of sociobiology were heartened this spring when Harvard failed to give tenure to Biologist Trivers, though denying that his work in sociobiology was the reason. It was a surprising move that Trivers interpreted as an invitation to leave the university —which he plans to do. Still he insists: "I don't think they will be successful in stopping me or slowing down the work. It has spread too far, to too many people, and to far too many studies." Indeed, sociobiology is establishing itself as part of the scientific spectrum. In June, for example, academics from around the nation gathered at San Francisco State University for a two-day meeting on the implications of sociobiology.

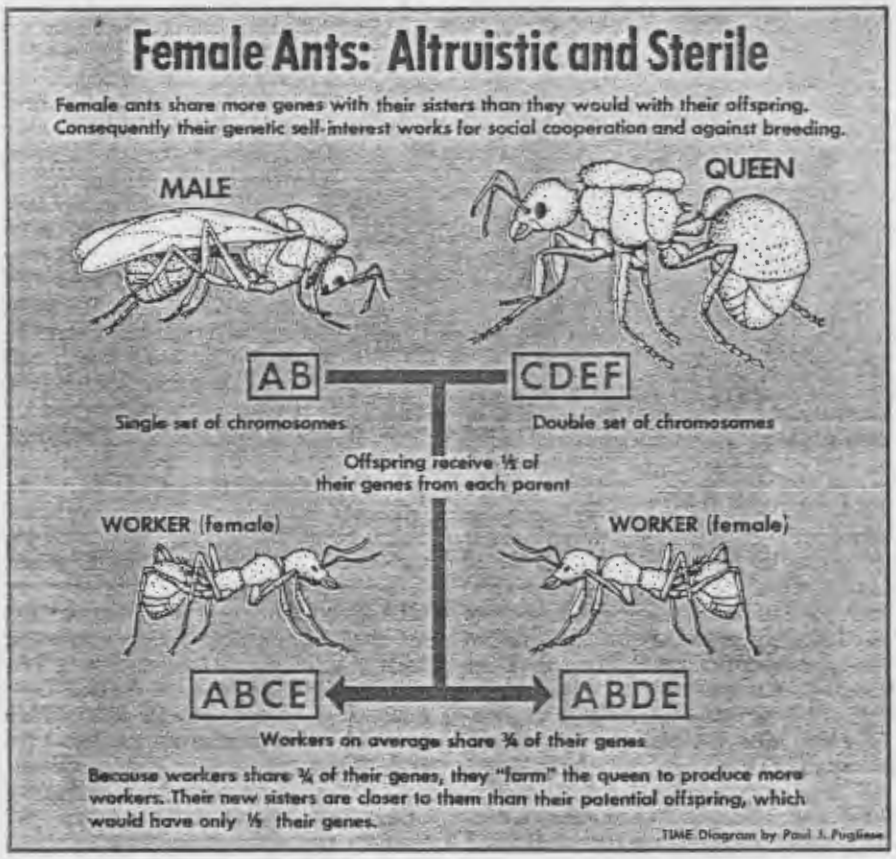
Sociobiologists call their doctrine "the completion of the Darwinian revolution"—the application of classic evolutionary theory and modern studies of genetics to animal behavior. Darwin's theory, now virtually unchallenged in the world of science, holds that all organisms evolve by natural selection —those that are better adapted to the environment survive and reproduce; the rest die out. Thus organisms are constantly perfected by the cruel competition to survive. Sociobiologists believe the behavior that promotes survival of the winners in the evolutionary game is passed on by their genes.

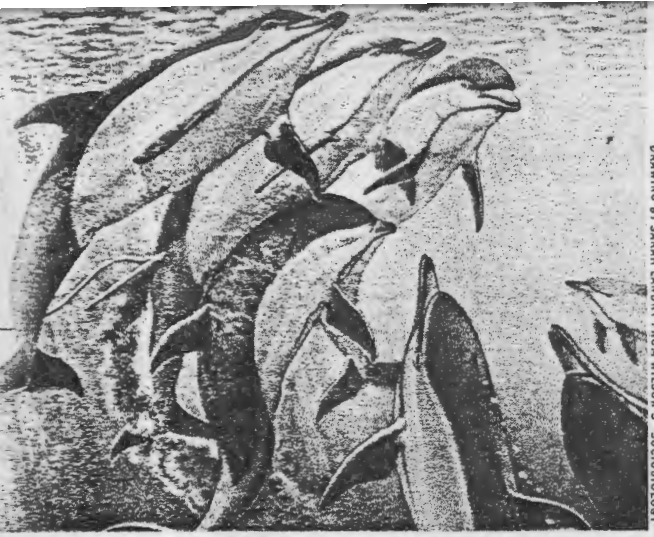
Many recent theorists—such as Nobel-prizewinning Ethologist Konrad Lorenz and Scots Biologist V.C. Wynne-Edwards—have focused on the group or species as the primary unit of selection. Darwin wrote that it was the individual organism. But sociobiologists believe it is the genes themselves that conduct the life-or-death evolutionary struggle. This gene-based view of life is compatible with a finding made independently by researchers in a widely divergent branch of science. Rutgers Biochemist George Pieczenik has discovered patterns in DNA coding that he sees as evidence of selection occurring at the molecular level (TIME, April 4). "What this means," he says, "is that the DNA sequences exist to protect themselves and their own information. It's not the organism that counts. The DNA sequences don't really care if they have to look like a lowly assistant professor or a giraffe."

Yet sociobiology did not arise from molecular studies but as an answer to a century-old gap in Darwinian theory: Darwin could not fully explain why some organisms help other members of their species. His theory held that every organism fights for its own survival and chance to reproduce, not that of others. Since altruistic behavior reduces an organism's chances to survive, evolution should be expected to breed it out of all species. Still, some birds risk their lives for the flock by crying out to warn of the presence of a predator—thus chancing attracting the attention of the enemy and being singled out for attack. Dolphins sometimes try to save injured dolphins from drowning. Social insects serve the entire community, some going so far as to give their lives to protect the colony from invaders.

Sociobiology tries to resolve the dilemma. Its solution: altruism is actually genetic selfishness. The bird that warns of an approaching hawk is protecting nearby relatives that have many of the same genes it has—thus increasing the chance that some of those genes will survive. Sterile female insects work and give their lives to promote the spread of genes they share with their sisters.

Some 20 years ago, British Biologist



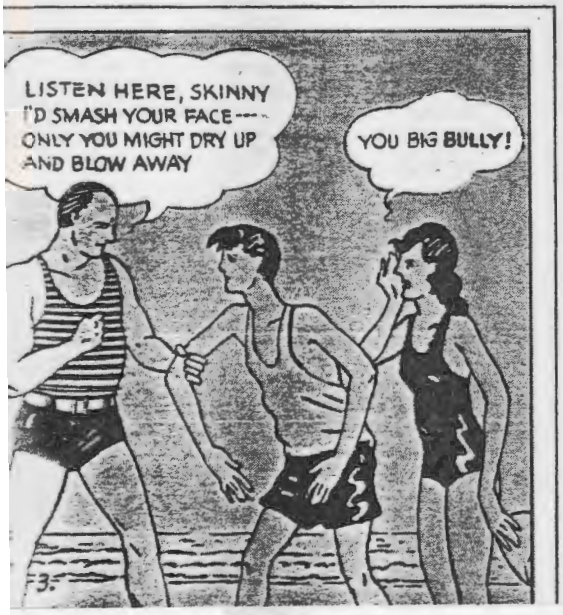


DRAWING BY SARAH LANDRY FROM WILSON'S "SOCIOBIOLOGY"

FRIENDS SAVING HARPOONED DOLPHIN
Rooted in gene selfishness.

J.B.S. Haldane anticipated the gene-based view of sociobiology when, tongue in cheek, he announced that he would lay down his life for two brothers or eight cousins. His reasoning: the survival of two full siblings (each with about half of his genes identical to Haldane's) or the group of cousins (each with about one-eighth of his genes the same as Haldane's) made the decision genetically acceptable.

According to sociobiologists, evolution produces organisms that automatically follow this mathematical logic, as if they were computers, totting up the genetic costs or benefits of helping out relatives who bear many of the same genes. If aiding the relatives increases the chances that familial genes will prosper and propagate, the organism will act altruistically—even to the extent of giving up its life, as a parent may, for example, by rushing into a burning house to save a child. Yet in humans, this genetic push is less binding; sociobiologists believe that human social behavior is largely controlled by facultative genes—the ones that can be influenced by environment to change their effects. Thus there is room for cowardly and selfish—as well as unselfish—behavior.



British Biologist William Hamilton in 1964 explained how altruism could help an individual spread his genes; he argued that the principle explained the social life of insects. In all ants, bees and wasps, daughters of the queen share an average of three-quarters of their genes *(see diagram)*. Because the daughters are more related to each other than they would be to their own offspring, said Hamilton, it is in their genetic self-interest not to breed but to assist the queen in producing more daughters. Thus the females evolved as sterile workers who cooperate socially for genetically selfish reasons.

Some years later, Trivers reasoned that if Hamilton was right about the social insects, worker ants would spend three times the energy rearing sisters as rearing brothers, because the workers are three times more closely related to their sisters than to their brothers. Trivers and his associate, Hope Hare, then analyzed thousands of ants of 20 different species and confirmed the 3-to-1 female dominance—the strongest evidence so far that organisms act as if they understand the underlying genetics.

Still, there are problems in explaining all altruism as a direct investment in one's own genes. For example, some birds give warning cries for the flock even when their young and close relatives are absent. Trivers proposed a solution in a 1971 paper on reciprocal altruism that has become a central text for sociobiologists. "In other organisms," Trivers wrote, "the evidence that altruism is genetic is rather overwhelming. It is therefore irrational to argue that the first species in which altruism has no genetic contribution is human beings." Using game theory, he concluded that natural selection produces individuals that exchange favors—in effect saying, "You scratch my back; I'll scratch yours." In other words, the favor will eventually be returned, thus improving the outlook for the genes of the first altruist. According to the theory, human charitable acts are therefore rooted in biology and gene selfishness. This theory could explain human loyalty to nation, corporation or church; these institutions can provide benefits to members that increase the chances for them to survive and propagate.

Some philosophers and theologians have been dismayed by the theory. So was one young man who had won a Carnegie Gold Medal for saving a drowning victim; he wrote Wilson a troubled letter. Recalls Wilson: "He found it difficult to grasp the notion that somehow his act was preordained through genes. I convinced him that the impulse and emotion behind his rational choice, though genetically determined, in no way detracted from the rationality and value of his altruistic act."

For many, such explanations of noble deeds are cold comfort. But Harvard Anthropologist Melvin J. Konner sees a bright side to reciprocal altruism. Sociobiologists, he says, "have in fact uplifted [human nature] by showing that altruism, long thought to be a thin cultural veneer, belongs instead to the deepest part of our being, produced by countless aeons of consistent evolution."

In Trivers' model, non-backscratchers (who refuse to play the game) and overt cheaters (who accept favors but never return them) are long-term losers in the evolutionary game. Yet subtle cheaters who pretend to cooperate but do not are winners. As a result, Trivers believes, humans survived by evolving a complex psychology and set of emotions to keep the altruist from being exploited by cheaters: indignation, guilt, gratitude, sympathy and moralism.

Indeed, to sociobiologists deceit is a crucial factor in evolution. Some birds, like the nighthawk, can feign a broken wing to lure predators away from a nest. In some avian species, a female that has been inseminated by a departed male may try to hide the fact, thus tricking a new male into investing his time and resources in offspring—and genes—that are not his. In the long run, however, natural selection sharpens up both the ability to cheat and the ability to detect cheating. Trivers and Dawkins suggest that the need for deceit—and for its detection—may have been responsible for the rapid enlargement of the human brain during the Pleistocene era.

Sociobiologists believe that self-deception is also a product of evolution, simply because a cheater can give a more convincing display of honesty if he lies to himself as well as to his neighbor. Says Zoologist Richard Alexander of the University of Michigan: "Selection has probably worked against the understanding of such selfish motivation becoming a part of human consciousness." Adds Trivers: "The conventional view that natural selection favors nervous systems which produce ever more accurate images of the world must be a very naive view of mental evolution."

Of all sociobiologists, Trivers has been the boldest in applying the gene-based view to humans. In part, that accounts for his rise—in just ten years—from an author of children's texts to a biology guru at age 34. The son of a Foreign Service officer, Trivers entered Harvard on a scholarship in 1961 to study math and prepare for a career as a civil rights lawyer. He was a bright, moody, private person who turned up at all the civil rights demonstrations and student protests. But his marks were so mediocre ("I was more interested in chasing women and the real world than in math") that his Harvard scholarship

was canceled and he was turned down after graduation by two law schools.

Abandoning a law career, he took a job writing children's textbooks for the Educational Development Center in Newton, Mass., and while working on an animal volume was struck by a photo of baboons disciplining their young. It looked so much like human parents dealing with their children, recalls Trivers, "that it was possible to imagine language as just so much froth on the ocean, and that there was something else underlying human discipline. It occurred to me that to understand human behavior, it would be very helpful to examine the behavior of other organisms."

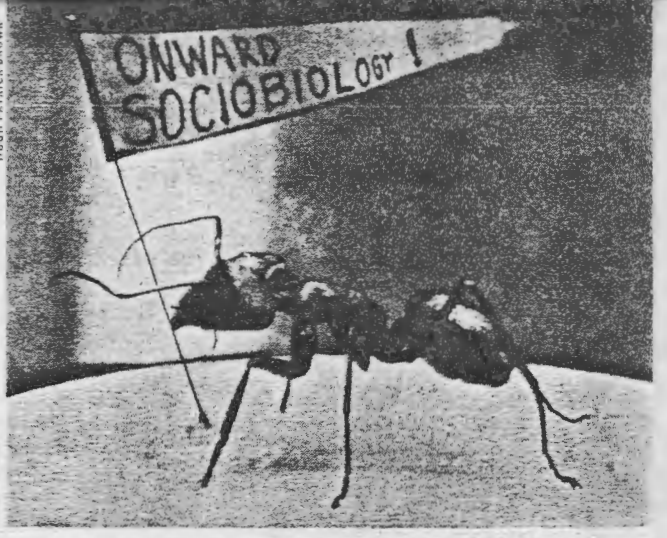
At the time, Trivers knew little about evolution and nothing at all about biology, but he plunged into the literature and sought out mentors. "Once I learned what natural selection was," he says, "it was clear that for one hundred years since Darwin, almost no work had been done in applying Darwin's reasoning to social behavior. It was an incredible opportunity to be able to move into this enormous vacuum."

Excited by his new interest, Trivers borrowed money and went back to Harvard as a special student in biology, gaining his Ph.D. and a faculty appointment in 1972. Zoologist Ernest Williams, one of his teachers, describes him as a brash, brilliant student who turned in papers with slashing attacks on well-known biologists, some of whom have not forgotten—or forgiven. Brashness is still part of Trivers' character. He derided an anthropologist (who, incidentally, admires his work) as too old to understand the implications of sociobiology. The anthropologist was then 38.

The second of seven children, Trivers admits that the problems of growing up in a large family and the arguments he had with his father helped to point him toward his theory that parent-child conflict is biologically certain. Trivers believes that the child shows a selfish interest in itself and seeks to get more than its fair share of the energy and resources of parents. But the parent has only a partial genetic interest in each child and thus is preoccupied with sharing resources. The result, according to Trivers, is biologically certain conflict between the child, who tends toward selfishness, and the parent, who insists that the child share.

Another example of the conflict, in a variety of mammals, is weaning. When the benefit to the child begins to be outweighed by the cost to the mother (reduced ability to bear or care for other offspring), the mother will deny milk, though the offspring will continue to demand more. But parents have an edge. (Says Trivers: "An offspring cannot fling its mother to the ground at will and nurse.") So evolution has provided a defensive weapon for the offspring: psychological warfare. Some fledgling birds will scream with hunger—even when they are reasonably well fed—to induce the parent to bring more food. Dogs withhold tail-wagging to get more food. Children withhold or provide smiles—as a means of reinforcing maternal behavior they need. Says Trivers: "Strong selection pressures tend to favor the infant's efforts to express its own self-interest. Once you explore the stratagems of parent and child, I think you can see that the child is not just an empty vessel to be filled by the parents but a sophisticated organism capable of acting in its own self-interests from early on."

So early, Trivers thinks, that the action may actually begin before birth. He believes there are "chemical tactics" that the fetus uses on the mother to increase its size and fitness while still in the womb. Even more surprising is Trivers' theory (for which he admits there is yet no evidence) of genetic conflict between egg and sperm before conception: under some conditions, the egg may try to repel sperm with female-producing X chromosomes in order to be fertilized into a boy rather than a girl.



EDWARD WILSON'S INSECT MASCOT AT HARVARD
Giving his life for eight cousins.

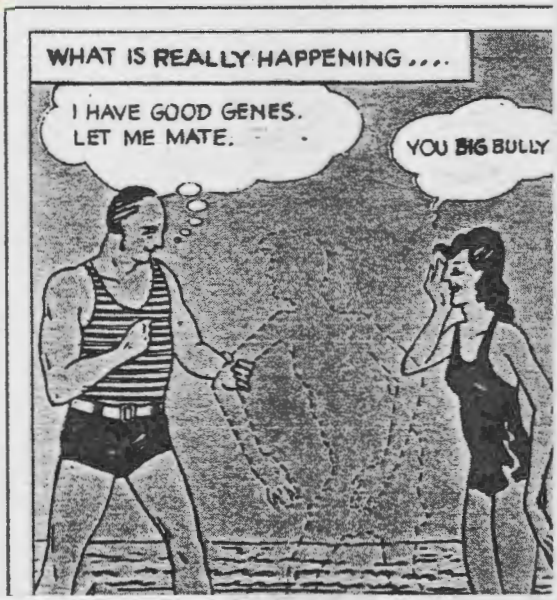
Parents, as well as children, have genetic interests that emerge as manipulation. One of Trivers' examples: a parent may be overprotective in order to keep a grown child at home helping with the other offspring —something that promotes the self-interest of the parents and the younger kids but diminishes the chances of reproductive success for the older child. Says Trivers: "Humans are caught in an intense co-evolutionary struggle with their closest relatives. Parents, siblings and offspring are our allies as well as our opponents."

In fact, sociobiologists believe, conflict—both in the family and with outsiders—is the essence of life. But they do not think that man is at the mercy of an irresistible aggressive instinct, as Lorenz *(On Aggression)* and Author Robert Ardrey *(The Territorial Imperative)* insisted in their popular books more than a decade ago. For sociobiologists the trick in becoming an evolutionary winner is to hit just the right level of aggression. Too little, and the organism may be muscled out by competitors. Too much, and it may die in battle without reproducing, or use up time and energy in fighting while competitors steal its food or mate. Aggression, in other words, pays off only when the cost-benefit ratio makes it a workable strategy.

Sociobiology seems to have an explanation—usually a deflating one—for nearly every human phenomenon. Maternal love is a genetic investment policy. Friendship and law are probably rooted in reciprocal altruism and its calculus of self-interest. The socialization of children, at home and school, is as much forced indoctrination in reciprocal altruism as it is genuine teaching. Ethnic pride (as well as racism) can be viewed as an irrational generalization of the biological tendency to distrust strangers and prefer the company of individuals who look like ourselves. Says Wilson: "We are likely to see some of our most exalted feelings explained in terms of traits which evolved. We may find that there is an overestimation of the nature of our deepest yearnings."

Sociobiologists argue that those yearnings are so encrusted with self-deceit and rationalizations that only a rigorous evolutionary analysis will make them clear. Wilson, in fact, calls for "ethics to be removed temporarily from the hands of the philosophers and biologicized." Though Wilson is hazy about what a biologicized ethic might be, he suggests there could be different moral strictures for males and females, old and young. An ethic of children, he says, might account for their genetically based resistance to parental control, as well as for the tendency of teen-agers to band together and set their own rules.

Wilson, 48, curator of entomology at Harvard's Museum of Comparative Zoology, is currently writing a book on the

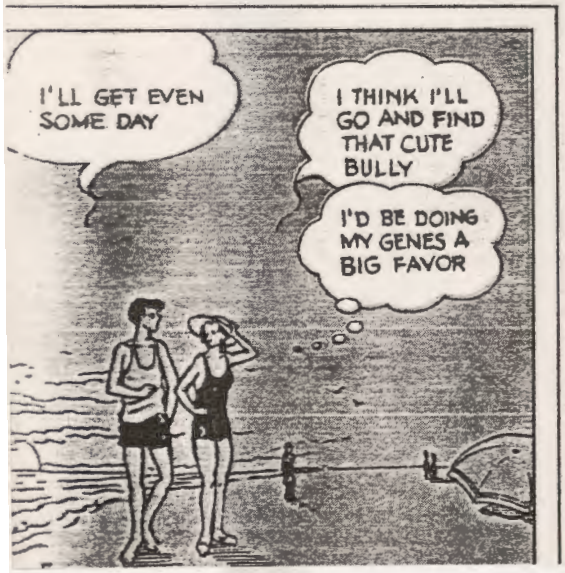


RADIO TIMES HULTON PICTURE LIBRARY

NATURALIST CHARLES DARWIN
The revolution completed.

evolution of ethics in relation to sociobiology. A specialist in the social insects, he wrote *The Insect Societies* (1971), then put in three years of 90-hour weeks working on his sociobiology text. Says he: "I wanted to synthesize and draw the boundaries to shape sociobiology into a discipline."

In the spectrum of current theories about human behavior, that discipline falls between the thinking of Harvard Psychologist B.F. Skinner, who regards people as pliable beings whose behavior can be almost entirely shaped by their environment, and Lorenz, who believes that man is a prisoner of his aggressive instincts. Like Freudian psychology, sociobiology stresses the innate but allows for the influence of environment. Indeed, sociobiologists concede the possibilities of a Freudian connection. Trivers says that he can think of 16 ways the discipline could "revitalize" the teachings of Freud, who also had something to say about inevitable parent-child conflict and the role of self-deception.



Many social scientists are now contributing to the development of sociobiological theory. Anthropologist Napoleon Chagnon of Penn State University (TIME, May 10, 1976) reports that the Yãnomamö tribes of southern Venezuela and northern Brazil seem to be engaged in almost continuous war over the right to reproduce. The tribes "invest" more heavily in raising boys, practice female infanticide and constantly raid other settlements for women. Anthropologists Lionel Tiger and Robin Fox (*The Imperial Animal*) insist that evidence points to a "biogram," or biological program, guiding human behavior.

Harvard's Irven DeVore, already one of America's leading anthropologists when he converted to sociobiology, now says he will go back and redo all of his major primate studies. He has gone to Africa this summer to conduct the first real test of sociobiological theory on primates.

Donald Campbell, former president of the American Psychological Association, believes that psychology must adapt itself to evolutionary theory, if not sociobiology. He thinks religious teachings have evolutionary importance —an idea a few theologians have picked up from sociobiology. Says Unitarian Ralph Burhoe of Chicago's Meadville/Lombard Theological School: "The truths in religion have been selected because they are necessary and essential to man." Though no sociobiologist has yet worked out a full theory of religion, the general view is that the golden rule about love of neighbor evolved out of reciprocal altruism.

All told, sociobiology seems to have won the first round with its critics —largely because their accusations were overblown and based on emotional response rather than hard evidence. "Our rhetoric was at fault," admits Biologist Stephen Gould, an opponent of sociobiology. Lewontin adds glumly: "Other people may have listened more if we had presented our arguments differently."

Still, Trivers agrees that the critics have a point in being concerned about the social implications of what sociobiologists preach. "Social theory," he says, "ought to be looked at from the standpoint of what its implications are. It's not like particle physics." Wilson's book, for instance, raises some unsettling questions that most social theorists shy away from: Is it possible that social classes reflect genetic differences? Do the upper classes gradually accumulate a separate and superior gene pool? After stating that the idea has "plausibility," Wilson goes on to say there is "little evidence" of its truth: culture moves too fast, and even the 2,000-year-old castes of India are not genetically different in any measurable way. Still, Wilson believes there is a "loose correlation of some of the genetically determined traits with success." Such beliefs worry many readers, so Wilson often devotes himself to reassuring audiences that sociobiology is not threatening. He says, for example, that only about 10% to 15% of human social behavior is genetically based. (After this less-than-scientific guess, Sahlins replied with some dry academic mockery that human behavior cannot be reduced to 10% biology, 5% physics, 3% chemistry, .7% geology, 81% symbolic logic and .3% the action of heavenly bodies.)

Wilson also stresses that genes need not always be obeyed. He notes that man has "a genetically inherited array of possibilities. Some of these possibilities set limits on man's aspirations, others do not, and the search should be for where biology pushes mankind and where man can resist the push." He also admits that "genetic constraints evolved during the millions of years of prehistory, under conditions that to a large extent no longer exist." It would be foolish, he says, to rear as many healthy children as possible in today's crowded world, no matter what the genetic push.

Despite the weaknesses in sociobiological doctrine that required these concessions, opponents have been slow to mount a scientifically based counterattack. A major reason for the delay: few critics feel competent to cut across all the disciplines involved, from ethology and mathematics to anthropology and game theory. But a more sophisticated opposition is beginning to take root in the academic community.

Anthropologist Sahlins in *The Use and Abuse of Biology*, the only anti-sociobiology book published to date, contends that kinship patterns among humans do not—as sociobiological theory predicts—always follow bloodlines. He also argues that Trivers' theory of reciprocal altruism simply does not work: an individual may help himself by behaving altruistically, but he also helps one of his competitors. Thus there is no net advantage to altruistic behavior, and it should be selected against by evolution.

Another common objection: human sociobiology is long on theory, short on proof. Some sociobiologists concede that large chunks of the theory may have to be modified as studies proceed.

But the strongest argument against sociobiology is that it underrates the emergence of the human brain, consciousness and culture. Said Columbia Anthropologist Marvin Harris to an M.I.T. audience last year: "Sociobiologists tend to drastically underestimate the result to which human cultures represent an emergent novelty." His point: even simple organisms show great variation in behavior, but only the genes can pass it on. Among humans, learning can be passed on by culture, thus overwhelming the genetic contribution to behavior.

The fear of many of sociobiology's opponents is that it will prove nothing but leave a heavy political impact any-

way. Sahlins fears it may disappear as a science but go on and on in the popular culture.

Indeed, few academic theories have spread so fast and with so little hard proof. Apart from the Hamilton-Trivers work on altruism, there has been little to impress the skeptics, and no hard evidence has been presented to show that genes influence human cultural behavior. The power of sociobiology comes from its astonishing promise to link the physical sciences with the human sciences and to bring all behavior from Drosophila to Homo sapiens under one great discipline.

What is more, sociobiology may have appeared at the right cultural moment. The 1970s have brought with them growing impatience and disillusionment over failed educational and environmental experiments designed to alter social behavior. The concept of social theorists that man is infinitely malleable and perfectible has fallen into disfavor. At such a time the emergence of a doctrine preaching that man is caught in history, able to exercise free will only within the limits set by his genes, may do very well indeed.

Sociobiology and Sex

Q. Why do men go to war?

A. Because the women are watching.

This classic exchange may not be the last word on human aggression, but sociobiologists would admire the insight into male psychology. In their view, male displays and bravado—from antlers in deer and feather ruffling in birds to chest thumping in apes and humans—evolved as a reproductive strategy to impress females. Machismo is biologically based and says in effect: "I have good genes, let me mate."

But such male bluster works only if females allow it to work. Among many monogamous birds, a female will mate only with a male willing to build nests before copulating. Presumably, human females have much more power to breed machismo out of the population. At cocktail parties, women often ask Anthropologist Irven DeVore when men will give up machismo. His immodest—but sociobiologically correct—reply: when women like you stop selecting high-success, strutting men like me. "Males," says DeVore, "are a vast breeding experiment run by females."

■

In evolutionary terms, sex is the central game in life, and the aim of all players is to get as many genes as possible into the next generation, at the lowest cost. Some of the best low-cost players are female fish, which deposit their unfertilized eggs in front of a chosen male. Then, while he is inseminating the eggs, they flee, leaving the poor male to protect his genetic investment by nurturing the young himself.

But in most species, including humans, the female has no such advantage. Men have far more chances to play the reproduction game: each male can start thousands of pregnancies; each female can start a maximum of about 30. More important, the female must invest far more heavily in each pregnancy—nine months of time, energy and eating for two. The male must invest only sperm, and promiscuity may pay off for him as a workable reproductive strategy. If he spreads his genes widely and refuses to nurture at all, he can still reasonably assume that some of his offspring will be likely to survive. Sociobiologists say this is why promiscuity is more popular among men, and why the urge to nest is stronger among women.

Why, in the vast majority of species, does the male aggressively pursue the female, instead of the other way round? According to Sociobiologist Robert Trivers, the sex that invests more is a "limiting resource." In other words, because women do most of the work to bring children into the world, they are in the position of sellers in a scarce market, and men must line up to buy. This principle explains the natural evolution of what DeVore and his colleague Joseph Popp have called "prostitution behavior" in higher species. A female chimp in estrus will use a sexual come-on to get more than her share of food. Even a very dominant male cannot afford to alienate the most precious of all resources—a willing female. Sociobiology also explains why, in most human societies, men are older than their mates: older men are more likely to control resources of value to a reproducing female. Males go along with the system because it is to their reproductive advantage to pick young females with many childbearing years left.

In general, males are the high rollers in the sex game. They take greater risks than females (death in combat over a female, exclusion from breeding by a stronger male), but they also have more to gain (spreading their genes far and wide). Still males have one overpowering disadvantage—they can never be sure that the offspring are their own. A cuckolded male is a biological loser, tricked into investing his time and energy in another male's genes. Thus sexual jealousy evolved among monogamous males as an adaptation. So did courtship rituals. By monopolizing a female's time, but not copulating, a courting male waits long enough to make certain that the female is not already pregnant. Among ring doves, a male turns from wooing to aggression if the female responds to his courtship too soon; that is a good sign that she may be pregnant.

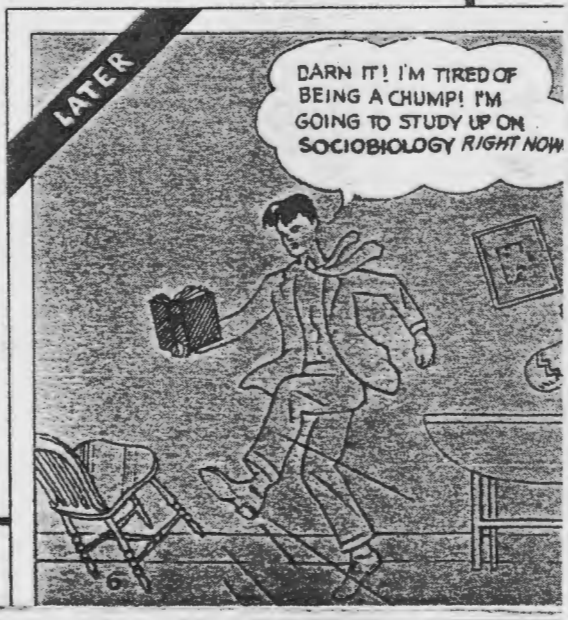
For females, coy behavior makes sense if it elicits some sign of good genes or commitment to nurturing. Sociobiologists believe estrus disappeared in humans as a female strategy to cement monogamy: a year-round sexual attractiveness helped keep mates from wandering off. Menopause may have evolved to turn aging females away from breeding and toward protecting their genetic investment by caring for grandchildren.

Sociobiologists think that evolution has produced different physiques, behavior and attitudes in males and females—a touchy subject for feminists. Trivers says the female is not equipped for the chase and shows no interest in it. And Edward Wilson reminds readers that in the million-year hunter-gatherer period of evolution, men hunted and women stayed home. Adds Wilson: "This strong bias persists in most agricultural societies, and on that ground alone appears to have a genetic origin."

■

Comments like these have irritated some campus feminists, who fear sociobiologists are telling them to stay home and mind the babies, but sociobiologists have some calming news: hunter-gatherer women were economic equals. Says DeVore: "The female is an absolutely integral part of the society, because only her gathering makes it possible for the male to indulge in the gamble of the hunt." Sociobiologists stress that the sexes are genetically equal and can evolve different strategies as conditions change.

It has been argued that the rise of feminism could be a genetic adaptation. Robert Trivers, however, has a sobering thought: if more feminists take jobs and have fewer children, more of the childbearing may be left to nonfeminists. In evolutionary terms, this would mean that feminism is being selected against and will either die out entirely or start from scratch in every generation.



Not the Devil but the Genes?

To the Editors:

Sociobiology [Aug. 1], like other theories that deny the importance of the individual mind and conscience, will sweep the nation. Instead of saying, "The devil made me do it," one can now be scientific and say, "I can't help it; it's in my genes."

David S. Bradburn
Manhattan Beach, Calif.

Sociobiology may apply to ants, but your article reveals it as just another pop simplification when it is extended to people. Rational theories of human behavior have to be flexible enough to account for both a Stevie Wonder, able to triumph over being blind as well as black, and a Patty Hearst, so much a creature of her

environment that she seems to have no genes at all.

Christopher Wills
La Jolla, Calif.

Women have never been invited into the war room of the Pentagon or the chambers of the National Security Council, but now sociobiology claims war occurs because women are watching. They do it all for us, and it's all our fault. Golleee fellas, do you really expect us to swallow that?

The burning question which we are all trying to answer, including the sociobiologist yarn spinners, is: Will the human species be doomed to destroy itself?

Miki Bratt
Claremont, Calif.

Sociobiology is obviously valid: in the proper hands, it could predict much with alarming accuracy.

Unfortunately, to quiet their alarm, the all-powerful majority will reject the discipline's predictions. Like economics, linguistics and psychology before it, sociobiology will wind up as just one more haven for professional "explainers," for those soothsayers whom we honor as scientists as long as their findings turn out to be soothing.

Erika Engelhardt
Munich

I am not comfortable with the idea that I was put on this planet solely for the survival of the DNA sequences.

I would much rather believe I was placed on this particular planet temporarily by mistake. This is surely the boondocks of the universe.

Sherry Clifton
Houston

About Abortion

In your Essay about abortion [Aug. 1], you seem to miss the point of the anti-abortionists: we want to stop the killing of innocent human life. If we can only stop the poor from getting abortions, we may have to be satisfied with that, however "unfair" it may seem to those who consider killing a right at all.

Joan K. McCoy
New York City

Abortion is not a social necessity; it is a social luxury. Yes, abortion may improve the "quality of life," but it will degrade us as human beings.

Michael A. Fleming
Houston

An equitable solution to the abortion problem would be to place two small boxes on our tax returns, as we did for presidential campaign contributions. One could be checked by anti-abortionists, who have a moral objection to abortion, to have their money used to support unaborted children of welfare recipients.

The other box would be checked by pro-abortionists, to have their tax money used for abortions for poor people.

Mark S. Cvetko
Portland, Ore.

In the old days, if there was an abortion, the man responsible for the pregnancy was expected to pay the bill. How come men got off the hook?

(The Rev.) Maurice Fitzgerald
Washington, D.C.

Unfortunately, Mr. Carter's saying that "many things in life are not fair" will do little to comfort an anguished woman who knows she cannot have a child and yet can't afford an abortion.

Caroline Vecchione
Monmouth Beach, N.J.

Catchy Slogans

Hugh Sidey's assessment [Aug. 1] of President Carter's first six months vis-à-vis the national mood is right on! The nation wants and needs an administrator, not a salesman. Espousing catch-phrase slogans is the easy work of politics; executing successful programs is the difficult work of Government.

Ron Carson
Frankfort, Ky.

Tom Paine wrote another work, the title of which I believe does indeed apply to President Carter: *Common Sense.*

Mina Otis
Dover, Mass.

The Needy

Your article "Lost Loophole" [Aug. 1] says that the Department of Health, Education and Welfare plans to tighten the rules so more money can go to needier students. What is a needy family, and what is middle income? We cannot put five children through college or even assist them through without more help than we have received so far. To have them leave home and declare themselves independent is not "tricking" or "exploiting" anyone. It's their only chance! We are the middle class. By the time the system is done with us, we will be the poor.

Mrs. R.O. Meyer
Cincinnati

Does anyone ever stop to think that if middle-income Americans were not so overburdened by taxes to feed, clothe, doctor and educate "needier" families, they would be able to afford to educate their own children without help from HEW?

Bravo to middle-income Americans who can devise a way to use their own tax dollars to help themselves—it sure doesn't happen often.

Ann Wollan
Wilmette, Ill.

Romance in Ashes

When describing the various feats Superman [Aug. 1] is to perform in the movie, your article casually made mention of his flying round the world in 90 sec. with Lois Lane in his arms. It all sounds romantic I grant you, but anyone else would realize that this stunt is impossible—if not for Superman, then certainly for Miss Lane.

Given an arbitrary height of 300 ft. at which to fly, the distance traveled in 90 sec. would be a mere 25,000 miles. To make it in the alloted time, Superman would have to travel at a cool 1 million m.p.h. This may be within his capacity, but Miss Lane could never survive. The air friction at that speed would reduce her to a pile of red-hot carbon ash and cruelly terminate her affair with our red-caped hero. Finally, it is unlikely that Superman and his lady love would even stay in earth orbit at the speed required for their 90-sec. trip round the world. After all, spacecraft orbit the earth at 24,000

Jimmy Carter in the Lions' Den

To the Editors:

Your cover story [Aug. 8] implied that U.S. foreign policy could succeed only if Carter adopted the ways and means of Nixon-Ford-Kissinger. In light of recent history, our friends and adversaries might have reason to question the honesty of this past policy.

A foreign policy based upon open negotiations, recognizing this country's basic ideal of human rights, is more honest to our beliefs. And it may be a good foreign policy for a world in need of moral leadership.

Charles B. Deane Jr.
Rockingham, N.C.

Jimmy Carter put himself in the lions' den and dragged Uncle Sam in too.

Ken Powers
Walnut, Ill.

Jimmy Carter, like Daniel, is a man of prayer and strong faith; he need not fear the lions.

(The Rev.) Lawrence E. Gidley
Newell, S. Dak.

Critics of Carter's human rights stance glibly trace his "basic principles and values" back to a Southern Baptist Sunday school outlook. Actually, such moral basics are common to all men of all times; they are found not only in the Bible but in Hindu, Egyptian, Chinese, Norse, Babylonian and Greek texts.

So Carter's sense of morality is no more Southern Baptist than the sun outside my window is Pasadenan. Universal laws deserve universal recognition.

Ray Seldomridge
Pasadena, Calif.

Genes *v.* Golden Rule

Contrary to the impression left by the brief paragraph mentioning our views in your cover story on sociobiology [Aug. 1], we believe that the moral teachings found in the world's religions are historically developed cultural products, opposing the selfish tendencies which biological evolution builds into human nature and which are serious obstacles to social cooperation. The golden rule and love of neighbors are not gene-based tendencies in each of us, but are on the contrary socially evolved preachings designed to curb the gene-based greed for more than our share for ourselves, our children and subsequent progeny.

Donald T. Campbell, Professor of Psychology, Northwestern University
Evanston, Ill.

Ralph W. Burhoe, Editor
Zygon: Journal of Religion and Science
Chicago

I have been quoted in TIME as part of the general wave of enthusiasm for sociobiology, but the quotes came from a discussion in which I also criticized and even ridiculed the new subfield. Its thought-provoking notions about behavior include some that are true, few that are novel, many that are trivial, and none that can substitute for the complex, laborious, difficult progress of the rest of behavioral and social science. Why do people always like it *easy?*

Melvin J. Konner, Associate Professor
Department of Anthropology, Harvard University, Cambridge, Mass.

Holy Grounds

It would seem that with the billions we spend for defense, the Navy would not have to desecrate the holy grounds of Hawaii's Kahoolawe [Aug. 8] for their bombing practice. Let them sharpen their skills in the local bar on the popular electronic games.

The Ugly American still lives in the Navy, it seems.

Gus Sigwart
New York City

In all Polynesian cultures, an act of violence to the land is regarded as an outrage against the people of that land. That is why the Navy's use of Kahoolawe Island as a target has always provoked bitterness among Hawaiians, now resulting in open protest. Ancient battles were provoked by cutting down coconut trees, thus obligating the owners to do battle as much as if a kinsman had been assaulted.

In the context of Hawaiian culture, the U.S. has essentially declared war on the Hawaiian people by using Kahoolawe Island as a target for violence.

Herb Kawainui Kane
Captain Cook, Hawaii

The Hawaiian members of Protect Kahoolawe Ohana are no more representative of the Hawaiian people than the "smattering of white liberals" your correspondent mentioned. The movement, which apparently began as a publicity stunt to steal some of the American Indians' thunder, would be ridiculous were it not so tragic. The Ohana want to turn back the clock.

Why wait more than 30 years to decide that the barren, waterless island is "sacred"? And what would they do with it? Return to human sacrifices, beginning with the U.S. military?

Alan Williamson
Honolulu

As a native Hawaiian woman, I am heartened to see TIME magazine finally reporting the Hawaiian tragedy.

For too long we have been depicted as happy, contented natives of Aloha Land, eager to greet the next planeload of tourists.

Our children are now being taught Tourist Appreciation from the fourth grade on so that we natives may serve the visitor properly.

Moanikeala Akaka
Hilo, Hawaii

Sweden for the Swedes

In response to your article "Racial Time Bomb" [Aug. 8]: Swedes are naturally a very proud people. You might also call us an obstinate and even boring people, but we have with some help made our native country what it is today —a paradise.

I want to tell you that most Swedes have nothing against foreigners. But David Schwarz's calculation that by the year 2000 nearly a third of all Swedes will be foreign born is frightening. We want to keep our country to ourselves.

Immigration must be stopped. SWEDEN FOR THE SWEDES.

Lars Larsson
Ekerö, Sweden

Your article about Swedish racism certainly points to a growing problem of Swedish society, but I cannot get rid of the idea that you merely project a great deal of your own problems concerning racial injustice onto a country in which the individual has long enjoyed far more freedom, tolerance and humaneness than in your own.

Joachim Grau
Hamburg, West Germany

Being Swedish born and now living in Hawaii, "the great melting pot of the Pacific," I find it unthinkable that Swedes would be racists by nature. The migrants from southern Europe and the Middle East who settled in Sweden are not resented because of their coloring. They are resented, even hated, for their way of living off welfare, for which the home-grown Swede is highly taxed. The people you refer to as irresponsible, riotous hooligans are merely young patriots who wish to

THE WHITE HOUSE

WASHINGTON

Press will call Fri am

Date: September 12, 1977

MEMORANDUM

FOR ACTION:
Peggy Rainwater

FOR INFORMATION:

It will recommend AGAINST - Peggy

FROM: Rick Hutcheson, Staff Secretary

SUBJECT: Press memo dated 9/1/77 re National Medal of Science Nominations

YOUR RESPONSE MUST BE DELIVERED TO THE STAFF SECRETARY BY:

TIME: 12:00 NOON

DAY: Wednesday

DATE: September 14, 1977

ACTION REQUESTED:

_X_ Your comments

Other:

STAFF RESPONSE:

____ I concur. ____ No comment.

Please note other comments below:

PLEASE ATTACH THIS COPY TO MATERIAL SUBMITTED.

If you have any questions or if you anticipate a delay in submitting the required material, please telephone the Staff Secretary immediately. (Telephone, 7052)

THE WHITE HOUSE

WASHINGTON

September 1, 1977

MEMORANDUM TO: THE PRESIDENT

FROM : Frank Press FP

SUBJECT : National Medal of Science Nominations

The National Medal of Science was established by Congress in 1959 as the nation's highest award for outstanding contribution to knowledge in science and engineering. The legislation provided that the awards would be made by the President. Executive Orders issued by your predecessors have established a Presidentially-appointed committee to oversee the nomination process and recommend those scientists and engineers most outstanding on the basis of their achievements. Since the first award by President Kennedy in 1962, the Medal has been awarded to 117 scientists and engineers at ceremonies in which 10-15 Medals have been presented.

In 1976 the Committee reviewed approximately 650 nominations from the National Academies of Sciences and Engineering, colleges and universities and scientific and engineering societies. The Committee reported its 1976 recommendations to President Ford at the end of December. President Ford decided to defer action so that you would have the opportunity to consider the nominations and hold an award ceremony early in your Administration.

I have reviewed carefully the nominees for the National Medal of Science, first as a member of the Committee in 1976 and now as your Science and Technology Adviser. The list of fifteen names is well balanced among physicists, chemists, biologists, mathematicians, and engineers. Each of the proposed recipients is a distinguished and original scientist. The list of nominees appears in TAB A, the report of the selection committee in TAB B. A list of previous recipients is in TAB C.

You should be aware that there may be some criticism of one nominee, Professor E. O. Wilson of Harvard University. Wilson did pioneering work on the organization of insect societies and the evolution of socially desirable behaviors among insects. For this work he was honored by election to the National Academy of Sciences at the unusually young age of 40, some 8 years ago. In recent years he has published a book entitled Sociobiology: A New Synthesis, which has drawn rave notices from many scientists and severe criticism from a few. The criticism is based upon extrapolation of his observations and his hypotheses to such

complex human behaviors as aggression, juvenile delinquency, and altruism. In my judgment, Wilson should not be denied recognition because of any controversy surrounding speculations mostly attributable to others. A concurring opinion from Dr. Don Kennedy, Commissioner of Food and Drugs and an expert in the field, appears in TAB D. Dr. Philip Handler, President of the National Academy of Sciences, supports the Wilson nomination. However, Dr. Richard Atkinson, Director of the National Science Foundation, recognizing the debate, would defer an award at this time.

Since its inception in 1962, all medals were awarded personally by the President at a brief annual ceremony in the White House. I recommend that you continue this tradition and make the award at an appropriate ceremony at the end of September or in early October.

ACTION

Approve list of nominees for National Medal of Science as submitted _____

Further review required _____

LIST OF 1976 NOMINATIONS AND SUMMARY CITATIONS FOR THE NATIONAL MEDAL OF SCIENCE

NAME	CITATION
Morris Cohen Institute Professor Department of Metallurgy and Materials Science Mass. Institute of Technology Cambridge, Massachusetts	For original research and advancement of knowledge of the physical and mechanical metallurgy of iron and steel, and especially for his work on the martensitic transformation in the hardening of steel.
K. O. Friedrichs Professor Emeritus Curant Institute of Mathematical Sciences New York University New York, New York	For bringing the powers of modern mathematics to bear on problems in physics, fluid dynamics, and elasticity.
Peter C. Goldmark President Goldmark Communication Corp. 98 Commerce Road Stamford, Connecticut	For contributions to the development of the communication sciences for education, entertainment, culture and human service.
Samuel A. Goudsmit Department of Physics University of Nevada Reno, Nevada	For the major discovery, together with George E. Uhlenbeck, of the electon spin as the source of a new quantum number.
Roger C. L. Guillemin Department of Neuroendocrinology Salk Inst. of Biological Studies San Diego, California	For demonstrating the presence of a new class of hormones, made in the brain, that regulate the function of the pituitary gland, thereby making possible improved diagnosis and treatment of numerous endocrine disorders.
Herbert S. Gutowsky Department of Chemistry University of Illinois Urbana, Illinois	In recognition of pioneering studies in the field of nuclear magnetic resonance spectroscopy.
Erwin W. Mueller Department of Physics 104 Davey Laboratory Pennsylvania State University University Park, Pennsylvania	For his invention of the field-emission microscope, the field-ion microscope, and the atom-probe microscope, which helped to resolve the atomic structures of solids.

Keith R. Porter Department of Molecular, Cellular and Developmental Biology University of Colorado Boulder, Colorado	For a multitude of fundamental contributions to the elucidation of the fine structure of cells by electron microscopy coupled with dynamic approaches, which has inaugurated a new era of cell biology integrating structure and function into a comprehensive and unified picture of the life of cells.
Efraim Racker Section of Biochemistry, Molecular and Cell Biology Cornell University Ithaca, New York	For major contributions to understanding of the subcellular mechanism whereby oxidative and photosynthetic energy is transformed into the specific form of chemical energy utilizable by living cells.
Frederick D. Rossini Department of Chemistry Rice University Houston, Texas	For contributions to basic reference knowledge in chemical thermodynamics.
Verner E. Suomi Professor of Meterology and Environmental Studies and Director of the Space Science and Engineering Center University of Wisconsin Madison, Wisconsin	As a distinguished meterologist and inventor, he has provided a new view of the dynamics of our atmosphere which already has brought substantial benefits to the people of this nation and the world.
Henry Taube Department of Chemistry Stanford University Stanford, California	In recognition of contributions to the understanding of reactivity and reaction mechanisms in inorganic chemistry.
George E. Uhlenbeck Professor of Physics Rockefeller University New York, New York	For the major discovery, together with Samuel A. Goudsmit, of the electron spin as a source of a new quantum number.
Hassler Whitney Professor of Mathematics The Institute for Advanced Study Princeton, New Jersey	For founding, and bringing to maturity, the discipline of Differential Topology.

Edward O. Wilson
Museum of Comparative Zoology
Laboratories
Harvard University
Cambridge, Massachusetts

For his pioneering work on the organization of insect societies and the evolution of social behavior among insects and other animals.

COMMISSIONER OF FOOD AND DRUGS
Rockville, Maryland 20852

June 8, 1977

Mr. Philip M. Smith
Executive Office of the President
Office of Science
and Technology Policy
Washington, D.C. 20500

Dear Phil:

Thank you for your inquiry about E. O. Wilson in regard to the National Medal of Science nomination. As you requested, I'm supplying you with some pros and cons.

Pros

Wilson is an authentic genius; he has undertaken a remarkable series of researches on the social organization of insects, on animal behavior, and on theoretical population ecology.

His more recent book on "Sociobiology" is in fact a splendid integrative work. Much of it involves nothing more or less than a synthesis of data on the social behavior of animals, their ecological outcomes, and the natural selection theory that is necessary to account for these. In the first and last chapters of the book, Wilson does speculate about the applications of sociobiology theory to human populations.

Cons

It is on the grounds of the material in those two chapters of Sociobiology that Wilson has come under attack. Most of the controversy has been generated by critics of the extreme left, especially from the

Boston Chapter of Science for the People. Members of this group, including Wilson's Harvard colleague Richard Lewontin, a distinguished population geneticist, have accused Wilson of espousing "biological determinism." By this they mean that he seeks to account for the ills of human societies by appealing to "innate" human qualities instead of to the inequities of the socio-economic system. They and others have additionally accused Wilson of displaying, in particular, "sexist" prejudices because of some speculative material contained in these chapters with regard to sex roles.

I myself believe that the criticisms have been overdone. Certainly Wilson suggests no political outcomes of his work, and the tone is generally studiously scholarly throughout. He has had much more support from his academic colleagues than have his attackers.

There would, on the other hand, be strong criticism of the Award from the radical left. Such criticisms would surely be reinforced by the proposed citation, which heavily emphasizes the human applications of his work and neglect the broad scholarly base.

My own recommendation would be that the Award should go forward, but that the citation should emphasize his fundamental contributions, and stress the boldness of the interdisciplinary systhesis represented by Sociobiology. Its potential applications to human social problems should be used, if at all, as an addendum at the very end.

Sincerely yours,

Donald Kennedy

THE WHITE HOUSE
WASHINGTON

9/15/77

Hamilton:

You earlier had no comment on this. I think we should probably have your recommendation as to the proposed award to Wilson. It sounds like a bad idea to me.

Rick

HJ oppose nomination
Pres will call

Tab A

Tab D

THE WHITE HOUSE
WASHINGTON

✓	FOR STAFFING
	FOR INFORMATION
	FROM PRESIDENT'S OUTBOX
	LOG IN/TO PRESIDENT TODAY
	IMMEDIATE TURNAROUND

memo + TABA only

ACTION	FYI	
	✓	MONDALE
		COSTANZA
		EIZENSTAT
✓		JORDAN
		LIPSHUTZ
		MOORE
		POWELL
		WATSON
		LANCE
		SCHULTZE

	ENROLLED BILL
	AGENCY REPORT
	CAB DECISION
	EXECUTIVE ORDER

Comments due to Carp/Huron within 48 hours; due to Staff Secretary next day

	ARAGON
	BOURNE
	BRZEZINSKI
	BUTLER
	CARP
	H. CARTER
	CLOUGH
	FALLOWS
	FIRST LADY
	HARDEN
	HUTCHESON
	JAGODA
✓	KING

✓	KRAFT memo only
	LINDER
	MITCHELL
	MOE
	PETERSON
	PETTIGREW
	POSTON
	PRESS
	SCHLESINGER
✓	SCHNEIDERS
	STRAUSS
	VOORDE
	WARREN

Tab B

REPORT OF THE PRESIDENT'S COMMITTEE

ON THE NATIONAL MEDAL OF SCIENCE FOR 1976

The Committee met on three occasions in sub-committees in the basic areas of Biological Sciences, Physical Sciences, Mathematical Sciences and Engineering Sciences, on December 9, 11, and 18, 1976, respectively, and as a whole on December 19. On December 9, Drs. Handler and Lang were present, and they conferred by telephone with Dr. McElroy. On December 11, Drs. Giaever, Press, Baldeschwieler, Walling, and Newmark met; and on December 18, Drs. Bing and Lax considered the Mathematics nominations; and Drs. Stever and Newmark the Engineering nominations, discussing these also by telephone with Dr. David.

At these meetings, each group considered all the active nominations and prepared a priority listing of from four to ten candidates in each area together with drafts of the "Citations" and "Summary of Achievements."

The Executive Secretary of the Committee, Dr. Richard S. Nicholson, met with the groups on December 18 and 19, and was represented by Mr. Philip M. Smith on December 9 and 11.

The entire Committee, except for Drs. McElroy, Press and David, met on December 19 and had available for consideration the priority listings of each of the groups, as well as the draft citations and summaries. After general discussion of the basic guidelines, agreement was reached on group quotas, total number of candidates, and assignment of individual nominees to the basic groupings. A resulting list of candidates was prepared, ranked in descending order in each of five categories, to be submitted to the President. This list is attached.

Also, on December 19, a slight revision was made to the letter calling for nominations for the 1977 awards, to emphasize the fact that all potential candidates in a particular field were to be considered in the nominations submitted to the Committee.

As a final action, the Committee discussed prospective nominees for appointment to fill the two present vacancies on the Committee and the four additional vacancies that will be created at the end of December 1977. Nominations for these vacancies will be transmitted by the members of the Committee to the President's Science Adviser.

Nathan M. Newmark

Nathan M. Newmark
Chairman

December 22, 1976

NOMINATIONS BY THE PRESIDENT'S COMMITTEE

ON THE NATIONAL MEDAL OF SCIENCE FOR 1976*

Biological Sciences

1. Roger Charles Louis Guillemin
2. Edward O. Wilson
3. Keith R. Porter
4. Efraim Racker

Engineering Sciences

1. Morris Cohen
2. Peter C. Goldmark
3. Erwin W. Mueller

Mathematical Sciences

1. Hassler Whitney
2. K. O. Friedrichs

Physical Sciences

Chemistry

1. Herbert S. Gutowsky
2. Henry Taube
3. Frederick D. Rossini

Physics

1. Samuel A. Goudsmit **
2. George Uhlenbeck **
3. Verner E. Suomi

* Ranked in descending order in each category.

** Because the contributions of these nominees are so closely related an award should be given to both or neither.

ALPHABETICAL LIST OF 1976 NOMINEES

NAME	YEAR OF BIRTH	CURRENT ADDRESS
COHEN, Morris	1911	Institute Professor Dept. of Metallurgy and Materials Science Massachusetts Inst. of Tech. Cambridge, Massachusetts
FRIEDRICKS, K. O.	1901	Courant Institute of Mathematical Sciences New York University New York, New York
GOLDMARK, P. C.	1906	Goldmark Communications Corp. 98 Commerce Road Stamford, Connecticut
GOUDSMIT, S. A.	1902	Department of Physics University of Nevada Reno, Nevada
GUILLEMIN, R.	1924	Department of Neuroendocrinology Salk Inst. of Biological Studies San Diego, California
GUTOWSKY, H. S.	1919	Department of Chemistry University of Illinois Urbana, Illinois
MUELLER, E. W.	1911	Department of Physics 104 Davey Laboratory Pennsylvania State University University Park, Pennsylvania
PORTER, K. R.	1912	Department of Molecular, Cellular and Developmental Biology University of Colorado Boulder, Colorado
RACKER, E.	1913	Section of Biochemistry, Molecular, and Cell Biology Cornell University Ithaca, New York

ROSSINI, F. D.	1899	Department of Chemistry Rice University Houston, Texas
SUOMI, V. E.	1915	Professor of Meteorology and Environmental Studies and Director of the Space Science and Engineering Center University of Wisconsin Madison, Wisconsin
TAUBE, H.	1915	Department of Chemistry Stanford University Stanford, California
UHLENBECK, G. E.	1900	Professor of Physics Rockefeller University New York, New York
WHITNEY, H.	1907	The Institute for Advanced Study Princeton, New Jersey
WILSON, E. O.	1929	Museum of Comparative Zoology Laboratories Harvard University Cambridge, Massachusetts

PRESIDENT'S COMMITTEE ON THE NATIONAL MEDAL OF SCIENCE - 1976

Nathan M. Newmark (Chairman)
John D. Baldeschwieler
R. H. Bing
Edward E. David, Jr.
Ivar Giaever
Philip Handler (Ex Officio)

Anton Lang
Peter D. Lax
William D. McElroy
Frank Press
H. Guyford Stever (Ex Officio)
Cheves Walling

Richard S. Nicholson (Executive Secretary)

MORRIS COHEN

Institute Professor, Department of Metallurgy and Materials Science, Massachusetts Institute of Technology, Cambridge, Massachusetts.

Citation: For original research and advancement of knowledge of the physical and mechanical metallurgy of iron and steel, and especially for his work on the martensitic transformation in the hardening of steel.

Summary of Achievements

The contributions of Morris Cohen are most notable in the following areas of metallurgical research: Phase transformations in metals; heat treatment and metallography; thermodynamics and solid-state diffusion; mechanical behavior, strengthening mechanisms, and fracture in metals; physical properties and structure of metals and alloys.

Morris Cohen's work was timely in furthering the basic knowledge of the martensitic transformation and properties of martensitic steel at the stage when the application and usage of such steels was expanding rapidly. His researches and that of his students in this area are the basis of our present understanding of the properties of steel.

His studies of the tempering effects in commercially important grades of steel promoted a more general understanding of the tempering reactions, knowledge which is required if the high hardness and strength of martensitic steels are to be practicable for use where toughness is required.

Present thinking on precipitation and age-hardening phenomena in nonferrous alloys also owes a great deal to his initial work. The continued research of Morris Cohen and his students has clarified our understanding of the initiation and propagation of cleavage fracture in iron and steel, and has proved most valuable to the practicing metallurgist in the proper application of steels in complex structures in hostile environments.

Whole new classes of high strength materials are being developed on the basis of his pioneering research.

K. O. FRIEDRICHS

Professor Emeritus of Mathematics, Courant Institute, New York University, New York, New York 10012

Citation: For bringing the powers of modern mathematics to bear on problems in physics, fluid dynamics, and elasticity.

Summary of Achievements:

Friedrichs is one of the founders of the modern theory of partial differential equations arising in mathematical physics. He made rigorous the mathematical theory of the Schrödinger operator, and created the basic mathematical ingredient of acoustical and quantum mechanical scattering theory. He has given many novel applications of perturbation theory to linear and nonlinear problems. In collaboration with Stoker, Friedrichs has made numerous discoveries about the buckling of elastic structures.

The theory of stability of difference equations, of fundamental use in all numerical analysis, is contained in a paper of Friedrichs, written jointly with Courant and Levy. He wrote, also with Courant, the basic mathematical study of shock waves, which has been influential in aerodynamics. He has contributed to the theory of flight, and helped to clarify the puzzle of transonic flow. In the late fifties and sixties, Friedrichs made basic contributions to the study of propagation of magnetohydrodynamic waves within the context of the controlled thermonuclear fusion program.

"The Mathematical Aspects of Quantum Theory of Fields", written in the fifties, was pioneering work and attracted many young researchers to this area.

PETER C. GOLDMARK

President, Goldmark Communication Corporation, Stamford, Connecticut.

Citation: For contributions to the development of the communication sciences for education, entertainment, culture and human service.

Summary of Achievements:

Dr. Peter C. Goldmark, in 36 years of activity, has created a series of important inventions which have had a great impact on the science and technology communications for the benefit of mankind.

Starting in 1936 with two technicians and one room, he has built an industrial research laboratory that now has a staff of several hundred professionals and support personnel, and is rated as one of the leading electronics and communications research organizations in the world. Under his leadership CBS Laboratories have produced devices and systems that have, and will continue to have, a profound influence on industry, government and society.

His contributions to his country during World War II as the head of a scientific laboratory in England have been singled out by such American Presidents as Roosevelt and Eisenhower, and have gained the mutual respect of fellow scientists.

Subsequently, he played an important part in America's space effort with several significant inventions, including the high-resolution photographic readout and transmission for the NASA Lunar Orbiter program and color television technology for the Apollo mission.

He was the first in 1940 to produce a working system of color television broadcasting. This same system has been used by the Apollo astronauts to transmit live color television pictures to earth from the moon.

In painstaking development, which started in 1959, Peter Goldmark created the first system of cassette television--called EVR--which is destined to provide a new medium for education at all levels in the home.

His vision of educational and other benefits inherent in improved electronics has been a prime factor in broadening communications technology for medicine. As part of this effort, he developed as a visiting professor medical electronics for the University of Pennsylvania a miniature color television system to send live color pictures from inside the human anatomy, which is used today for medical education and clinical diagnosis.

During the intervening years CBS Laboratories' scientists, under his direction, have turned out a long series of communication systems for the nation's defense effort, of which only a small part is publicly known. One such development is the highly sophisticated photographic laser transmission system called "Compass Link" to send high quality photographs from Saigon to Washington in minutes over a satellite network.

Recently, he directed the development of a new generation, high-speed electronic photocomposition system (Linotron) now in use at the U.S. Government Printing Office and by the Air Force Logistics Command.

In the last decade Dr. Goldmark has increasingly directed his attention to the social consequences of communication techniques and their application for a healthy development of an American rural environment.

Towards this objective he has chaired since 1969 a distinguished panel of scientists for the National Academy of Engineering's Committee on Telecommunications as part of a presidential advisory group.

After his retirement as President of CBS Laboratories in December of 1971, he formed the Goldmark Communications Corporation to devote his great energies mainly to this problem and to the benefit of his country.

The National Academy of Engineering, to which he is a long standing member, is sponsoring such a project of Dr. Goldmark's on "The New Rural Society" in cooperation with the Department of Housing and Urban Development and other government agencies.

It is therefore our opinion that Dr. Goldmark is a person of exceptional merit, highly deserving of the award of the National Medal of Science.

SAMUEL A. GOUDSMIT

Emeritus Deputy Chairman, Brookhaven National Laboratory,
Long Island, New York

Citation: For the major discovery, together with George E. Uhlenbeck, of the electron spin as the source of a new quantum number.

Summary of Achievements

As every textbook on atomic physics written since 1925 has stated, Uhlenbeck and Goudsmit showed that the electron had an intrinsic angular momentum (spin) and an intrinsic magnetic moment. These revolutionary concepts explained many of the then puzzling experimental phenomena in atomic spectra, as well as those observed in the study of the anomolous Zeeman effect. The concept of the spin and magnetic moment of the electron played an enormously important role in the various developments of quantum mechanics such as the Pauli Principle, Fermi Statistics and Dirac's Theory of the Electron. The electron spin is, of course, now firmly established and because of this discovery, Uhlenbeck's and Goudsmit's names are forever linked together in the history of physics.

From this early discovery when he was only 23 years old, Dr. Samuel A. Goudsmit went on to a distinguished and creative career in physics, and has made numerous contributions to atomic structure, nuclear spin, mass spectrography and statistical problems. During World War II, he was head of the "Alsos" mission whose object was to assess Germany's progress toward a nuclear bomb. For this work he received the Medal of Freedom and was made an officer of the Order of the British Empire.

For many years Dr. Samuel A. Goudsmit has served as an Editor-in-Chief for The Physical Review and Physical Review Letters which he founded in 1958. Under his leadership these journals have become the undisputed leading physics journals in the world.

Goudsmit has received many awards in his career; the most outstanding are the Research Corporation Award in 1954 and the Max Planck Medal of the German Physical Society in 1964.

It is remarkable that Samuel A. Goudsmit has achieved eminence in two areas, as a creative scientist and as an editor of the major bulk of the world's physics literature.

ROGER CHARLES LOUIS GUILLEMIN

Resident Fellow and Research Professor
The Salk Institute
San Diego, California 92110

CITATION: For demonstrating the presence of a new class of hormones, made in the brain, that regulate the function of the pituitary gland, thereby making possible improved diagnosis and treatment of numerous endocrine disorders.

SUMMARY OF ACHIEVEMENTS

The role of the adenohypophysis (the anterior pituitary) as master endocrine gland of the body has been appreciated for a half-century during which much has been learned of the nature and mode of action of the six different hormones that are synthesized and secreted by this small organ. Two decades ago, attention was drawn to understanding the mechanisms that, in turn, regulate the rate of synthesis and secretion of those hormones. A few investigators were attracted to the possibility that such control is exercised by the hypothalamus, a very small protuberance extending from the bottom side of the brain and connected to the adenohypophysis by a small blood vessel (a portal vein).

Roger Guillemin has been the most successful of all investigators who addressed this question. He pioneered in devised assays using either whole animals or preparations of adenohypophysis in tissue culture to detect when that gland is stimulated to release each of its individual hormones. With those assays he was able to demonstrate that the hypothalamus itself manufactures and secretes into that portal vein minute amounts of a family of independent, discrete 'releasing factors' (RFs), each of which, in reaching the adenohypophysis, causes the latter to release one of its specific hormones.

Next, he conquered the problem of isolating more preparations of several of the releasing factors from thousands of animal brains. To date, he has purified and established the unusual chemical structure of each of the following: Thyrotrophic RF, which causes release of the hormone which in turn causes release of thyroxine by the thyroid; the luteinizing RF which causes release of the gonadotrophic hormones which, in turn, stimulate the testes or ovary; the growth RF which causes release of the growth hormone and, most recently, 'somatostatin,' which has the opposite effect, i.e., it prevents release of growth hormone from the pituitary and also suppresses secretion of glucagon by the pancreas and gastrin by the stomach.

Each of these RFs proved to be a small polypeptide; each has proved to be present in areas of the brain other than the hypothalamus. When

these findings are combined with the recent description of the enkephalins, the polypeptides that are the natural 'opiates,' it becomes clear that a new chapter has been opened in knowledge of chemical communication in the nervous system.

HERBERT S. GUTOWSKY

Director, School of Chemical Sciences and Head, Department of Chemistry, University of Illinois, Urbana, Illinois.

Citation: In recognition of pioneering studies in the field of nuclear magnetic resonance spectroscopy.

Summary of Achievements

Nuclear magnetic resonance spectroscopy is probably the most important tool that has been developed for chemical studies in the last 25 years.

Herbert Gutowsky was among the first to recognize the importance of this to chemistry. His major contributions include:

(a) Pioneering research in the phenomena of the chemical shift and electron-coupled spin-spin interactions which are fundamental to the wide use of nuclear magnetic resonance for analysis of the structures of molecules in solution.

(b) The application of nuclear magnetic resonance in chemical kinetics, with particular emphasis on proton exchange and molecular conformational rearrangements.

(c) Studies of crystallographic structure, molecular motion and phase transitions in solids.

Dr. Gutowsky has made major contributions to both the basic theory of nuclear magnetic resonance spectroscopy and to the development of experimental methods and instrumentation. This work has been applied to solids, liquids, gases, solutions, polymers, metals, and biological substances.

Aside from his own scientific work, Gutowsky has made important contributions to American science as Chairman of the Committee on Professional Training of the ACS and as Chairman of the NAS panel reviewing data on the effect of flurocarbons on the ozone layer of the stratosphere.

ERWIN W. MUELLER

Evan Pugh Research Professor of Physics, The Pennsylvania State University, University Park, Pennsylvania.

Citation: For his invention of the field-emission microscope, the field-ion microscope, and the atom-probe microscope, which helped to resolve the atomic structures of solids.

Summary of Achievements:

In August 1955, as a result of his invention of the field-ion microscope, Erwin Mueller became the first man to see a crystal as a collection of individual atoms. With his later invention of the atom-probe microscope, it became possible to identify a single atom.

The work of Dr. Mueller has changed surface physics from a phenomenological subject to a field in which detailed atomic mechanisms can be studied. The impact of his work on the science of surfaces has been likened to the influence of cloud chambers and other particle tracking devices in nuclear physics.

In addition to his uniquely important contributions to instrument development, Dr. Mueller has advanced the understanding of the atomic mechanisms of emission, ionization, and desorption.

KEITH R. PORTER

Professor (former Chairman)
Department of Cellular, Molecular
and Developmental Biology
University of Colorado, Boulder

CITATION: "For a multitude of fundamental contributions to the elucidation of the fine structure of cells by electron microscopy coupled with dynamic approaches, which has inaugurated a new era of cell biology integrating structure and function into a comprehensive and unified picture of the life of cells."

SUMMARY OF ACHIEVEMENTS

All living creatures are built up of microscopic elementary units, the cells. Understanding of structure and function of cells, in normal as well as pathological situations, is therefore one essential premise for the understanding of structure and function of the whole organism, including man, in health as well as in sickness.

For three centuries, man's understanding of cell structure was limited by the resolution power of the light microscope, although this was enough to show that the cell was a complex microcosm comprising a variety of substructures each of which could be presumed to have specific functions.

Porter was among the first to grasp the opportunity afforded by the electron microscope which increased resolution power by several orders of magnitude, and he was the first to use this instrument in biology in a systematic, broadly-based manner. He was thus responsible, more than any other single investigator, for demonstrating the importance of the electron microscope for biological research, contributing to its rapidly expanding use in biology, and thus providing us with a "new" view of the cell. This new view included both far more detailed information about structures that were known from light microscopic studies, and the existence of structures that could not be seen with the light microscope, or could be seen only as indistinct shadows. An example of the former was Porter's discovery of striation in fibrin which led him into later studies on collagen and its formation. As to "new" cell structures, Porter has to his credit the greatest number of such structures discovered or characterized in detail by any electron microscopist, in healthy as well as diseased cells. He showed that a tumor-inducing agent in the milk of mice (Bittner milk agent) was very probably associated with a defined particle present in infected cells, and he clarified the nature of the inward extensions of the muscle cell surface

(transverse tubules). He expanded our knowledge of the endoplasmic reticulum, a membrane system permeating the entire cell and also connecting adjacent cells, into a variety of specialized cell types. He discovered the autolysosomes of the liver, the "coated vesicles" in oocytes, the microtubules which are present in a great variety of cells, and most recently, using the high voltage electron microscope, the microtrabaeculae - structures in the "cytosol," the matrix which is present in cells between the organized structures and which had been considered as having little if any structure of its own. However, in all this work Porter never stopped at describing a cell structure, whether "old" or "new," but by selecting cell types associated with defined functions or processes and by subjecting cells to experimental treatments he succeeded in gaining profound insights into the function of that structure. Thus, he demonstrated or laid the basis for demonstrating that the endoplasmic reticulum in many cells played a central role in protein synthesis and in secretion of various products while in striated muscle cells it was involved in circulating calcium ions as a means of regulating muscle contraction and in smooth muscle cells it played an important role in detoxification of drugs and other toxic materials. The autolysosomes were recognized as important in the degradation of structures in aging cells, the coated vesicles in the selective uptake of proteins by cells. Porter's discovery of the nature of the transverse tubules opened up an important area of studies concerned with the inward spread of contraction activation in muscle cells. Last not least, microtubules were found, with Porter himself leading the way, to play central roles in the determination and modification of cell shape and in cell (nuclear) division. This fusion of structural and functional aspects is in fact the most important general impact Porter's work has had on cell biology; it has opened a new era in this discipline, enabling us to develop comprehensive and integrated understanding of cell structure and function.

Two features have been essential for this impact of Porter's work. Firstly, he exhibits a unique sovereignty in the choice of biological material. He has worked with muscle cells, cell cultures, plant cells and other cell types, but in each case he selected that cell type which best exhibited what he was searching for. This is not simple coincidence or serendipity; it is the sign for a very fine and broad understanding of organisms and the cell types of which they are composed. Secondly, Porter evidently possesses a singular ability for recognizing the usefulness of new technical developments for biological research. The electron microscope, scanning electron microscope, and high voltage electron microscope had been "around" and had been used with biolgical materials before Porter. But as already stated, Porter was the first to use the electron microscope in the study of cell structure systematically and on a broad basis, and more recently but in quite a similar manner he has pioneered the uses of the scanning electron microscope and the high voltage electron

microscope and has become the head of the first high voltage electron microscope facility set up for biological research. In all these cases, he designed methods for adapting the technology to the special characteristics of biological materials. Thus, he introduced the use of osmium tetroxide as a particularly conservative agent for fixing cells and tissues, and designed the Porter-Blum microtome for preparation of ultrathin tissue sections for electron microscopic study; both methods belong to the standard equipment of the modern cell biology laboratory. Considering both the remarkable sweep and the incisiveness of Porter's work it is not surprising that he had a profound influence on "his" discipline. His laboratories at the Rockefeller University, Harvard and the University of Colorado have been training grounds for very numerous students and postdoctoral fellows who were infected by his enthusiasm but also steeped in his rigorous and demanding attitudes, and who are now carrying on his work, many of them by now in leading positions of their own.

EFRAIM RACKER

CITATION: For major contributions to understanding of the subcellular mechanism whereby oxidative and photosynthetic energy is transformed into the specific form of chemical energy utilizable by living cells.

SUMMARY OF ACHIEVEMENTS

Animal cells are engines, viz., they perform work -- such as muscle contraction -- utilizing energy that they obtain by the combustion of fuel, the oxidation of carbohydrate or fat by oxygen. But they do so not as in man-made machines, by using the heat liberated in such a process, but by utilizing the free energy of the process, at constant temperature, to drive the chemical formation of one compound, adenosine triphosphate (ATP), the potential energy of which is, in turn, used to drive all other energy-requiring processes possible in living systems (nervous transmission, chemical syntheses, growth, special secretions, formation of urine, etc., etc.). For three decades numerous laboratories, worldwide, have attempted to learn the nature of the process whereby the energy liberated by the chemical reactions by which sugar or fat is oxidized to carbon dioxide and water is linked to the formation of ATP. A multitude of investigators showed this process to be localized in the subcellular organelles termed mitochondria. Many theories were offered but each was destroyed by observation and experiment. One hypothesis, however, the 'proton-motive hypothesis,' which was offered on the basis of scanty and insufficient evidence, has been shown by Racker to be a valid description of this vital process.

Racker's entire scientific career has been addressed to the question of the mechanisms of ATP formation. He played a central role in demonstrating how that process operates in the process called glycolysis in muscles or fermentation by yeast or bacteria, in the absence of oxygen. And he had played a central role in establishing the fate of the glucose molecule in the special metabolic pathway that operates when liver cells are engaged in synthesizing fat from sugar. When he turned to the events in aerobic mitochondria, he was struck by the inability to find any intermediates in the process and by the fact that that process is intimately related to the organized structure of mitochondria and the integrity of the mitochondrial membranes. By learning how to fragment those membranes and reconstitute them from their fractional components, Racker and his colleagues identified the components essential to the process of oxidative phosphorylation, described their chemical nature and provided the final proof of the validity of the proton-motive

hypothesis. This has proved to be the mechanism operative in formation of ATP both in cells oxidizing fat or carbohydrate and in plant cells obtaining energy for this process by photosynthesis. These findings have also illuminated the mechanisms by which cations are actively transported across all biological membranes, as in muscle contraction and nervous transmission.

FREDERICK D. ROSSINI

Professor of Chemistry, Rice University, Houston, Texas.

Citation: For contributions to basic reference knowledge in chemical thermodynamics.

Frederick Rossini has been one of the pioneers in the development of techniques for high precision thermochemical measurements and the collection of thermodynamic data on important classes of chemical compounds. Dr. Rossini served as scientific and administrative leader of the thermo-chemistry section of the National Bureau of Standards where he developed much of the basic reference data on which modern engineering practice relies for the design of internal combustion engines, chemical processes, and power generating plants.

Professor Rossini's work includes high-precision values for the heats of formation of water, carbon dioxide and a variety of hydrocarbons, which form the basic family of chemical compounds involved in common combustion processes. This precision determination of physical and thermochemical properties of these compounds has laid the goundwork for the optimum use of fossil fuels.

VERNER E. SUOMI

Professor of Meteorology and Director of Space Science Engineering Center, University of Wisconsin, Madison, Wisconsin.

Citation: As a distinguished meteorologist and inventor, he has provided a new view of the dynamics of our atmosphere which already has brought substantial benefits to the people of this nation and the world.

Summary of Achievements:

Dr. Suomi is the major driving force in the scientific community in the application of space systems for improvement of weather service to the public. His impact on international meteorology has been enormous, and people of all nations will benefit in the coming decades. His service to environmental science and engineering has both distinguished him and brought great credit to his country.

Dr. Suomi studies nature with the efficiency of an engineer yet with the subtlety and insight of a true scientist. His is a unique and highly productive talent -- he translates natural occurrences into quantitative measurements with which men can comprehend their environment.

Dr. Suomi's best known development is the "spin-scan camera," which has revolutionized satellite meteorology, saved millions of dollars in weather observations, and upon which the world's largest international scientific undertaking is based. The spin-scan camera has made it possible to look at the same weather system repeatedly at intervals of a few minutes. From these observations it is possible to measure the dynamics of the phenomena: air motion, cloud height and growth rates, rainfall location and amounts, and even the extent of atmospheric pollution. Other satellite systems produce interesting pictures, but from the spin-scan camera data we obtain numbers which describe weather accurately and which have moved satellite sensing from qualitative viewing to quantitative measurement.

Three major benefits of Suomi's contribution in this area are of great importance:

(1) The great stability of the spin-scan camera provides a basis for highly accurate measurements.

(2) The spin-scan camera provides measurements in the time-domain. That is, by repeating observations at short intervals, rates of change are apparent -- like a movie instead of a snapshot.

(3) The spin-scan camera is simple, hence extremely long-lived, and it produces data at costs much less than any earth-based system could. The world's largest cooperative international scientific program, the Global Atmospheric Research Program, would not be possible without the data from the spin-scan camera. The United States, ESRO, Russia, and Japan have all adopted the spin-scan camera concept for their operational meteorological satellite systems; and all are being coordinated through Suomi for international data compatability.

HENRY TAUBE

Professor of Chemistry, Stanford University, Stanford, California.

Citation: In recognition of contributions to the understanding of reactivity and reaction mechanisms in inorganic chemistry.

Summary of Achievements:

Henry Taube's early work was concerned with the mechanisms of atomic and free radical reactions in solution. He was a pioneer in the application of isotopes to chemistry, including his first definitive measurements of hydration numbers of metal ions in solution, and the elucidation of inorganic reaction mechanisms using isotopic tracer studies. He recognized the dependence of substitution labilities of metal complexes on their electron configuration, and provided insights into the relationships between electronic structure and chemical reactivity. This pioneering work on the mechanisms of electron transfer and redox reactions includes demonstration of the role of bridging ligands on electron transfer between metal ions.

Taube's recent work has contributed to discoveries in the chemistry of ruthenium, the formation and properties of complexes of molecular nitrogen, the mechanism of nitrogen fixation, and the development of new insights into the reactivity of O_2 in electrochemical systems of importance to fuel cells and energy storage.

GEORGE E. UHLENBECK

Professor of Physics, Rockefeller University, New York, New York

Citation: For the major discovery, together with Samuel A. Goudsmit, of the electron spin as a source of a new quantum number.

Summary of Achievements

As every textbook on atomic physics written since 1925 has stated, Goudsmit and Uhlenbeck showed that the electron had an intrinsic angular momentum (spin) and an intrinsic magnetic moment. These revolutionary concepts explained many of the then puzzling phenomena in atomic spectra as well as those observed in the study of the anomolous Zeeman effect. The concept of the spin of the electron played an enormously important role in the various developments of quantum mechanics such as the Pauli Principle, Fermi Statistics and Dirac's Theory of the Electron. The electron spin is, of course, now firmly established and because of this discovery, Goudsmit's and Uhlenbeck's names are forever linked together in the history of physics.

From this discovery early in his career, Dr. George E. Uhlenbeck has had a major influence on the fields of statistical mechanics and quantum mechanics and their many applications to the various aspects of physics. Characteristic of his contributions is his clarifying analysis of problems and their reduction to essential points. During World War II Uhlenbeck was connected with the theory section of MIT Radiation Laboratory. His work there resulted in the book Threshold Signals (with J. L. Lawson).

Dr. Uhlenbeck is a past president of the American Physical Society, and in 1955 he received the Oersted Medal for his "notable contribution of the teaching of physics". As a superb teacher, he has had a major influence on the course of physics in the USA, and his many pupils who have gone on to successful careers are eloquent testimony to his ability.

In addition, he has received numerous honorary degrees and awards; the most outstanding are the Max Planck Medal of the German Physical Society in 1964 and the Lorentz Medal in 1970.

HASSLER WHITNEY

Professor of Mathematics, Institute for Advanced Studies
Princeton, New Jersey 08540.

Citation: For founding, and bringing to maturity, the discipline of Differential Topology.

Summary of Achievements:

Topology, a branch of geometry, was created in the twentieth century. Differential Topology, a newer branch which rivals the older in depth and in variety of applications, is the child of Whitney. This theory is a confluence of geometric, analytic and algebraic notions, and in turn had profound influence on each of its parent disciplines. Almost single handed, Whitney created Cohomology - a basic tool in algebraic geometry, homological algebra, algebraic number theory, differential geometry and even in quantum field theory. Fiber Bundle is another idea of Whitney's which lives on as a separate subject at the frontiers of research; one of the basic notions of this field are the so-called Stiefel-Whitney classes. Yet another creation of Whitney's is Obstruction Theory, one of the basic tools in homotopy theory.

In a paper written in 1955 Whitney initiated the study of Singularities of Differential Mappings. In the hands of R. Thom this subject has taken on great potential significance for describing the development of complicated structures, such as occur in biology.

EDWARD O. WILSON

CITATION: "For his pioneering work on the organization of insect societies and the evolution of social behavior among insects and other animals."

SUMMARY OF ACHIEVEMENTS

E. O. Wilson, Chairman of the Center for Environmental and Behavioral Biology and Associate of the Museum of Comparative Zoology, Harvard University, is the author of a recent (1975) book, "Sociobiology: The New Synthesis" in which, drawing on his own work and on "the studies of a myriad of animals conducted by hundreds of investigators in various biological disciplines" he demonstrates the existence of various distinct patterns of social behavior in animals and merges them into a general sociobiology -- a science which aims at understanding social behavior on the basis of firm biological facts, and the methods and concepts of which can be extended to man. Wilson's book is thus the first available basis for developing a better understanding of human behavior -- man's social attitudes, activities and anomalies -- and thus ultimately finding solutions for the enormous social problems confronting mankind which pay the necessary attention to man's entire biological "make-up." This attention has been lacking in the efforts of academic sociology as these have been based on analyses of human behavior alone, with little concern to fundamental biological factors which can be fully understood only when the social behavior of animals in general is taken into account -- as it is in Wilson's book.

The book is not the product of a sudden inspiration but of a continuous evolution on the part of the author. Wilson's first major work -- his doctoral thesis -- was a revision of a group of ants. It is rightly considered a masterpiece of systematics but it is conservative in the sense that it largely employs established methods of one discipline. In his subsequent work, however, Wilson went into, or made use of methods and concepts of, an ever increasing number of other disciplines: biogeography, biomathematics, evolution, ecology, biochemistry -- intensive work on insect pheromones, the volatile substances playing an essential role in insect behavior -- sociology and ethology.

However, this ever continuing broadening of his work was not adding more single pieces to a mosaic which was becoming increasingly complex but in which each piece remained separate and distinct. Wilson possesses in an uncommon measure an ability not overly common in scientists, the ability to synthesize. The various pieces of his work are again and again welded into an integrated, unified structure in which they have lost some of their individuality but are adding up to far more than their simple, arithmetic sum.

This integration of results and concepts from a variety of disciplines resulted in several remarkable books which preceded "Sociobiology": first, "The Theory of Island Biogeography," co-authored in 1967 with the late R. H. McArthur and a seminal work in ecology; next, "The Insect Societies" (1971), universally acclaimed as the definitive treatment of the field. "Sociobiology" is thus so far the last -- although we fervently hope, not the last -- milestone on a road which led the author, in a deliberate, carefully planned and executed manner, to increasingly broader concepts without, however, any loss in precision and depth. The book is however of singular importance since it takes the author, and ourselves, to our very own problems, the problems of man. In Wilson's own words, again, "it is the intellectually viable contention of the final chapter that the sociobiological methods which have proved effective in the study of animals can be extended to human beings." Wilson is careful to stress that because of "our vastly more complex, flexible behavior" the application of those methods will be "technically more difficult." The book has generated a very widespread discussion and has been subjected to some violent if not vicious attacks. These however have been based on ideological rather than strictly scientific considerations. The book is a thoroughly scientific work, in which the author fully recognizes gaps in our knowledge and the uncertainties in some of his conclusions. But for this very reason it can serve as the basis for more definitive research and improved structuring of the theory of human social behavior, and may ultimately lead to a genuine understanding and, on this basis, solution of such grave and as yet unresolved problems as ever-increasing crime rates, vandalism, racist antagonism and the vague but very real discontent of many with present social orders.

Tab C

RECIPIENTS OF THE NATIONAL MEDAL OF SCIENCE

1962-1975

Biological	34
Engineering	23
Mathematical	14
Physical	46
Total . . .	117

RECIPIENTS OF THE NATIONAL MEDAL OF SCIENCE

1975

Backus, John	IBM Staff Member San Jose Research Laboratory	San Jose, California
Benedict, Manson	Institute Professor Emeritus	Massachusetts Institute of Technology
Bethe, Hans A.	Emeritus John Wendell Anderson Professor of Physics	Cornell University
Chern, Shiing-shen	Professor of Mathematics	University of California (B)
Dantzig, George Bernard	Professor of Operations Research and Computer Science	Stanford University
Davis, Hallowell	Director Emeritus of Research	Central Institute for the Deaf
	and Emeritus Professor of Otolaryngology	Washington University
** Gyorgy, Paul	Professor Emeritus of Pediatrics	University of Pennsylvania Medical School
	and Consultant	Philadelphia General Hospital
Hendricks, Sterling B.	Formerly Chief Chemist Beltsville Plant Industry Station	U.S. Department of Agricultur
Hirschfelder, Joseph Oakland	Homer Adkins Professor of Theoretical Chemistry	University of Wisconsin-Madison
Pickering, William H.	Director, Jet Propulsion Laboratory	California Institute of Technology
Sarett, Lewis Hastings	President, Merck, Sharp & Dohme Research Laboratories	Rahway, New Jersey
Terman, Frederick Emmons	Provost Emeritus	Stanford University

** Awarded Posthumously

1975 (Cont'd)

Vogel, Orville Alvin	Professor Emeritus, Department of Agronomy and Soils	Washington State University
Wilson, E. Bright	Theodore William Richards Professor of Chemistry	Harvard University
Wu, Chien-Shiung	Michael I. Pupin Professor of Chemistry	Columbia University

1974

Bloembergen, Nicolaas	Professor of Applied Physics	Harvard University
Chance, Britton	Director, Johnson Research Foundation and Chairman, Department of Biophysics	University of Pennsylvania
Chargaff, Erwin	Professor of Biochemistry	Columbia University
Flory, Paul John	Jackson Wood Professor of Chemistry	Stanford University
Fowler, William A.	Professor of Physics	California Institute of Technology
Gödel, Kurt	Professor of Mathematics	Institute for Advanced Study
Kompfner, Rudolf	Professor of Applied Physics	Stanford University
Neel, James V.	Lee R. Dice Professor of Human Genetics	University of Michigan Medical School
Pauling, Linus	Professor of Chemistry	Stanford University
Peck, Ralph Brazelton	Consultant Foundation Engineer and Professor Emeritus	University of Illinois
Pitzer, K. S.	Professor of Chemistry	University of California (B)
Shannon, James A.	Special Adviser to the President	Rockefeller University
Wolman, Abel	Professor Emeritus Sanitary Engineering	Johns Hopkins University

1973

Amon, Daniel I.	Professor and Chairman of the Department of Cell Physiology and Biochemist in the Agricultural Experiment Station	University of California (B)
Djerassi, Carl	Professor of Chemistry	Stanford University
Edgerton, Harold E.	Professor Emeritus	Massachusetts Institute of Technology
* Ewing, William Maurice	Distinguished Professor, Electrical Engineering	The Marine Institute The University of Texas Medical Brance at Galvestor
Haagen-Smit, Arie J.	Professor of Biochemistry Emeritus	California Institute of Technology
Haensel, Vladimir	Vice President for Research and Development	Universal Oil Products Company
Seitz, Frederick	President	Rockefeller University
* Sutherland, Earl W., Jr.	Professor of Biochemistry	University of Miami
Tukey, John W.	Professor of Statistics	Princeton University
Whitcomb, Richard Travis	Aeronautical Engineer	Langley Research Center
Wilson, Robert R.	Director	Fermi National Accelerator Laboratory Weston, Illinois

1970

Brauer, Richard D.	Professor of Mathematics	Harvard University
Dicke, Robert H.	Cyrus Fogg Brackett Professor of Physics	Princeton University
McClintock, Barbara	Distinguished Service Member Carnegie Institution of Washington	Cold Spring Harbor New York

* Deceased

1970 (Cont'd)

Mueller, George E.	Senior Vice President	General Dynamics Corporation
Sabin, Albert B.	President, Weizmann Institute of Science	Rehovoth, Israel
Sandage, Allan R.	Staff Member, Hale Observatories Carnegie Institution of Washington	California Institute of Technology
* Slater, John C.	Professor of Physics and Chemistry	University of Florida
Wheeler, John Archibald	Joseph Henry Professor of Physics	Princeton University
** Winstein, Saul	Professor of Chemistry	University of California (LA)

1969

Brown, Herbert C.	Professor of Chemistry	Purdue University
** Feller, William	Professor of Mathematics	Princeton University
Huebner, Robert Joseph	Chief, Viral Carcinogenesis Branch, National Cancer Institute	National Institutes of Health
Kilby, Jack S. C.	Manager, Customer Requirements Department	Texas Instruments, Inc.
Mayr, Ernst	Director and Professor, Museum of Comparative Zoology	Harvard University
Panofsky, W. K. H.	Director and Professor, Stanford Linear Accelerator Center	Stanford University

* Deceased
** Awarded Posthumously

1968

Barker, Horace Albert	Professor of Biochemistry	University of California (B)
Bartlett, Paul D.	Professor of Chemistry	Harvard University
Brodie, Bernard B.	Chief, Laboratory of Chemical Pharmacology	National Institutes of Health
* Bronk, Detlev W.	President Emeritus	Rockefeller University
Eckert, J. Presper	Vice President, Remington Rand Univac Division	Sperry Rand Corporation
Friedman, Herbert	Superintendent, Atmosphere and Astrophysics Division	Naval Research Laboratory
Lush, Jay L.	Professor of Animal Breeding	Iowa State University
Newmark, N. M.	Professor of Civil Engineering	University of Illinois
Neyman, Jerzy	Professor of Mathematics	University of California (B)
* Onsager, Lars	Professor of Chemistry	Yale University
Skinner, B. F.	Professor of Psychology	Harvard University
Wigner, Eugene P.	Professor of Mathematical Physics	Princeton University

1967

Beams, J. W.	Professor of Physics	University of Virginia
Birch, A. Francis	Professor of Geological Sciences	Harvard University
Breit, Gregory	Professor of Physics	Yale University
Cohen, Paul J.	Professor of Mathematics	Stanford University
Cole, Kenneth S.	Senior Research Biophysicist	National Institutes of Health
Hammett, Louis Plack	Professor of Chemistry	Columbia University
Harlow, Harry F.	Professor of Psychology	University of Wisconsin

* Deceased

1967 (Cont'd)

Heidelberger, Michael	Professor of Immunochemistry	New York University
Kistiakowsky, G. B.	Professor of Chemistry	Harvard University
Land, Edwin Herbert	President	Polaroid Corporation
* Sikorsky, Igor I.	Former Engineering Manager	Sikorsky Aircraft Division of United Aircraft Corporation
* Sturtevant, Alfred Henry	Professor of Biology, Emeritus	California Institute of Technology

1966

* Bjerknes, Jacob	Professor of Meteorology	University of California (LA)
Chandrasekhar, Subrahmanyan	Professor of Theoretical Astrophysics	University of Chicago
Eyring, Henry	Dean, Graduate School	University of Utah
Knipling, E. F.	Director, Entomology Research Division	U. S. Department of Agriculture
Lipman, Fritz A.	Professor of Biochemistry	Rockefeller University
Milnor, John W.	Professor of Mathematics	Princeton University
Rose, William C.	Professor of Chemistry, Emeritus	University of Illinois
Shannon, Claude E.	Donner Professor of Science	Massachusetts Institute of Technology
Van Vleck, J. H.	Professor of Physics	Harvard University
Wright, Sewall	Professor of Genetics, Emeritus	University of Wisconsin
Zworykin, Vladimir Kosma	Honorary Vice President	Radio Corporation of America

* Deceased

1965

Bardeen, John	Professor of Electrical Engineering and Physics	University of Illinois
* Debye, Peter J. W.	Professor of Chemistry, Emeritus	Cornell University
** Dryden, Hugh L.	Former Deputy Administrator	National Aeronautics and Space Administration
Johnson, Clarence Leonard	Vice President for Advanced Development Projects	Lockheed Aircraft Corporation
Lederman, Leon M.	Professor of Physics	Columbia University
* Lewis, Warren Kendall	Professor of Chemical Engineering, Emeritus	Massachusetts Institute of Technology
* Rous, Francis Peyton	Member, Emeritus	The Rockefeller Institute
* Rubey, William Walden	Professor of Geology and Geophysics	University of California (LA)
Simpson, George Gaylord	Professor of Vertebrate Paleontology	Harvard University
* Van Slyke, Donald D.	Research Chemist	Brookhaven National Laboratories
Zariski, Oscar	Professor of Mathematics	Harvard University

1964

* Adams, Roger	Professor of Chemistry, Emeritus	University of Illinois
* Ammann, Othmar H.	Consulting Engineer	Ammann & Whitney Rye, New York
* Dobzhansky, Theodosius	Member	The Rockefeller Institute
Draper, Charles Stark	Head, Department of Aeronautics and Astronautics	Massachusetts Institute of Technology

* Deceased
** Awarded Posthumously

1964 (Cont'd)

* Lefschetz, Soloman	Professor of Mathematics, Emeritus	Princeton University
Miller, Neal Elgar	Professor of Psychology	Yale University
Morse, Harold Marston	Professor of Mathematics	Institute for Advanced Studies
Nirenberg, Marshall Warren	Chief, Section of Biochemical Genetics	National Institutes of Health
Schwinger, Julian	Professor of Physics	Harvard University
Urey, Harold Clayton	Professor of Chemistry	University of California (B)
Woodward, Robert Burns	Professor of Chemistry	Harvard University

1963

Alvarez, Luis Walter	Professor of Physics	University of California (B)
* Bush, Vannevar	Administrator, Electrical Engineer	Former President, Carnegie Institution of Washington and Honorary Chairman M.I.T. Corporation
Pierce, John Robinson	Executive Director, Communications Division Systems	Bell Telephone Laboratories
van Niel, Cornelis B.	Professor of Microbiology	Stanford University
* Wiener, Norbert	Professor of Mathematics	Massachusetts Institute of Technology

1962

* von Karman, Theodore	Professor of Aeronautical Engineering, Emeritus	California Institute of Technology

* Deceased

Date: September 2, 1977 MEMORANDUM

FOR ACTION:
Hamilton Jordan
Jim King
Tim Kraft

FOR INFORMATION:
The Vice President
Greg Schneiders

FROM: Rick Hutcheson, Staff Secretary

SUBJECT: Press memo dated 9/1/77 re National Medical of Science Foundations

YOUR RESPONSE MUST BE DELIVERED TO THE STAFF SECRETARY BY:

TIME: 12:00 NOON

DAY: TUESDAY

DATE: September 6, 1977

ACTION REQUESTED:

__X Your comments

Other: We restricting ceremonial appointments for months of September & October, to

STAFF RESPONSE:

____ I concur. ____ No comment.

Please note other comments below:

free time for Congress & emergencies (sometimes identical..) - latter part of Nov. or December would be preferable — for Presidents participation - TK

PLEASE ATTACH THIS COPY TO MATERIAL SUBMITTED.

If you have any questions or if you anticipate a delay in submitting the required material, please telephone the Staff Secretary immediately. (Telephone, 7052)

Date: September 12, 1977 MEMORANDUM

FOR ACTION:
Peggy Rainwater

FOR INFORMATION:

FROM: Rick Hutcheson, Staff Secretary

SUBJECT: Press memo dated 9/1/77 re National Medal of Science Nominations

YOUR RESPONSE MUST BE DELIVERED TO THE STAFF SECRETARY BY:

TIME: 12:00 NOON

DAY: Wednesday

DATE: September 14, 1977

ACTION REQUESTED:

_X_ Your comments

Other:

STAFF RESPONSE:

____ I concur. ____ No comment.

Please note other comments below:

Because of the cover story of Time August 1, 1977, sociobiology seems to be too current a subject of controversy. It is fresh in the mind of the public, and to recognize Wilson at this time would be asking for criticism from women's groups and minority groups. I recommend that an award to Wilson be postponed.

Peggy Rainwater

Attached: Copies of Time story and
Letters to the Editor

PLEASE ATTACH THIS COPY TO MATERIAL SUBMITTED.

If you have any questions or if you anticipate a delay in submitting the required material, please telephone the Staff Secretary immediately. (Telephone, 7052)

THE WHITE HOUSE
WASHINGTON

	FOR STAFFING
	FOR INFORMATION
	FROM PRESIDENT'S OUTBOX
	LOG IN/TO PRESIDENT TODAY
	IMMEDIATE TURNAROUND

ACTION	FYI	
		MONDALE
	/	COSTANZA
	/	EIZENSTAT
/		JORDAN
		LIPSHUTZ
		MOORE
		POWELL
		WATSON
		LANCE
		SCHULTZE

	ENROLLED BILL
	AGENCY REPORT
	CAB DECISION
	EXECUTIVE ORDER

Comments due to Carp/Huron within 48 hours; due to Staff Secretary next day

		ARAGON
		BOURNE
		BRZEZINSKI
		BUTLER
		CARP
		H. CARTER
		CLOUGH
		FALLOWS
		FIRST LADY
		HARDEN
		HUTCHESON
		JAGODA
		KING

		KRAFT
		LINDER
	/	MITCHELL
		MOE
		PETERSON
		PETTIGREW
		POSTON
		PRESS
		SCHLESINGER
		SCHNEIDERS
		STRAUSS
		VOORDE
		WARREN

THE WHITE HOUSE
WASHINGTON

X	FOR STAFFING
	FOR INFORMATION
	FROM PRESIDENT'S OUTBOX
	LOG IN/TO PRESIDENT TODAY
	IMMEDIATE TURNAROUND

→ Peggy Rainwater

ACTION	FYI	
		MONDALE
		COSTANZA
		EIZENSTAT
		JORDAN
		LIPSHUTZ
		MOORE
		POWELL
		WATSON
		LANCE
		SCHULTZE

	ENROLLED BILL
	AGENCY REPORT
	CAB DECISION
	EXECUTIVE ORDER

Comments due to Carp/Huron within 48 hours; due to Staff Secretary next day

		ARAGON
		BOURNE
		BRZEZINSKI
		BUTLER
		CARP
		H. CARTER
		CLOUGH
		FALLOWS
		FIRST LADY
		HARDEN
		HUTCHESON
		JAGODA
		KING

	KRAFT
	LINDER
	MITCHELL
	MOE
	PETERSON
	PETTIGREW
	POSTON
	PRESS
	SCHLESINGER
	SCHNEIDERS
	STRAUSS
	VOORDE
	WARREN

THE WHITE HOUSE

WASHINGTON

Nothing urgent — list made in Dec 76. Hold until 9/13

MEMORANDUM

Date: September 2, 1977

FOR ACTION:
Hamilton Jordan dc
Jim King nc
Tim Kraft - attached prefers late Nov or Dec

FOR INFORMATION:
The Vice President
Greg Schneiders

FROM: Rick Hutcheson, Staff Secretary

SUBJECT: Press memo dated 9/1/77 re National Medical of Science Foundations

YOUR RESPONSE MUST BE DELIVERED TO THE STAFF SECRETARY BY:

TIME: 12:00 NOON

DAY: TUESDAY

DATE: September 6, 1977

ACTION REQUESTED:

__X__ Your comments

Other:

STAFF RESPONSE:

____ I concur. ____ No comment.

Please note other comments below:

PLEASE ATTACH THIS COPY TO MATERIAL SUBMITTED.

If you have any questions or if you anticipate a delay in submitting the required material, please telephone the Staff Secretary immediately. (Telephone, 7052)

18

Da[illegible] September 2, 1977 MEMORANDUM

FOR ACTION:
Hamilton Jordan
Jim King
Tim Kraft

FOR INFORMATION:
The Vice President
Greg Schneiders

FROM: Rick Hutcheson, Staff Secretary

SUBJECT: Press memo dated 9/1/77 re National Medical of Science Foundations

YOUR RESPONSE MUST BE DELIVERED TO THE STAFF SECRETARY BY:

TIME: 12:00 NOON

DAY: TUESDAY

DATE: September 6, 1977

ACTION REQUESTED:

__X__ Your comments

Other:

STAFF RESPONSE:

____ I concur. X No comment.

Please note other comments below:

PLEASE ATTACH THIS COPY TO MATERIAL SUBMITTED.

If you have any questions or if you anticipate a delay in submitting the required material, please telephone the Staff Secretary immediately. (Telephone, 7052)

Date: September 2, 1977 MEMORANDUM

FOR ACTION:
Hamilton Jordan
Jim King
Tim Kraft

FOR INFORMATION:
The Vice President
Greg Schneiders

FROM: Rick Hutcheson, Staff Secretary

SUBJECT: Press memo dated 9/1/77 re National Medical of Science Foundations

YOUR RESPONSE MUST BE DELIVERED TO THE STAFF SECRETARY BY:

TIME: 12:00 NOON

DAY: TUESDAY

DATE: September 6, 1977

ACTION REQUESTED:

__X Your comments

Other:

STAFF RESPONSE:

____ I concur. __X__ No comment.

Please note other comments below:

James B. King
Peggy Rainwater

PLEASE ATTACH THIS COPY TO MATERIAL SUBMITTED.

If you have any questions or if you anticipate a delay in submitting the required material, please telephone the Staff Secretary immediately. (Telephone, 7052)