NOMINATION

HEARING

BEFORE THE

COMMITTEE ON HUMAN RESOURCES

UNITED STATES SENATE

NINETY-FIFTH CONGRESS

FIRST SESSION

ON

RICHARD C. ATKINSON, OF CALIFORNIA, TO BE DIRECTOR OF THE NATIONAL SCIENCE FOUNDATION

MAY 2, 1977

Printed for the use of the Committee on Human Resources

U.S. GOVERNMENT PRINTING OFFICE
91-750 O WASHINGTON : 1977

NOMINATION

MONDAY, MAY 2, 1977

U.S. SENATE,
COMMITTEE ON HUMAN RESOURCES,
Washington, D.C.

The committee met, pursuant to notice, at 10:03 a.m., in room 4232, Dirksen Senate Office Building, Senator Edward M. Kennedy presiding pro tempore.

Present: Senators Kennedy, Stafford, Hayakawa, and Hatch.

Also Present: Senator Schmitt.

Senator KENNEDY. We will come to order.

Our hearing this morning is on the nomination of Richard Atkinson to be Director of the National Science Foundation. I will make a part of the record a biographical sketch of the nominee and the financial statement has been reviewed in conformity with the procedures that are being followed by all the committees and position description.

I will also place in the record a number of letters that I have received which are in very strong support of the nominee. They come from some of the really outstanding members of the scientific community, some of its most distinguished members. These endorsements should be a source of very considerable satisfaction to the nominee. I will make them a part of the record.

[The information referred to follows:]

NATIONAL SCIENCE FOUNDATION

WASHINGTON, D.C. 20550

DR. RICHARD C. ATKINSON
Acting Director

Dr. Richard C. Atkinson was sworn in on June 2, 1975, as Deputy Director of the National Science Foundation; on August 12, 1976, he became Acting Director. He is on leave of absence from Stanford University where he has been on the faculty since 1956.

Dr. Atkinson is an experimental psychologist and applied mathematician whose research has been concerned primarily with experimental and theoretical analyses of memory and cognition. He was one of the first to transform intuitive ideas about the nature of memory into an explicit theory that could be formulated in mathematical terms. This theory has been the basis for much of the current research on memory and cognition. The theory also has played an important role in specifying correlates between brain structures and psychological phenomena, in explaining the effects of drugs on memory, and has proved to have important implications for optimizing the learning process.

Dr. Atkinson's research on memory has led him to be concerned with problems of classroom learning. He was among the first to develop a computer-controlled system for instruction, whose basic features have had wide influence on the computer field and have been used in the design of commercial computer-assisted instruction programs. The principal application of the computer system developed by Dr. Atkinson has been for teaching reading to elementary school children. The system is highly adaptive so that the sequence of instruction at any moment in time is a function of the student's unique response history. The adaptive process depends on a mathematical representation of the student's learning process that is optimized using control theory methods.

He is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, the National Academy of Education, and the Society of Experimental Psychologists. He has been a Fellow of the Center for Advanced Study in the Behavioral Sciences, a Fellow of the Guggenheim Foundation, and the recipient of a Distinguished Research Award from the Social Sciences Research Council.

Dr. Atkinson joined the Stanford University faculty in 1956 after serving in the U.S. Army. Except for three years at UCLA and one at the University of Michigan, he has been at Stanford ever since. He served as chairman of the Psychology Department from 1968 to 1973, and as a Dean in Humanities and Sciences from 1973 to 1975. In addition to being a Professor in the Psychology Department, he holds appointments in the School of Engineering, the School of Education, and the Institute for Mathematical Studies in the Social Sciences.

February 1977

Richard Chatham Atkinson

Biographical Data

Address: Office of the Director
National Science Foundation
Washington, D.C. 20550
(Phone: 202/632-4001)

Born: March 19, 1929; Oak Park, Illinois

Degrees, Fellowships, and Awards

Ph.B., University of Chicago, 1948
Ph.D., Indiana University, 1955
Distinguished Research Award, Social Science Research Council, 1962
Fellow, Center for Advanced Study in the Behavioral Sciences, 1963-1964
Fellow, American Psychological Association
Society of Experimental Psychologists, Elected 1967
Fellow, American Association for the Advancement of Science
Guggenheim Fellowship, 1967-1968
Board of Governors, Psychonomic Society, 1968-1971
Distinguished Visiting Scholar, Educational Testing Service, 1971
Board of Directors, American Psychological Association, 1973-1976
Chairman, Psychonomic Society, 1973-1974
President, Division of Experimental Psychology, American Psychological Association, 1974
Chairman, Psychology Section, American Association for the Advancement of Science, 1975-1976
Board of Trustees, Psychometric Society, 1973-1976
President, Western Psychological Association, 1975-1976
Professional Achievement Award, University of Chicago Alumni Association, 1976
American Academy of Arts and Sciences, Elected 1974
National Academy of Sciences, Elected 1974
National Academy of Education, Elected 1974

Academic and Government Appointments

1956-1957	Lecturer, Applied Mathematics and Statistics Laboratories, Stanford University
1957-1961	Assistant Professor of Psychology, University of California, Los Angeles
1961-1965	Associate Professor of Psychology, Stanford University
1961-1975	Associate Director, Institute for Mathematical Studies in the Social Sciences, Stanford University
1963	Visiting Professor of Psychology, University of Michigan
1965-present	Professor of Psychology (also Professor of Education and Affiliate Faculty Member, Institute of Engineering-Economic Systems, School of Engineering), Stanford University
1968-1973	Chairman, Department of Psychology, Stanford University
1973-1975	Associate Dean, School of Humanities and Sciences, Stanford Unviersity
1975-1976	Deputy Director, National Science Foundation (on leave of absence from Stanford University)
1976-present	Acting Director, National Science Foundation (on leave of absence from Stanford University)

Professional Activities

1954-1956	Military service in the U.S. Army; assigned to the Human Resources Research Organization, Fort Ord, California
1958-1967	Consultant, Systems Development Corporation
1961-1963	Consultant, Bell Telephone Laboratories
1961-1966	Editorial Board: Journal of Verbal Learning and Verbal Behavior
1963-1970	Editor: Journal of Mathematical Psychology
1963-1969	Social Science Research Council Committee on Learning and the Educational Process (Chairman, 1966-1968)
1964	Co-director of Summer Research Conference on Learning and the Educational Process sponsored by the U.S. Office of Education
1965-1973	Associate Editor: Perception and Psychophysics
1965-1968	Task Force on Information Networks of EDUCOM (Interuniversity Communications Council)
1966-1968	Editorial Board: Psychological Review
1966	Director of Job Corps Reading Institute sponsored by the Office of Economic Opportunities and Stanford University
1966	Director of Summer Seminar on Mathematical Theories of Discrimination Learning sponsored by the Mathematical Social Science Board
1968-1975	Editorial Board: Contemporary Psychology
1968-1972	Mathematical Social Science Board, Center for Advanced Study in the Behavioral Sciences
1968-1971	Personality and Cognitive Research Review Committee of the National Institute of Mental Health
1968-1975	Consultant, Office of Computing Activities, National Science Foundation
1968-1970	Smithsonian Institute: Committee on Technological Augmentation of Cognition
1970-present	Board of Editors: Journal of Mathematical Psychology
1971-1976	Research Advisory Committee: Children's Television Workshop
1971-1972	Chairman: Mathematical Social Science Board, Center for Advanced Study in the Behavioral Sciences
1973-present	Editorial Board: Perception and Psychophysics
1973-present	Assembly of Behavioral and Social Sciences of the National Research Council
1974-1975	Chairman: Personality and Cognition Committee (Behavioral Sciences Research Branch), National Institute of Mental Health
1976-present	Advisory Council: International Association for the Study of Attention and Performance

Books

Markov Learning Models for Multiperson Interactions. Stanford, California: Stanford University Press, 1960 (with Patrick Suppes).

Studies in Mathematical Psychology. Stanford, California: Stanford University Press, 1964 (Editor).

An Introduction to Mathematical Learning Theory. New York: John Wiley & Sons, 1965 (with G. H. Bower and E. J. Crothers). Translated into Russian, 1969.

Introduction to Psychology (4th ed.). New York: Harcourt Brace Jovanovich, Inc., 1967 (with E. R. Hilgard). Translations: Hebrew edition, 1967; German edition, 1967; Norwegian edition, 1967; Portuguese edition, 1969.

Computer-Assisted Instruction. New York: Academic Press, 1969 (Editor, with H. A. Wilson).

Introduction to Psychology (5th ed.). New York: Harcourt Brace Jovanovich, Inc., 1971 (with E. R. Hilgard and R. L. Atkinson).

Contemporary Psychology: Readings from Scientific American. San Francisco: W. H. Freeman & Company, 1971 (Editor).

Contemporary Developments in Mathematical Psychology: Volume I, Learning, memory, and thinking; Volume II, Measurement, psychophysics, and neural information processing. San Francisco: W. H. Freeman & Company, 1974 (Editor, with D. H. Krantz, R. D. Luce, and P. Suppes).

Introduction to Psychology (6th ed.). New York: Harcourt Brace Jovanovich, Inc., 1975 (with E. R. Hilgard and R. L. Atkinson).

Psychology in Progress: Readings from Scientific American. San Fancisco: W. H. Freeman & Company, 1975 (Editor).

Articles

1. Experiential factors in visual form perception. Journal of Experimental Psychology, 1952, 43, 173-178 (with R. B. Ammons).

2. An analysis of the effect of non-reinforced trials in terms of statistical learning theory. Journal of Experimental Psychology, 1956, 52, 28-32. (Republished in Stimulus Sampling Theory, edited by E. D. Neimark and W. K. Estes, San Francisco: Holden-Day, Inc., 1967).

3. Films and group discussions as a means of training leaders. Technical Report 27, Human Resources Research Organization, George Washington University, Washington, D. C., 1956 (with C. J. Lange and C. H. Rittenhouse).

4. A stochastic model for rote serial learning. Psychometrika, 1957, 22, 87-95.

5. Probabilistic discrimination learning. Journal of Experimental Psychology, 1957, 54, 233-239 (with W. K. Estes, C. J. Burke, and J. P. Frankman).

6. A Markov model for discrimination learning. Psychometrika, 1958, 23, 309-322. (Republished in Stimulus Sampling Theory, edited by E. D. Neimark and W. K. Estes, San Francisco: Holden-Day, Inc., 1967.)

7. An analysis of two-person game situations in terms of statistical learning theory. Journal of Experimental Psychology, 1958, 55, 369-378 (with P. Suppes)

8. Discrimination learning in a verbal conditioning situation. Journal of Experimental Psychology, 1958, 56, 21-26 (with J. Popper). (Republished in Stimulus Sampling Theory, edited by E. D. Neimark and W. K. Estes, San Francisco: Holden-Day, Inc., 1967.)

9. Applications of a Markov model to two-person non-cooperative games. In Studies in Mathematical Learning Theory, edited by R. R. Bush and W. K. Estes, Stanford, California: Stanford University Press, 1959, 65-75.

10. Discrimination learning with probabilistic reinforcement schedules: Supplement Report. Journal of Experimental Psychology, 1959, 57, 349-351 (with W. Bogartz and R. Turner). (Republished in Stimulus Sampling Theory, edited by E. D. Neimark and W. K. Estes, San Francisco: Holden-Day, Inc., 1967.)

11. A theory of stimulus discrimination learning. In Mathematical Methods in the Social Sciences, edited by K. J. Arrow, S. Karlin, and P. Suppes, Stanford, California: Stanford University Press, 1960, 221-241.

12. The use of models in experimental psychology. Synthese, 1960, 12, 162-171. (Republished in The Concept and the Role of the Model in Mathematics and Natural and Social Sciences, edited by H. Freudenthal, Dordrecht, Holland: D. Reidel Publishing Co., 1961.)

13. Decision making by children as a function of amount of reinforcement. Psychological Reports, 1960, 6, 299-306 (with G. Sommer and M. B. Sterman).

14. A generalization of stimulus sampling theory. Psychometrika, 1961, 26, 281-290.

15. The observing response in discrimination learning. Journal of Experimental Psychology, 1961, 62, 253-262. (Republished in Stimulus Sampling Theory, edited by E. D. Neimark and W. K. Estes, San Francisco: Holden-Day, Inc., 1967.

16. Optimal allocation of items in a simple, two-concept automated teaching model. In Programmed Learning and Computer-Based Instruction, edited by J. E. Coulson, New York: John Wiley & Sons, 1962, 25-45 (with R. E. Dear).

17. Sequential phenomena in psychophysical judgments: A theoretical analysis. Institute of Radio Engineers Transactions on Information Theory, Sept. 1962, Vol. IT-8, 155-162 (with E. C. Carterette and R. A. Kinchla). (Republished in Stimulus Sampling Theory, edited by E. D. Neimark and W. K. Estes, San Francisco: Holden-Day, Inc., 1967.)

18. Choice behavior and monetary payoff. In Mathematical Methods in Small Group Processes, edited by J. Criswell, H. Solomon, and P. Suppes, Stanford, California: Stanford University Press, 1962, 23-34.

19. Mathematical models in research with children. In Basic Cognitive Processes in Children, edited by J. C. Wright and J. Kagen, Monograph of the Society for Research in Child Development, 1963, 28, No. 2 (Serial No. 86), 145-163. (Republished in Cognitive Development in Children, edited by R. Brown, Chicago: University of Chicago Press, 1970.)

20. A variable sensitivity theory of signal detection. Psychological Review, 1963, 70, 91-106.

21. Mathematical models in research on perception and learning. In Theories in Contemporary Psychology, edited by M. H. Marx, New York: MacMillan Co., 1963, 551-564.

22. Stimulus sampling theory. In Handbook of Mathematical Psychology, Vol. 2, edited by R. D. Luce, R. R. Bush, and E. Galanter, New York: John Wiley & Sons, 1963, 121-268 (with W. K. Estes).

23. The effects of forced-choice trials upon free-choice behavior. Psychonomic Science, 1964, 1, 55-56 (with R. C. Calfee).

24. The effect of information feedback upon psychophysical judgments. Psychonomic Science, 1964, 1, 83-84 (with E. C. Carterette and R. A. Kinchla).

25. Choice behavior and reward structure. Journal of Mathematical Psychology, 1964, 1, 170-203 (with J. L. Myers). (Republished in Stimulus Sampling Theory, edited by E. D. Neimark and W. K. Estes, San Francisco: Holden-Day, Inc.,

26. The effect of false-information feedback upon psychophysical judgments. Psychonomic Science, 1964, 1, 317-318 (with R. A. Kinchla).

27. An authomated system for discrete-trial research with animals. Psychological Reports, 1964, 14, 424-426 (with R. C. Calfee).

28. A test of three models for stimulus compounding with children. Journal of Experimental Psychology, 1964, 67, 52-58 (with R. C. Calfee, G. R. Sommer, and W. E. Jeffrey).

29. Short-term memory with young children. Psychonomic Science, 1964, 1, 255-256 (with D. N. Hansen and H. A. Bernbach).

30. A comparison of paired-associate learning models having different acquisition and retention axioms. Journal of Mathematical Psychology, 1964, 1, 285-315 (with S. J. Crothers).

31. Mathematical learning theory. In Scientific Psychology, edited by B. B. Wolman, New York: Basic Books, Inc., 1965, 254-275 (with R. C. Calfee).

32. Intermodality judgments of signal duration. Psychonomic Science, 1965, 2, 271-272 (with T. A. Tanner, Jr., and R. M. Patton).

33. Mathematical models for verbal learning. In Cybernetics of the Nervous System: Progress in Brain Research, Vol. 17, edited by Norbert Wiener and J. P. Schade, Amsterdam, The Netherlands: Elsevier Publishing Co., 1965, 333-349 (with R. C. Calfee and T. Shelton, Jr.).

34. A learning model for forced-choice detection experiments. British Journal of Mathematical and Statistical Psychology, 1965, 18, 184-206 (with R. A. Kinchla).

35. Paired-associate models and the effects of list length. Journal of Mathematical Psychology, 1965, 2, 254-265 (with R. C. Calfee).

36. Mathematical models for memory and learning. Technical Report 79, Institute for Mathematical Studies in the Social Sciences, Stanford University, 1965. (Published in Readiness to Remember: Proceedings of the Third Conference on Learning, Remembering and Forgetting, edited by D. P. Kimble, New York: Gordon and Breach, Science Publishers, Inc., 1969, 39-109.)

37. Short-term recall of paired-associates as a function of the number of interpolated pairs. Psychonomic Science, 1966, 4, 73-74 (with J. W. Brelsford, Jr., L. Keller, and R. M. Shiffrin).

38. Influence of correlated visual cues on auditory signal detection. Perception and Psychophysics, 1966, 1, 67-73 (with R. A. Kinchla, J. T. Townsend, and J. I. Tellott, Jr.).

39. Two-choice behavior under limiting cases of contingent reinforcement schedules. Journal of Comparative and Physiological Psychology, 1966, 62, 193-200 (with R. C. Calfee).

40. The effect of signal intensity on comparative judgments of auditory durations. Psychonomic Science, 1966, 4, 353-354 (with T. A. Tanner, Jr. and R. M. Patton).

41. Models for optimizing the learning process. Psychological Bulletin, 1966, 66, 309-320 (with G. J. Groen).

42. Computer-assisted instruction in initial reading: The Stanford Project. Reading Research Quarterly, 1966, 2, 5-25 (with D. N. Hansen).

43. Some two-process models for memory. In Proceedings of the XVIII International Congress of Psychology (Symposium 12, Mathematical Models of Psychological Processes), Moscow, Russia, 1966, 51-61.

44. An optimal strategy for the presentation of paired-associate items. Behavioral Science, 1967, 12, 1-13 (with R. E. Dear, H. F. Silberman, and D. P. Estavan).

45. Reading instruction under computer control. American School Board Journal, 1967, 155, 16-27.

46. The effects of reinforcement interval on the acquisition of paired-associate responses. Journal of Experimental Psychology, 1967, 73, 268-277 (with L. Keller, W. J. Thomson, and J. R. Tweedy).

47. Effects of list length on short-term memory. Journal of Verbal Learning and Verbal Behavior, 1967, 6, 303-311 (with J. L. Phillips and R. M. Shiffrin).

48. Multi-process models for memory with applications to a continuous presentation task. Journal of Mathematical Psychology, 1967, 4, 277-300 (with J. W. Brelsford, Jr., and R. M. Shiffrin).

49. Learning aspects of computer-assisted instruction. In Computers and Education, edited by R. W. Gerard, New York: McGraw-Hill Book Co., 1967, 11-63.

50. Signal recognition as influenced by presentation schedules. Perception and Psychophysics, 1967, 2, 349-358 (with T. A. Tanner, Jr., and R. W. Haller).

51. Instruction in initial reading under computer control: The Stanford Project. Journal of Educational Data Processing, 1967, 4, 175-192.

52. Mathematical models for verbal learning. In Brain Function and Learning: UCLA Forum in Medical Sciences, Vol. 4, edited by D. B. Lindsley and A. S. Lumsdaine, Los Angeles: University of California Press, 1967, 189-209.

53. Computer-based instruction in initial reading: A progress report on the Stanford Project. Technical Report 119, Institute for Mathematical Studies in the Social Sciences, Stanford University, 1967 (with H. A. Wilson).

54. A reply to Professor Spache's article "A reaction to computer-assisted instruction in initial reading." Reading Research Quarterly, 1968, 3, 418-420.

55. The computer as a tutor. Psychology Today, January 1968. (Republished in: Readings in Psychology Today, Del Mar, California: CRM Books, 1969 (first edition), 1972 (second edition), 1974 (third edition); Readings in Developmental Psychology Today, Del Mar, California: CRM Books, 1970; Readings in Educational Psychology Today, Del Mar, California: CRM Books, 1970.)

56. The role of the computer in teaching initial reading. Childhood Education, 1968, 44, 464-470. (Republished in The Readings Book Program, New York: MSS Educational Publishing Co., Inc., 1970.)

57. Computer-based instruction in initial reading. Proceedings of the 1967 Invitational Conference on Testing Problems. Princeton, N. J.: Educational Testing Service, 1968, 55-66.

53. Human memory: A proposed system and its control processes. In The Psychology of Learning and Motivation: Advances in Research and Theory, Vol. 2, edited by K. W. Spence and J. T. Spence, New York: Academic Press, 1968, 89-195 (with R. M. Shiffrin).

59. Computerized instruction and the learning process. American Psychologist, 1968, 23, 225-239. (Republished in: The Bobbs-Merrill Reprint Series in Psychology, New York: Bobbs-Merrill Co., 1969; Research in Psychology: Readings for the Introductory Course, edited by B. L. Kintz and J. L. Bruning, Glenview, Ill.: Scott, Foresman and Co., 1970; Current Research in Psychology, edited by H. C. Lindgren, D. Byrne, and F. Lindgren, New York: John Wiley and Co., 1971; Classroom Management: The Successful Use of Behavior Modification, edited by K. D. O'Leary and S. G. O'Leary, Elmsford, N. Y.: Pergamon Press, 1971; Readings in Learning and Human Abilities, 2nd edition, edited by R. E. Ripple, New York: Harper and Row Publishers, 1971; Guiding Learning: Readings in Educational Psychology, edited by M. D. Glock, New York: John Wiley and Co., 1971.)

60. Multiple reinforcement effects in short-term memory. The British Journal of Mathematical and Statistical Psychology, 1968, 21, 1-19 (with J. W. Brelsford, Jr., and R. M. Shiffrin).

61. Learning to read under computer control. Programmed Learning and Educational Technology: British Journal of the Association for Programmed Learning, 1968, 5, 25-37.

62. Priming and the retrieval of names from long-term memory. Psychonomic Science, 1968, 11, 219-220 (with R. H. Hopkins).

63. Massed versus distributed practice in computerized spelling drills. Journal of Educational Psychology, 1968, 59, 290-296 (with E. Fishman and L. Keller).

64. First-letter clues in the retrieval of proper names from long-term memory. Psychological Reports, 1968, 23, 851-866 (with R. H. Hopkins).

65. Recall of paired-associates as a function of overt and covert rehearsal procedures. Journal of Verbal Learning and Verbal Behavior, 1968, 7, 730-736 (with J. W. Brelsford, Jr.).

66. Computer-assisted instruction. Science, 1968, 162, 73-77 (with H. A. Wilson). (Republished in: Selected Readings in Psychology, edited by D. E. Gibbons and J. F. Connelly, St. Louis: C. V. Mosby Co., 1969; Contemporary Issues in Educational Psychology, edited by H. F. Clarizio and C. N. Mehrens, Boston: Allyn and Bacon, Inc., 1969; Individualization of Instruction: A Teaching Strategy, edited by V. M. Howes, New York: Macmillan Co., 1970.)

67. Degree of priming in the retrieval of author's names from long-term memory. Psychonomic Science, 1968, 12, 399-400 (with R. H. Hopkins).

68. Innovation without analysis: Discussion of Dr. Rothkopf's paper. In Approaches to Thought, edited by J. F. Voss, Columbus, Ohio: Merrill Publishing Co., 1969, 317-319.

69. Storage and retrieval processes in long-term memory. Psychological Review, 1969, 76, 179-193 (with R. M. Shiffrin).

70. Repetition versus imagery instructions in the short- and long-term retention of paired-associates. Psychonomic Science, 1969, 15, 183-184 (with J. A. Schnorr).

71. Recognition versus recall: Storage or retrieval differences? Quarterly Journal of Experimental Psychology, 1969, 21, 214-224 (with R. D. Freund and J. W. Brelsford, Jr.).

72. Information delay in human learning. Journal of Verbal Learning and Verbal Behavior, 1969, 8, 507-511.

73. Computer-assisted instruction. Sapere, 1969, 712, 42-45 (published in Italian)

74. Applications of multiprocess models for memory to continuous recognition tasks. Journal of Mathematical Psychology, 1969, 6, 576-594 (with R. D. Freund and G. R. Loftus).

75. Processing time as influenced by the number of elements in a visual display. Perception and Psychophysics, 1969, 6, 321-326 (with J. E. Holmgren and J. F. Juola).

76. Models for memory. In Sciences du comportement: La recherche en enseignement programme, edited by F. Bresson and M. de Montmollin. Paris: Dunod, 1969, 75-9

77. Computer-assisted learning in action. Proceedings of the National Academy of Sciences, 1969, 63, 588-594.

78. Recognition memory as influenced by differential attention to semantic and acoustic properties of words. Psychonomic Science, 1970, 19, 79-81 (with G. Cermak, J. Schnorr, and H. Buschke).

79. Models for human memory. In Applications of Research on Human Decision Making, edited by R. M. Patton and T. A. Tanner, Jr., Washington, D.C.: National Aeronautics and Space Administration (NASA SP-209), 1970, 159-170.

80. Rehearsal processes in free recall: A procedure for direct observation. Journal of Verbal Learning and Verbal Behavior, 1970, 9, 99-105 (with D. Rundus)

81. Signal recognition as influenced by information feedback. Journal of Mathemati Psychology, 1970, 7, 259-274 (with T. A. Tanner, Jr., and J. A. Rauk).

82. Memory scans based on alternative test stimulus representations. Perception and Psychophysics, 1970, 8, 113-117 (with R. Klatzky).

83. Study position and item differences in the short- and long-term retention of paired-associates learned by imagery. Journal of Verbal Learning and Verbal Behavior, 1970, 9, 614-622 (with J. A. Schnorr).

84. Effects of overt rehearsal procedures on freee recall. Psychonomic Science, 1970, 19, 249-250 (with I. Fischler and D. Rundus).

85. Immediate free recall and three-week delayed recognition. Journal of Verbal Learning and Verbal Behavior, 1970, 9, 684-688 (with D. Rundus and G. R. Loftus).

86. Test stimulus representation and experimental context effects in memory scanning. Journal of Experimental Psychology, 1971, 87, 281-288 (with R. L. Klatzky and J. F. Juola).

87. Instruction in initial reading under computer control: The Stanford Project. In Computer in Education, edited by A. Romano and P. Rossi, Bari, Italy: Adriatica Editrice, 1971, 69-99 (with J. D. Fletcher, H. C. Chetin, and C. M. Stauffer).

88. Human memory and the concept of reinforcement. In The Nature of Reinforcement, edited by R. Glazer, New York: Academic Press, 1971, 66-120 (with T. D. Wickens).

89. Recognition time for information stored in long-term memory. Perception and Psychophysics, 1971, 10, 8-14 (with J. F. Juola, I. Fischler, and C. T. Wood).

90. Computer-assisted instruction in programming: AID. Technical Report 164, Institute for Mathematical Studies in the Social Sciences, Stanford University, 1971 (with Jamesine Friend).

91. Memory scanning for words versus categories. Journal of Verbal Learning and Verbal Behavior, 1971, 10, 522-527 (with J. F. Juola).

92. Specialization of the cerebral hemispheres in scanning for information in short-term memory. Perception and Psychophysics, 1971, 10, 335-338 (with R. L. Klatzky).

93. The control of short-term memory. Scientific American, 1971, 224, 82-90 (with R. M. Shiffrin).

94. Teaching children to read with a computer. The Reading Teacher, 1972, 25, 319-327 (with J. D. Fletcher).

95. Evaluation of the Stanford CAI program in initial reading. Journal of Educational Psychology, 1972, 63, 597-602 (with J. D. Fletcher).

96. An approach to the psychology of instruction. Psychological Bulletin, 1972, 78, 49-61 (with J. A. Paulson).

97. Incidental learning of words used in a memory scanning task. Psychonomic Science, 1972, 27, 317-320 (with D. J. MacKenzie).

98. Ingredients for a theory of instruction. American Psychologist, 1972, 27, 921-931. (Republished in Changing Education: Alternatives from Educational Research, edited by M. C. Wittrock, Inglewood Cliffs, New Jersey: Prentice Hall, Inc., 1973.)

99. Optimizing the learning of a second-language vocabulary. Journal of Experimental Psychology, 1972, 96, 124-129.

100. Effects of memory load on reaction time. Journal of Experimental Psychology, 1972, 96, 232-234 (with C. F. Darley and R. L. Klatzky).

101. Optimal allocation of instructional effort to interrelated learning strands. Journal of Mathematical Psychology, 1973, 10, 1-25 (with V. G. Chant).

102. Factors influencing speed and accuracy of word recognition. In Attention and Performance IV, edited by S. Kornblum, New York: Academic Press, 1973, 583-612 (with J. F. Juola).

103. Scanning for information in long- and short-term memory. Journal of Experimental Psychology, 1973, 98, 95-101 (with K. T. Wescourt).

104. Marihuana and retrieval from short-term memory. Psychopharmacologia, 1973, 29, 231-238 (with C. F. Darley, J. R. Tinklenberg, and L. E. Hollister).

105. Influence of marihuana on storage and retrieval processes in memory. Memory and Cognition, 1973, 1, 196-200 (with C. F. Darley, J. R. Tinklenberg, W. T. Roth, and L. E. Hollister).

106. Computer-assisted instruction in initial reading: Individualized instruction based on optimization procedures. Educational Technology, September, 1973, 27-37 (with J. D. Fletcher, E. J. Lindsay, J. O. Campbell, and A. Barr).

107. Comparison of student performance and attitude under three lesson-selection strategies in computer-assisted instruction. Technical Report No. 222, Institute for Mathematical Studies in the Social Sciences, Stanford University, 1973 (with M. H. Beard, P. V. Lorton, and B. W. Searle).

108. Entwurf einer theorie des lehrens. In Fortschritte und Ergebnisse der Bildungstechnologie, edited by E. B. Rollett und K. Weltner, München, Germany: Ehrenwirth Verlag, 1973, 58-75.

109. Effects of short-term memory contents on short- and long-term memory searches. Memory and Cognition, 1973, 1, 443-448 (with R. C. Moss and K. T. Wescourt).

110. Tachistoscopic recognition of syllabicated words. The Quarterly Journal of Experimental Psychology, 1974, 26, 158-166 (with C. Manelis).

111. Search and decision processes in recognition memory. In Contemporary Developments in Mathematical Psychology: Volume I, Learning, memory, and thinking, edited by D. H. Krantz, R. C. Atkinson, R. D. Luce, and P. Suppes, San Francisco: W. H. Freeman and Co., 1974, 243-293 (with J. F. Juola).

112. Search processes in recognition memory. In Theories in Cognitive Psychology: The Loyola Symposium, edited by R. L. Solso, Hillsdale, New Jersey: Erlbaum Associates, 1974, 101-146 (with D. J. Herrmann and K. T. Wescourt).

113. Teaching children to read using a computer. American Psychologist, 1974, 29, 169-178.

114. The serial position function for lists learned by a narrative-story memonic. Bulletin of the Psychonomic Society, 1974, 2, 377-378 (with D. J. Herrmann and F. V. Geisler).

115. Recognition time for words in short-term, long-term or both memory stores. Journal of Experimental Psychology, 1974, 102, 830-835 (with R. C. Mohs).

116. Response latency in visual search with redundancy in the visual display. Perception and Psychophysics, 1974, 16, 123-128 (with J. E. Holmgren and J. F. Juola).

117. The nature of storage deficits and state-dependent retrieval under marihuana. Psychopharmacologia, 1974, 37, 139-149 (with C. F. Darley, J. R. Tinklenberg, and W. T. Roth).

118. A theoretical comparison of list scanning models. Journal of Mathematical Psychology, 1974, 11, 79-106 (with S. K. Shevell).

119. Accuracy and speed strategies in scanning active memory. Memory and Cognition, 1974, 2, 629-636 (with W. P. Banks).

120. Cost and performance of computer-assisted instruction for education of disadvantaged children. In Education as an Industry, edited by J. Froomkin, D. Jamison, and R. Radner. National Bureau of Economic Research, in press (with D. Jamison, J. D. Fletcher, and P. Suppes).

121. Some remarks on a theory of memory. In Attention and Performance V, edited by P. M. A. Rabbitt and S. Dornic, London: Academic Press, 1975, 485-498 (with K. T. Wescourt).

122. Search of list structures stored in long-term memory. Journal of Verbal Learning and Verbal Behavior, 1975, 14, 82-88 (with I. E. Appelman).

123. A mnemonic method for learning a second-language vocabulary. Journal of Educational Psychology, 1975, 67, 1-16 (with M. R. Raugh).

124. A rationale and description of a CAI program to teach the basic programming language. Instructional Science, 1975, 4, 1-31 (with A. Barr and M. Beard).

125. An application of the mnemonic keyword method to the acquisition of a Russian vocabulary. Journal of Experimental Psychology: Human Learning and Memory, 1975, 104, 126-133 (with M. R. Raugh).

126. Mnemotechnics in second-language learning. American Psychologist, 1975, 30, 821-828.

127. Search processes for associative structures in long-term memory. Journal of Experimental Psychology: General, 1975, 104, 103-121 (with R. C. Mohs and K. T. Wescourt).

128. Memory scanning for words in visual images. Memory and Cognition, 1975, 3, 541-544 (with L. D. Rothstein).

129. Verification of algebra step problems: A chronometric study of human problem solving. Journal of Mathematical Psychology, 1976, 13, 214-240 (with P. G. Matthews).

130. Adaptive instructional sytems: Some attempts to optimize the learning process. In Cognition and Instruction, edited by D. Klahr, Hillsdale, New Hersey: Erlbaum Associates, 1976, 81-108.

131. Individual differences and interrelationships among a select set of cognitive skills. Memory and Cognition, 1976, 4, 661-672 (with A. Chiang).

132. Fact retrieval processes in human memory. In Handbook of Learning and Cognitive Processes, Vol. 4, edited by W. K. Estes, Hillsdale, New Jersey: Erlbaum Associates, 1976, 363-413 (with K. T. Wescourt).

133. The computer as a tutorial laboratory: The Stanford BIP project. International Journal of Man-Machine Studies, 1976, 8, 567-596 (with A. Barr and M. H. Bear

134. Sequential search processes in long-term memory. Memory and Cognition, 197 in press (with C. L. Krumhansl and R. C. Mohs).

135. Teaching a large Russian language vocabulary by the mnemonic keyword method Instructional Science, 1977, in press (with M. R. Raugh and R. D. Schupbach).

136. Reflections on psychology's past and concerns about its future. American Psychologist, 1977, in press.

137. Exhaustive and self-terminating search of compact and dispersed visual displays. Perception and Psychophysics, in press (with I. B. Appelman and A. Chiang).

138. Applications of learning models and optimization theory to problems of instruction. In Handbook of Learning and Cognitive Processes, Vol. 6, edited W. K. Estes, Hillsdale, New Jersey: Erlbaum Associates, in press (with V. G. Chant).

ALUMNI CITATION
The University of Chicago
Alumni Association

June 5, 1976

The Professional Achievement Awards

The Professional Achievement Awards recognize those alumni whose attainments in their vocational fields have brought distinction to themselves, credit to the University, and real benefit to their fellow citizens.

Richard C. Atkinson, Ph.B. 1948, Deputy Director of the National Science Foundation, is a dedicated, ingenious and productive experimental psychologist who has introduced original and provocative ideas for the analysis of human learning, memory, and cognitive processes. The theoretical model that he proposed of short-term memory and its interfacing with long-term memory has become a "classic" formulation guiding research in the field for the past decade. He has played a seminal role in the theoretical development of mathematical psychology and was the founding editor of the *Journal of Mathematical Psychology*. He is co-author of the first textbook on the subject, *An Introduction to Mathematical Psychology*, as well as the widely used general psychology textbook, *Introduction to Psychology*. His contributions to the social sciences have brought him recognition of the highest order including election to the National Academy of Sciences, the National Academy of Education, and the American Academy of Arts and Sciences. As Chairman of the Psychology Department and Associate Dean of the School of Humanities and Sciences at Stanford University, he earned the reputation as a scholar with a wide range of knowledge of the social sciences and the ability to use that knowledge in an administrative setting. He is currently on leave of absence from Stanford University, serving as Deputy Director of the National Science Foundation. In this position he plays a key role in shaping the science policy of the United States and in uniting science and society in the search for solutions to national and global problems.

[Excerpt from U.S. Government Manual, 1976–77]

The National Science Foundation (NSF) promotes the progress of science through the support of research and education in the sciences. Its major emphasis is on basic research, the search for improved understanding of the fundamental laws of nature, upon which our future well-being as a nation is dependent.

The National Science Foundation is also involved in applied research directed toward the solution of more immediate problems of our society. Its educational programs are aimed at ensuring increasing understanding of science at all educational levels and an adequate supply of scientists and engineers to meet our country's needs.

The purposes of the National Science Foundation are to: increase the Nation's base of scientific knowledge and strengthen its ability to conduct scientific research; encourage research in areas that can lead to improvements in economic growth, energy supply and use, productivity, and environmental quality; promote international cooperation through science; and develop and help implement science education programs that can better prepare the Nation for meeting the challenges of the decades ahead. In its role as a leading Federal supporter of science, NSF also has an important role in national science policy planning.

The National Science Foundation was established by the National Science Foundation Act of 1950 (64 Stat. 149; 42 U.S.C. 1861–1875), as amended, and was given additional authority by the National Defense Education Act of 1958 (72 Stat. 1601; 42 U.S.C. 1876–1879). Reorganization Plan No. 1 of 1973, effective July 1, 1973, transferred to the Director of NSF the functions of the Office of Science and Technology which was abolished by the reorganization plan. The Foundation consists of the National Science Board of 24 members, and a Director, each appointed by the President with the advice and consent of the Senate. The National Science Foundation Act also provides for a Deputy Director and four Assistant Directors, appointed by the President and subject to Senate confirmation. The Director is the chief executive officer of the Foundation and serves ex officio as a member of the Board and as chairman of its Executive Committee.

Since 1973, the Director of the Foundation hsa carried out the many functions previously assigned to the Office of Science and Technology. These functions include providing advice and assistance to help in achieving coordinated Federal policies for the promotion of scientific research education in the sciences, energy research and development, and other energy related programs.

The Director of the National Science Foundation functions as the Science Adviser to the President and Chairman of the Federal Council for Science and Technology pending passage of legislation which will establish these positions in the Executive Office of the President. In this capacity, he advises and assists the White House, Office of Management and Budget, Domestic Council, and other organizations within the Executive Office of the President on matters where scientific and technological considerations are involved. He also acts as the President's representative in chairing cooperative international and scientific programs, including such bodies as the U.S.–U.S.S.R. Joint Commission on Scientific and Technical Cooperations.

The National Science Foundation, commencing in 1976, will award annually the Alan T. Waterman Award to an outstanding young scientist. This award provides for up to $150,000 and 3 years of research and study at the institution of the awardee's choice. The Foundation also provides support for the President's Committee on the National Medal of Science.

NATIONAL ACADEMY OF SCIENCES,
Washington, D.C., April 28, 1977.

Hon. EDWARD KENNEDY,
Senate Committee on Human Resources, U.S. Senate, Washington, D.C.

DEAR SENATOR KENNEDY: I am most pleased to support the nomination of Dr. Richard C. Atkinson for the post of Director, National Science Foundation.

I have had the privilege of numerous contacts with Dr. Atkinson during his service as Deputy Director and as Acting Director of the Foundation. It is clear that he has taken firm hold of the affairs of the Foundation and is keenly aware of the problems of the Foundation vis-a-vis its scientific constituency, its own staff,

and the Congress. He is sensitive and knowledgeable with respect to each. Any qualms that I might once have held with respect to the installation of a behavioral scientist in the post of Director of the Foundation have long since been alleviated. In his research and in his outlook, Dr. Atkinson thinks like a quantitative scientist and is truly a member of that community. This is evident also in the very fact of his election some years ago to membership in the National Academy of Sciences.

Dr. Atkinson holds the values of a scientist and is, at the same time, keenly aware of the position of the natural sciences as the underpinning of American industry as well as of agriculture, the public health and the national defense. He is sensitive to the changing role of the university in American society and the special requirements of science within that setting.

He is a crisp executive, a well organized administrator and, I am informed, has established a comfortable working relationship with the National Science Board. And above all else he is a warm, intelligent man.

Dr. Atkinson is at this moment superbly prepared to lead the National Science Foundation in this time of transition and I am pleased to commend him to you without reservation.

Sincerely yours,

PHILIP HANDLER, *President.*

[Telegram]

WASHINGTON, D.C., *April 29, 1977.*

Senator EDWARD KENNEDY,
Washington, D.C.

The officers of the American Association for the Advancement of Science wish to advise the cognizant Members of the Senate that we unreservedly recommend confirmation of Dr. Richard C. Atkinson as Director of the National Science Foundation. The Foundation has been without a permanent Director for more than 8 months. As acting Director, Richard Atkinson has done an exemplary job of conducting the affairs of the agency. The position of Director calls for scientific distinction, a demonstrable capacity for management, and sensitivity to social values. In addition, it requires independence of judgement and a willingness to lead. On each of these counts the President's choice of Dr. Atkinson is a wise one and we strongly endorse his nomination.

WILLIAM D. MCELROY,
Board Chairman.
EMILIO Q. ADDARIO,
President.
EDWARD E. DAVID,
President Elect.
WILLIAM D. CAREY,
Executive Officer.

[Mailgram]

MASSACHUSETTS INSTITUTE OF TECHNOLOGY,
Cambridge, Mass., April 28, 1977.

Hon. EDWARD M. KENNEDY,
Chairman, subcommittee on Health and Scientific Research,
Washington, D.C.

The following mailgram sent to the Honorable Harrison Williams. I learned with great pleasure that the President has nominated Dr. Richard C. Atkinson as Director of the National Science Foundation, and I urge the Committee on Human Resources to recommend his confirmation to the Senate. Dr. Atkinson has done a splendid job as Deputy Director and now Acting Director of the Foundation, and I know that he would provide the NSF with the outstanding leadership it needs at this time. A member of the National Academy of Sciences, Dr. Atkinson is both a distinguished scientist and accomplished administrator whose nomination has been widely applauded in the scientific and educational communities.

JEROME B. WIESNER,
President.

[Telegram]

WASHINGTON, D.C., *April 29, 1977.*

Senator EDWARD KENNEDY,
Washington, D.C.

The American Association of State Colleges and Universities comprised of 324 member institutions supports confirmation of Dr. Richard Atkinson as Director of the National Science Foundation.

ALLAN W. OSTAR,
Executive Director, American Association of State Colleges and Universities.

[Telegram]

WASHINGTON, D.C., *April 29, 1977.*

Senator EDWARD KENNEDY,
Washington, D.C.

The American Association of Community and Junior Colleges supports the nomination of Dr. Richard C. Atkinson as Director of the National Science Foundation and recommends his prompt confirmation.

EDMUND J. GLEAZER, Jr.
President, American Association of Community and Junior Colleges.

[Mailgram]

ANN ARBOR, MICH., *April 28, 1977.*

Senator EDWARD KENNEDY,
Chairman, Health and Scientific Research Committee, Committee on Human Resources, U.S. Senate, Washington, D.C.

The Great Lakes Colleges Association supports the nomination of Richard Atkinson as director for NSF. His interim leadership of this agency has soundly demonstrated his qualifications for this post.

JON FULLER, *President.*

EVERETT RESEARCH LABORATORY, INC.,
Everett, Mass., April 29, 1977.

Hon. EDWARD M. KENNEDY,
U.S. Senate, Washington, D.C.

DEAR SENATOR KENNEDY: I understand that your Subcommittee on Health and Scientific Research is holding hearings on the nomination of Richard Atkinson as Director of NSF.

I am writing to endorse that nomination. I am persuaded that Atkinson is an alert, industrious scientist. I have found him very receptive to new ideas and very willing to devote his time to understanding new scientific areas. His administration of NSF has reflected a willingness to be receptive to change that I think is very healthy for the Foundation and for science generally.

I hope that your subcommittee will enthusiastically endorse his nomination.

Yours sincerely,

ARTHUR KANTROWITZ.

NATIONAL SMALL BUSINESS ASSOCIATION,
Washington, D.C., April 29, 1977.

Hon. HARRISON A. WILLIAMS,
Chairman, Committee on Human Resources,
Washington, D.C.

DEAR CHAIRMAN WILLIAMS: The President has submitted to the Senate Dr. Richard C. Atkinson, Acting Director of the National Science Foundation, to be permanent Director.

During Dr. Atkinson's tenure as Acting Director, the Foundation has taken its first steps towards developing the small business program which the Congress has mandated. We believe that at least the Research Applied to National Needs

(RANN) program of NSF has made a reasonable beginning in carrying out the Congressional intent. For that reason, we believe we should commend Dr. Atkinson to you and urge his confirmation since it was under his leadership in the Foundation that his helpful beginning has been made.

Respectfully submitted,

JOHN LEWIS,
Executive Vice President.

Senator KENNEDY. Dr. Atkinson has been endorsed by the National Academy of Sciences, American Association for Advancement of Science, American Association of State Colleges and Universities, the President of the Massachusetts Institute of Technology, the American Association of Community and Junior Colleges. All of these groups have a very important relationship with the National Science Foundation. I think they are very impressive commendations for the nominee.

It is a clear indication as far as I am concerned that President Carter, who indicated he was looking for the best, got the very best in this nominee.

I certainly feel that way personally. As one who has had the opportunity to work closely with the nominee over the period of recent years, I am immensely pleased personally to welcome him and to congratulate him. I also congratulate the President on this nomination, and I hope we can move expeditiously to see that the formal aspects of this nomination, and formal requirements, are met.

I am going to make some brief comments now, and then we will proceed to the nominee's statement and comments which he would like to make.

I am pleased to welcome Dr. Atkinson here this morning. Since 1975, when Dr. Atkinson became Deputy Director of the National Science Foundation, the committee has had the opportunity to work very closely with him.

We have heard his testimony on numerous occasions during hearings on the NSF budget. He has been especially effective in insuring that the Foundation has responded to the concerns of our Subcommittee on Health and Scientific Research.

Before Dr. Atkinson joined the Foundation, he served at Stanford University as professor of experimental pyschology and associate director of the Institute for Mathematical Studies in the Social Sciences. He has published numerous books and professional papers in his field, and his "Introduction to Psychology" is a widely used college textbook in this country.

Dr. Atkinson is the first behavioral scientist to be named to head the National Science Foundation in its 26-year history.

His nomination is an important recognition of the role of the social sciences in the Nation's scientific research program. It holds the promise of increased emphasis on the interrelationships between the social, physical, and life sciences and highlights the importance of interdisciplinary research to the advancement of science and to the application of science and technology to national and international needs.

During his tenure at the National Science Foundation, Dr. Atkinson personally assumed oversight responsibilities for a thorough reexamination of NSF's procedures for processing research proposals. The result was a series of managerial improvements aimed at assuring a greater degree of equity in the system.

He also established a new system for the handling of Freedom of Information Act requests which, in turn, heightened NSF's perception of the need for openness. I think that is extremely encouraging.

As the author of the 1974 amendments to the Freedom of Information Act, and as a member of the Judiciary Committee, I welcome those initiatives. A number of the other agencies have not been nearly as forthcoming. If they followed the commitment that our nominee followed on that issue, I think we would carry forward the purposes of that act more effectively.

He has also conducted a thorough review of NSF activities in policy research and introduced improved procedures in this area.

He was instrumental in persuading the National Science Board to adopt Government in the Sunshine Act procedures well in advance of being required to do so by law.

He has established systematic oversight and evaluation procedures designed to assure accountability and effective program management at all levels of NSF.

During Dr. Atkinson's service at the National Science Foundation, he worked closely with Dr. Frank Press, who was a member of the National Science Board. Dr. Press has now been confirmed by the Senate to be Director of the White House Office of Science and Technology Policy and Science Adviser to the President.

I believe that the good understanding which exists between Dr. Press and Dr. Atkinson will contribute significantly to providing the President and his administration with strong leadership on scientific and technical issues, and I look forward to Dr. Atkinson's testimony this morning.

I also want to say how pleased we are to have Senator Schmitt here, who is a member of the Commerce, Science, and Transportation Committee and a very active member on their Science, Technology, and Space Subcommittee. We want to extend a warm word of welcome to him. We hope he will participate in our hearing this morning.

Before recognizing Dr. Atkinson, I want to indicate that Senator Javits wanted me to extend a warm word of welcome to you. He gives his wholehearted support to your nomination, as does Senator Cranston. Both of them wanted me to extend a warm greeting to you, Dr. Atkinson, and say they, too, look forward to working very closely with you.

STATEMENT OF HON. ALAN CRANSTON, A U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator CRANSTON. I am delighted that President Carter has nominated Dr. Richard C. Atkinson as Director of the National Science Foundation.

Dr. Atkinson's contributions to both the science of mathematics and to psychology have been outstanding.

His scientific achievements have been recognized through his membership in the National Academy of Sciences, the American Academy of Arts and Sciences, the National Academy of Education, and the Society of Experimental Psychologists. He has been a fellow of the Guggenheim Foundation, and the recipient of a distinguished research award from the Social Sciences Research Council.

I am confident his firm understanding of the scientific process and his familiarity with the scientific community will enable him to provide firm leadership in carrying out the statutory mandates of the National Science Foundation.

Dr. Atkinson has been acting as Director of the National Science Foundation since last August. His nomination as Director is well deserved and I fully support it.

Senator KENNEDY. Senator Schmitt, did you have any comment?

Senator SCHMITT. I appreciate the committee allowing me to participate this morning. I think the NSF and the job to which you have been nominated, Dr. Atkinson, is one of the most exciting and one of the most important agencies in the Federal Government.

In a large sense, you are dealing with the scientific foundations upon which we enter the future, particularly in relationship to the educational research activities throughout this country.

As members of the Commerce, Science, and Transportation Committee, and more specifically the Science, Technology and Space Subcommittee, Senator Stevenson and I will be very interested in watching the progress of the agency and participating in reports and other information you develop that is directly relevant to our activities.

I hope that you will, in turn, keep us informed as much as possible in those areas.

I have a long personal association with the NSF, including participation as a grantee. As my activities in the NASA grew to management of energy research and development, I had a very close working relationship with your predecessor and many members in the Foundation.

I wish to compliment your predecessor and the staff prior to your assuming the reins on their activities. I hope that they will continue to provide the kind of science leadership that is so necessary to this country and to science in its broadest definition.

One area of difficulty I think you may find and one which I hope you will look at very closely, is that of transforming an agency that began as one of primarily offering research grants into one that is—through the leadership of gentlemen like Senator Kennedy and many others—providing much more than just grant leadership in this country.

I think the transition is not complete. I believe there is a slowness to some degree in the response time of the Foundation to national needs and specific needs of individuals.

I hope that you will look at the management structure of the Foundation very closely to see if there are not ways in which that response time can be increased. It is a very important part of the future of your foundation, as well as the country.

I will wait until I hear your comments, and then I may have a few questions.

Thank you, Senator.

Senator KENNEDY. Thank you very much.

Our nominee's home is in California. We welcome a member of our full committee, Senator Hayakawa, who wants the privilege of presenting you formally before the committee. I recognize Senator Hayakawa at this time for whatever comments he would like to make.

Senator HAYAKAWA. Mr. Chairman, it is a real pleasure to recommend to the committee the confirmation of Dr. Richard C. Atkinson

as Director of the National Science Foundation, an organization I have long interest in.

Dr. Atkinson, who is on leave of absence from Stanford University, has been associated with that distinguished institution for 20 years. He started out a lecturer in applied mathematics and statistics laboratories, and eventually advanced to positions of chairman of the department of psychology and associate dean of the School of Humanities and Sciences.

It is the bridge he provides between the humanities and sciences, I think, which is an important fact about the nominee.

I am not going to take up the time reciting the list of his publications. That would take all morning.

But I just want to say that Dr. Atkinson has so far—he is still a very young man, at least from my point of view—10 books and more than a hundred articles to his credit.

He has been a fellow of the Guggenheim Foundation, and the recipient of a distinguished research award from the Social Sciences Research Council.

Moreover, this committee is in the fortunate position of escaping the risks attendant on any new appointment. Dr. Atkinson has served with distinction as Deputy Director of the Foundation since 1975. He has been Acting Director since 1976. So he has already done the work to which he has been appointed.

In other words, we are not being asked to confirm a new hand.

I would like to add I am in the comfortable position of recommending a fellow scholar whose views on the status of our national research, I am sure I share.

Dr. Atkinson is rapidly concerned about the sharp decline in support for university-based fundamental research in the past decade. There is a real fear that we eventually could be short of technologists necessary to maintain our international supremacy unless such research is adequately supported.

The New York Times has recently brought attention to this danger, and let me quote:

> An increasing body of evidence in recent years has suggested that the U.S. leadership in science and technology is beginning to be lost. One example is the disquieting survey of leaders of United States Research Institute recently published by the National Science Foundation. The Nation's research administrators, the study indicates, fear collapse of top-ranking institutions because of inadequate or unreliable funding. They find evidence that at least the young people are moving away from basic research. They see rapidly growing numbers of bureaucratic and other obstacles to research freedom, and they perceive ever increasing spirit of antiintellectualism threatening our entire American scientific enterprise.

Well, during the years of the college uproar, I was in the middle of anti-intellectualism and also antitechnological spirit which permeated so much of the counter culture in the 1960's.

I think it is very important to have a strong National Scicnce Foundation to continue to fight for the kind of rationality and kind of scientific spirit that is at the heart of our scientific and humanistic culture.

In my judgment, Dr. Atkinson would be the right man to deal sith the problem faced by our schools of higher learning and to deal with our deficiencies in basic research.

I therefore recommend unhesitatingly the confirmation of Dr. Atkinson by the Senate.

Thank you, Mr. Chairman.

Senator KENNEDY. Thank you very much.

We are also joined by Senator Stafford, who is a very active member. It is a great compliment to get members of the committee here, four Senators, on a Monday morning, so you can tell there is a good deal of interest. They are all very interested in the National Science Foundation.

Senator Stafford has been a very active member of our committee.

Senator, do you have a word of welcome?

Senator STAFFORD. Thank you very much, Mr. Chairman. I appreciate the kind words.

We are glad to welcome you, sir.

I have no questions at this time so I will yield to my colleagues.

Senator KENNEDY. That is your cue, Dr. Atkinson.

You have a statement, and we will look forward to hearing from you.

STATEMENT OF DR. RICHARD C. ATKINSON, NOMINEE FOR DIRECTOR OF THE NATIONAL SCIENCE FOUNDATION

Dr. ATKINSON. Thank you.

I appreciate your remarks, the remarks of Senator Hayakawa, and those of Senator Schmitt. Senator Schmitt and I have not had a chance to meet, but his remarks were very perceptive comments about the state of the Foundation.

Mr. Chairman, it is a pleasure to appear before you today as President Carter's nominee for Director of the National Science Foundation. The last time I sat at this witness table, Senator Kennedy's subcommittee was in session, and the topic was NSF's authorization. Today, I look forward to discussing not only the National Science Foundation but anything else the committee may wish to review.

Two years ago, I was appointed Deputy Director of the National Science Foundation, and about 9 months ago I became its Acting Director when Dr. Stever left the post to become the President's Science Adviser. I have appeared before this committee twice to discuss NSF authorizations, and a third time last September to accompany Presidential nominees at their confirmation hearings. On each occasion, I was impressed by the knowledgeable and perceptive questions raised by committee members and by their willingness to exchange ideas. These dialogs were extremely productive, and I hope they will continue.

The most significant change during my 2-year tenure at NSF has been a turnabout in the Government's attitude concerning the value and importance of research. For too many years, there was a steady erosion in Federal support for basic research. With the assistance of this committee, the situation has begun to change. There was real growth in the 1977 budget for basic research, and I hope there will be additional growth in the 1978 budget.

If I am confirmed as Director of the National Science Foundation, my main objective will be to insure the continued strength and vitality of basic research. I believe that much of the success of American science—and, in turn, our technology and industrial progress—stems from the research that NSF has sponsored over the past 26 years. NSF has a distinguished tradition in the support of science—one that

must be continued if our citizens are to prosper and if this country is to maintain a leadership role in world affairs.

Of course, the National Science Foundation and the scientific community must recognize that society is changing in ways that will influence the direction and conduct of research. The public is aware of the benefits of research, but also increasingly concerned with potential hazards. As science competes for limited Federal resources, the need to explain and justify research will become increasingly important. NSF must be responsive to these societal changes, recognizing not only its responsibility to pursue excellence in research, but also its responsibility to be cognizant of society's concerns and to meet them in an appropriate and public way.

Being Director of the National Science Foundation during the coming years will be an exciting challenge. If the Foundation does the job that Congress has mandated it to do, then the long-term benefits to to this Nation and the world will be truly unbounded. I look forward to the challenge and the opportunity to serve science and my country.

Thank you, Mr. Chairman.

Senator KENNEDY. Thank you very much.

As we have stated, we are very much aware of your views on many of the matters which are before the Foundation. Probably your best testimony is your achievements and your accomplishments in many of these areas in the past.

If I might, I would like to get into some of the areas of particular interest. Before doing so, I wonder if you would review your relationship, as you see it, with the President's Science Adviser. You have enjoyed a very close personal relationship, and I know that you are certainly one of those who recognize the importance of having the Science Adviser's input in the domestic council and in the framing of domestic and foreign policy issues.

Would you review with us how you see that relationship, and how you think the NSF could contribute to the resource base of the Science Adviser.

Dr. ATKINSON. Senator Kennedy, I have known Dr. Press for a good number of years. I have great regard for him. I believe he was an excellent choice for the position of Science Adviser.

It is going to be necessary for the National Science Foundation to work very closely with the Office of Science and Technology Policy. As you are well aware, it is one of the requirements of our legislation to support the activities of that office. Our support will be primarily in terms of long-term studies on science policy and science analysis, but there will be many occasions when it will to be necessary to provide short-term backup support.

We have begun to work out the nature of this relationship in terms of contact points between Dr. Press' office and the National Science Foundation. I anticipate that it will be a very effective and successful relationship.

Senator KENNEDY. I think that is extremely encouraging, quite frankly, because obviously they are complementary in their functions and purposes. I think that is going to be very important in developing national science policy in the country.

I think that is reassuring.

One of the aspects of science policy that I have been especially interested in is what the NSF can do in meeting our international responsibilities in the areas of science and research, particularly in food, nutrition and health care matters. The U.N. Conference on science and technology is being planned and I understand that the NSF is planning for it. Maybe you could review your own thoughts on this function.

Dr. ATKINSON. Senator Kennedy, I believe that the role of science in international affairs is ever increasing in its importance.

During the past decade, there have been many new bilateral science agreements and other types of exchanges reached between the United States and foreign countries. In fact, last night, I met with a group of French scientists who are here to discuss our bilateral exchange with France in science and technology.

There is no question in my mind that these exchanges have been important and productive activities. On the other hand, one of my first initiatives after Dr. Press assumed his duties at the White House was to write to him, indicating my concern about our international programs and the fact that they have evolved in a somewhat haphazard way over the past 10 years. It is important to reexamine the full range of international science agreements and try to provide a justification and rationale for these activities.

When Congressman Mink assumed her new duties at the State Department, I wrote her a similar letter. I have had very positive responses from both Dr. Press and Mrs. Mink.

One of my main agenda items will be to review the NSF international science program to assess what successes and failures we have had in the past and where it should be going.

Senator KENNEDY. The fact is that usually in the past those have been matters which have been superimposed on NSF. Our experience is that in reality a communique comes from our American President who has met with a foreign leader, we find scientific and technical assistance announced in the communique, and all too infrequently the NSF has not been brought into the decisionmaking process.

It has been my experience this kind of assistance has grown in a haphazard way. NSF has had to make commitments which have not necessarily been consistent and perhaps not as effective as they could have been.

I think by reviewing what has been done in making recommendations in the past we can learn a great deal and be more efficient and effective in developing approaches that can be more useful and productive. This will obviously be an aspect of your responsibility as Director of NSF.

Our Subcommittee on Health and Scientific Research, for example, will be spending the better part of the year working in the area of biomedical research and in carrying out our responsibility in the areas of international health. I think we can make a constructive and positive contribution, and our findings will relate obviously to your functions and purposes.

There is a great deal that can be done in the area of tropical disease through biomedical research. These matters can be coordinated in ways which are realistic, constructive, and positive. Meeting these needs is important.

Although health issues are not the front burner responsibility of the NSF, they are an important aspect of your concerns.

Our subcommittee has also been very concerned about scientific manpower, womanpower, personpower. Only 4 percent of that group is engaged primarily in basic research areas. Less than half of those are in the academic community, the majority are in Federal labs, nonprofit organizations and private industry.

It seems at least to some members of the committee that it might be wise for the NSF to be sensitive to the capabilities which exist in the industrial sector. There has been rather important movement that you are familiar with, of researchers who, 15 or 20 years ago, were primarily located in universities and who now choose to work in private industry.

We are interested in the funding of quality research, and NSF should review proposals on that basis particularly when industry is prepared to comply with patent provisions, and other safeguards to protect the public's investment.

We may well have to look at those patent provisions in the Judiciary Committee to insure protection of the public interest. I am wondering what your own sense of this issue is.

Again it is a matter, I think, of some importance when we review the whole area of research.

As you are aware, an interesting study is being done now in the Office of Technology Assessment on the health of research and technology in this country. That study also deals with international technology transfer and similar issues.

Do you have any initial reactions to these issues and questions?

Dr. ATKINSON. Quite a few issues were raised in your remarks, Senator. I find them all interesting.

Certainly the Foundation has been concerned with women and minorities in science. There has been considerable progress, although the progress is not what one might have wished.

One of the best indicators, though of commitment on the Foundation's part in this regard is the representation of minorities and women in the senior scientific staff of the Foundation.

The Foundation as a whole has had a very strong record in that regard at all levels when compared with other Government agencies. But women and minorities are not adequately enough represented at the higher levels of the Foundation. And we have made special efforts in this regard. We have a program in effect now which, if successful, will have significant impact in this area. That program is one of several indications of the National Science Board's interest, and my own interest, in these matters.

Senator KENNEDY. We have been interested in the role of women in science. The percentages and numbers have not been great, and and really have not increased very much, if at all, over time.

There have to be ways, innovative ways, to bring their particular skills to bear. The same has been true for minorities.

I was also interested in this other issue—whether industrial researchers making proposals to the NSF are being evaluated in the basis of quality.

Your tradition, and certainly it has been completely justified in terms of the past, has been to direct NSF resources almost exclusively to university researchers.

But I am wondering, given the fact that about 6 percent of Federal basic research support generally goes to the private sector, and the fact that only .3 percent of NSF's basic research funds goes to the private sector, whether there is an opportunity for excellence in industry being lost. Should the Board be sensitive to that, and are you? What are your views?

Dr. ATKINSON. Senator Kennedy, I am going to want to get back to these percentages in a minute.

As you well know, the NSF has been concerned with the relationship of the Foundation to industry. The Foundation has had a task force dealing with this issue. There are a number of recommendations in the task force's report that will have an impact on NSF-supported basic research in industry. One involves a new approach where NSF will accept proposals that are submitted jointly from industries and universities, where scientists at a university and scientists in an industry join together in making a proposal to conduct basic research. We are concerned with strengthening research in industry, and we see this as a step in that direction.

Of course, our RANN program has always supported research in industry, and there are a fair number of dollars in that program that could be labeled as basic research dollars going to industry.

I do, however, want to comment on your statistics. If one asks what percent of the Ph. D. scientists and engineers in this country involved in basic research as a primary occupation are in industry, it turns out that about 11 percent are in industry.

If one looks at all funding across the Federal Government for basic research, it turns out that about 6 percent of Federal funds for basic research go to industry.

So, in a sense, there is a reasonable match between basic-reseacrh dollars going to industry and the numbers of scientists in industry. Of course, the NSF could move more aggressively in this area. It is a matter that is now receiving considerable attention by the National Science Board.

Your concern for maintaining the strength of American science in industry is an increasingly important one. It is also of concern to the Foundation and will continue to be so in the future. I would like to add one last remark. I do not see the National Science Board as opposing the interests that you have expressed. But I do see the Board as being concerned that we move slowly, and by slowly I do not mean over a decade, but over the next year or so in coming to a view of how to handle this issue.

Senator KENNEDY. I think that is fair enough.

We have a number of Senators here. I will try to keep this to a reasonable period of time. I will submit other questions.

One of the areas we have been very interested in is the State science program at NSF. What is being done to bring, the benefits of science and technology to the State governments, and also to local communities.

Some States have developed incredibly effective programs over a period of time. I am interested in how you see the NSF working with those programs. Do you see value in the development of scientific and technical capacities in States and in local communities? I do not know how many local governments would be able to develop pro-

grams. But several States have developed programs. Pennsylvania, for example, did a very good job under Governor Scranton a few years ago. What can you tell us about your views?

Dr. ATKINSON. Senator Kennedy, our intergovernmental science program has been remarkably effective. It has had a small budget, about $5 million in the 1977 budget, yet it has been very effective. The new State science engineering and technology program is another major step. I will be interested in examing the types of proposals that are put forward by that program. I see the program as providing an important adjunct to the Governor or State legislature in decision-making—that is, providing a solid science input to those decisions.

I did meet with Dr. Press' Intergovernmental Science, Engineering, and Technology Advisory Panel. I was quite impressed by the strong support from Governors, mayors, and others for NSF's intergovernmental science program.

I believe that Dr. Press was equally impressed by that meeting. I am told the OMB is also very much concerned with the success of these programs. I see our intergovernmental programs prospering over the next few years.

Senator KENNEDY. Another matter of concern is the makeup of the Science Board, and the need to include precollege science educators on the Board.

So many important science education efforts are taking place in our secondary schools, junior colleges, 4-year colleges, as well as obviously in universities and graduate schools. We have been concerned about the priority assigned to science education in the budget over a period of years, quite frankly. We are also concerned about the role of young scientists and the public generally in terms of the Board.

So many scientific and technical issues are going to require public acceptance, public awareness, and public understanding.

One of the critical questions, is how are we going to make complex involved issues comprehensible by lay people, and how can we make the scientific community understand to some extent the concerns of the public. That is a long process. It is difficult to set up particular ways to do this.

Certainly one step would be to include on the Board those that have strong interests in science and those who have involvement in public concerns.

Are you sensitive to this particular issue?

I know you have been from our own private conversations. But since we are going to have a number of Board vacancies to be filled, I am wondering how you view the presence of non-scientists and precollege science educators on the Board.

Dr. ATKINSON. Senator Kennedy, I welcome those remarks, and I believe the National Science Board is in agreement with you. The names that were forwarded to the White House for consideration are in accord with your interests.

On the other hand, the National Science Board is a rather small group. It is now augmented by the National Science Foundation Advisory Council, and I would hope that one would look at the makeup of both the Advisory Council and the National Science Board to determine the adequacy of various groups' representation in the Foundation's advisory structure.

But your remarks are well taken, and I assure you that the National Science Board recognizes your concerns and is sympathetic.

Senator KENNEDY. We established a set-aside for small business in the area of applied research at the Foundation to take advantage of the energies of smaller business community. It appears to be working quite well.

I am interested in whether the small business programs are helping the Foundation to tap first-rate research capabilities as far as you are concerned.

Dr. ATKINSON. One measure of how well it is working is, first of all, are we receiving a fair number of proposals from the small business community, and second, does the excellence of those proposals warrant funding?

I think the answer is yes on both counts. Working with small businesses, have been quite successful in initiating proposals, and we have been pleased with the quality of the proposals. In this regard, the suggestions we have received from this committee have been very useful.

Senator KENNEDY. Finally, you have been on leave of absence from Stanford University.

Can you tell us how this has been handled in terms of direct or indirect interests of the university in activities from the NSF?

What is your current arrangement with the university?

Do you maintain any financial relationship with Stanford?

Dr. ATKINSON. Senator Kennedy, I am on leave of absence from Stanford University. When I came to the Foundation, it was on a 2-year leave of absence. That 2-year leave will be up this summer.

I have written to the university indicating that I would like to extend my leave of absence. Although nothing yet has been agreed upon, what I hope for is an arrangement where the university will offer me a 1-year continuing leave of absence. The basic idea is that the university will give me a year's notice, if they judge it in their interest to terminate my contract.

The Foundation depends very heavily on individuals who come to NSF from the university for periods of 2 or 3 years and then return to their university. In fact, in many of our science programs, about 20 percent of the program officers are individuals on leaves of absence from their university, with the clear understanding that they will be returning to the university after service at the Foundation.

We view this rotator program as one of the great strengths of the Foundation. These rotators are individuals who are not part of the bureaucratic structure of the Government. They are clearly at the Foundation for a limited period. They help insure close contact for the Foundation and the scientific world. The policy of bringing scientists to NSF from universities for limited periods has been one of the unique strengths of the National Science Foundation.

Of course, we must guard against conflicts of interest and have effective procedures in that area. Those same procedures apply to me and to any members of the National Science Board. We have 24 members to the National Science Board who are Presidential appointees. A good number of those, I would say at least 18, are employed at universities. They also are in the same situation of possibly being in conflict of interest. I believe the procedures the Foundation uses to protect against conflict of interest are quite effective.

I noticed that Dr. Press offered at his confirmation hearing to resign his position at MIT if the committee wished him to do so.

I also would be willing to do so if that were the judgment of this committee. On the other hand, I would be concerned about the precedent that would be established.

Senator KENNEDY. The committee will work its will on that issue. It is obviously a matter of concern to members of the Senate given the Ethics Code that has been established by the administration and also by the Congress.

I think you have identified, particularly in the area of NSF, why it is such a complex and difficult issue and why the basic thrust of our science policy could very well suffer if resignations were required.

Senator SCHMITT. Would the Senator yield?

Senator KENNEDY. Yes.

Senator SCHMITT. I wish to associate myself with your remarks and those of Dr. Atkinson.

I realize that there is some inconsistency in the way we are operating the Government with respect to what Congress has recently done and with respect to what President Carter has asked certain high level members of his administration to do.

But I certainly hope that you will not discard procedures that have worked well in the past. By establishing a good structure for the avoidance of conflict of interest, the National Science Foundation and other technical and scientific organizations in the Government can, in fact, tap the best people in the country, whether they are from the academic world, industry or the private sector. We must do that. I do not think the National Science Foundation or other Government organizations could function if they could only draw on those who had absolutely no potential conflict of interest.

The thing we must do, as I am sure you recognize, is to avoid creating the potential for conflict of interest. I think we can do that. I think we have done that. At the same time it is most important that Congress not do anything to narrow the broad spectrum of talent currently accessible to people like yourself.

Senator KENNEDY. The willingness to resign on the part of both Dr. Press and yourself makes a very strong case for your desire to serve in the public interest. I know you do not make that judgment lightly, and that is perhaps an additional reason why we are fortunate to have your leadership in this position.

I recognize Senator Stafford who is the senior minority member here.

Senator STAFFORD. Thank you very much, Mr. Chairman.

Being aware, Doctor, that you have already served 2 years as Deputy Director and Acting Director of NSF, I do not think I have any reservations about voting for you to continue as the Director of NSF.

Most of the questions that might have occurred to me have already been asked by our chairman.

Since you invited broad questions in your statement, I would just like to ask you one in one area.

As a layman, it appears to me that there are an excess number of Ph. D.s in the country today, and one of whom is one of my children—It makes me wonder about the relevancy of the Ph. D. programs across the country to the needs of research in the various areas that are pertinent to our American society today.

91-750 O - 77 - 3

Would you comment generally on the question I have raised?

Dr. ATKINSON. It is a real problem. There is no question that in the late 1960s and early 1970s, we were overproducing Ph. D's. I think you will find in most schools today a concern about cutting back Ph. D. programs, or at least making graduate students well aware of the job market and trying to make them realistic about the alternatives.

As is often the case, we tend to be slow in responding to these changes. Frankly, I am concerned about what might be called the overproduction of Ph. D.s. On the other hand, I am also concerned about whether we are still drawing the quality of people into our science graduate programs that we did 5 or 6 or 10 years ago.

My own judgment is that there are too many young people in the country who do not regard a career in science as viable in terms of income and security, and that worries me.

The issue you raise is important. But I hope we do not overrespond and, as a result, have a generation of less than the very best and most qualified people entering our college programs for science and engineering. One of the things that bothers me most in government and the universities is our inability to plan and anticipate the future.

For example, we are going to have about a 20-percent reduction in college age students in the next 15 or so years. This is going to have a dramatic impact on universities. We have to plan ahead. Yet, we have been very slow to consider what should be done.

Ten years ago, we knew also about events that were going to be occurring in the grade schools in terms of the need for teachers, and again we were not thoughtful about these trends.

This is a very important concern for the Foundation. The strength of American basic research largely resides in our universities, and our universities must continue to be healthy.

At the same time, we cannot foster programs that are so large that they produce too many Ph. D.'s.

My answer has not been very concise, Senator, but at least you have some remarks regarding your concerns.

Senator STAFFORD. I appreciate your response.

Mr. Chairman, I have no further questions.

Senator HAYAKAWA. Mr. Chairman.

Senator KENNEDY. Senator Hayakawa.

Senator HAYAKAWA. Dr. Atkinson, I would like to ask a little bit of the relationship of the National Science Foundation in relationship to the other involvements with science on the part of the Federal Government. We do have the National Institutes of Health, which is involved in research. We have the Naval Research Laboratory, and I do not know how many other scientific bodies, commitments, the Government has.

I would like to know to what degree your mission differs from the others, to what degree these various outfits are dedicated to basic, to applied research granted the division between those two categories.

Would you tell me something about your relationship to the other scientific communities?

Dr. ATKINSON. Senator Hayakawa, the National Science Foundation maintains very close relationships with all agencies in the Federal Government involved in the support of basic research. That is done

by various types of committee structures and personal exchanges.

I myself have a close relationship with people in other agencies concerned with science and technology. But the important remark, and it is in a recent resolution of the National Science Board, is that NSF believes that each mission agency should engage in a strong program of basic research relevant to the particular mission of that agency.

So we encourage, for example, the fact that the Department of Defense has had a strong program of basic science support in certain areas of computer science, certain areas of chemistry and the like. We are very supportive of the need for a strong program of basic research in the plant sciences in the Department of Agriculture.

I can touch on each agency in this regard. One of the Foundation's roles is to provide a balancing effect to research support, to ensure that all areas of science are being properly supported. If, for example, the Department of Agriculture has a strong program in the plant sciences, our program will be somewhat reduced. If the Department of Defense has a strong program of basic research in the computer sciences, our program will be somewhat reduced. But we continually monitor the basic research going on in the United States and try to ensure that in our judgment, the judgment of the National Science Board, and the judgment of the scientific community an appropriate balance exists in the support of different fields of science.

One of the problems the Foundation has faced over the last 5 or 6 years is that mission agencies, because of tight budgets, have tended to cut back on their support of basic research. As these cuts have occurred, the Foundation has had to shift its funds to pick up certain activities that we consider vital, but that in previous years have been supported by the appropriate mission agencies.

Have I made my point?

Senator HAYAKAWA. Yes.

Thank you very much.

No further questions.

Senator KENNEDY. Senator Hatch.

Senator HATCH. I will defer to my colleague, Senator Schmitt, and if I could reserve the right to ask a few questions.

Senator SCHMITT. Dr. Atkinson, as I indicated in my opening statement, the Commerce, Science and Transportation Committee is charged with general science oversight in the U.S. Senate. We will be exercising that charge in various ways.

I hope that you will keep us informed as you are charged to keep this committee and others informed of your activities, and those that would, in your judgment, be important to our ability as a committee and as individual Senators to conduct this kind of oversight.

Would you do so?

Dr. ATKINSON. Senator, you have my assurance we will do so on a formal basis and also on an informal basis. I would be happy to meet with you or any members of the committee at your request. And we certainly will keep you informed.

Senator SCHMITT. In view of your somewhat specialized background, how do you intend to establish management and philosophical interface with disciplines other than your own, but equally important to the future of this country?

Dr. ATKINSON. Senator, my scientific background is a fairly broadly based one. My first job at Stanford was as a lecturer in applied mathematics and statistics, and my major interests were in mathematics. At the time I viewed my scientific career as moving in that direction.

Some years later, I became interested in computer applications, particularly as they affect the psychological sciences—the area of artificial intelligence, cognitive processes, human memory, and the like.

The main thrust of my work has been in that area, namely mathematical and computer models for human memory and cognition. This is a rather specialized field of interest. But I believe that my background in mathematics and in computer sciences provides a base from which to understand and be involved in a broad range of scientific activities.

On the other hand, it is a mistake to believe that the Director of the Foundation determines NSF priorities. Priorities are set by the policymaking arm of the Foundation, the National Science Board. Those priorities are based on extensive consultation with the scientific community.

In many ways, the Foundation's Director is critical in this priority setting, but in a very real sense it is the scientific community and the National Science Board that set priorities.

The procees is a very public one, and is open to challenge and question. It is this possibility for challenge and continual public reexamination that is the key aspect of our priority setting.

Senator SCHMITT. That is the kind of answer I hoped I would hear.

Let me dig into one specific point which is quite complex and of great concern at the moment.

A number of policies being articulated by the administration are based on assumptions of a particular resource base for energy. Let us take one specific assumption, one which is probably the most difficult because of a lack of basic research in the field and that is the uranium resource base.

There are estimates varying all over the ball park of what that resource may be.

One reason, it seems to me, as a geologist—and I think this is shared by almost all of my colleagues in the geology business at least—there has been very little basic research in the distribution of uranium as an element, in its concentration in potential ore deposits and in how one can search in a realistic and modern way for those ore deposits.

I think it is safe to say with one or two minor exceptions that we know little more about our uranium resources than we did 12, 13, 14 years ago when the uranium boom stopped fairly abruptly.

I realize that the NSF does not have a specific mission in this area. However, you do have the mission of supplying the scientific community with guidance, as well as funds. Through these funds and guidance, the NSF can establish the basic scientific resource base from which the administration and Congress can derive a realistic policy.

I would have to say that I think a poll taken within the geological community associated with ore deposits, would reveal a completely different estimate than that assumed by the administration in the articulation of both breeder reactor policy and the general energy policy expressed by the President. The difference between what the

administration has assumed ,and what the available resource base actually is, would probably be a factor of three to four. That is a very serious difference and could have as a consequence the success or failure of a particular policy.

Would you care to comment?

Dr. ATKINSON. I do not have specific comments. My discussions with geologists and others about the Ford Foundation and other reports have raised a number of issues. I think this is one point that bears careful scrutiny.

Senator SCHMITT. How do you see NSF's role in establishing a really fundamental base of scientific knowledge. I am not talking about the drilling of holes to find uranium, but the base of understanding on how uranium moves in rock and what concentrates it.

What targets have been established for finding new uranium resources?

Dr. ATKINSON. Senator, in all of our programs we depend heavily on advisory panels composed of scientists from the relevant discipline. In your own field, we have an advisory panel for Earth sciences.

An advisory panel will review the research activities supported by the Foundation and elsewhere in the Federal Government and try to determine whether the total Federal program is balanced, whether appropriate expenditures are being made, and the like.

That panel will make recommendations. Those recommendations will then be reviewed by the Assistant Director and then entered into our long-range planning process. Our long-range planning process is rather complicated and would take a long time to describe.

Senator SCHMITT. The thing that concerns me is that ever since October 1973, and within the science community longer than that, the question of energy and mineral resource base estimation, and of the science that is required to make realistic estimates or actually find such resources and turn them into reserves, have been lagging. It obviously has been something that should have a high priority, but has not.

Most probably you are not yet familiar with the structure of NFS by which you will monitor that particular high priority area. It is that structure that concerns me.

The administration has now articulated a policy which, based on the estimates of many people within the community, and I believe the National Academy of Sciences, will assume an unrealistically high estimate of uranium resources and unrealistically low estimate of oil and gas resources. That is a very serious situation.

I hope that the NSF, under your leadership, will start to anticipate some of these areas where basic research is going to be required in order to support possible future policy that the Congress may need to approve or articulate.

Dr. ATKINSON. Senator, I am sorry I am not well prepared in this area. I should have checked with our program officers to determine what we have done in the past—what sort of special thrust we have initiated, whether our advisory panel in earth sciences has recommended particular studies, and the like.

I am not familiar with every program in the Foundation. I would like to provide for the record information about NSF's program in geochemistry. Certainly it is a critical area.

The Foundation depends on input from many sources, particularly the scientific community, but also other sources for identifying problem areas, and then tries to devise procedures for dealing with them. There are many examples where NSF has anticipated problems well in advance and has mounted special programs based on those early warnings.

During the period from fiscal year 1974 through TQ 1976, the NSF geochemistry program awarded from $300,000 to $600,000 per year for fundamental research on the formation of ore deposits. Although small in absolute terms, this amount represents on the average 9.2 percent of the total program funds. The current level of support for this area of research is approximately $500,000 per year.

Only a few of the projects supported deal specifically with uranium deposits. Many are, however, theoretical or experimental studies aimed at elucidating the fundamental physical-chemical processes in the Earth's crust by which certain elements are extracted from their geological hosts, transported, concentrated, and deposited or precipitated as potential economic resources.

The geochemistry program has recognized that this relatively neglected area of research is extremely important, not only because of the relevance to the energy and mineral demands of society, but also because it represents a first-order problem in geochemistry. This will be one of our priority areas for further investments in basic geochemistry.

In addition to the above research project support, the geochemistry program has recently joined ERDA and the USGS in formulating plans for an interagency program on chemical migration in the Earth's crust. This program would directly address the complex problems of mobilization, migration, and deposition of energy and mineral resources, and the partially related problem of the disposal of waste products. It is designed to complement and to extend existing research activity within or funded by the participating agencies. The NSF role in this program would be to fund basic research on fundamental mechanisms and controls of chemical migration in the natural environment, with emphasis on generalized aspects of the overall problem. This interagency program is still only in the planning stage and we expect the area will receive a higher priority in the coming years.

Senator SCHMITT. To take some of the burden off of you, I do not think we in the geologic community have been working with the National Science Foundation and other research arms of the Government. We have not had foresight in this area either and I think that is a problem.

Basic research in these areas has been deemphasized to the betterment, if you will, of other areas of research. It has happened within a period of increased Federal support of some basic research, and a period of diminished private support for this type of research.

Those are actually synergistic events, as you well know. As Federal support increased in the 1950's and the 1960's, private funding went elsewhere, or actually started to disappear.

Now, I hope that one of the approaches of your office in the next few years will be to try to encourage the development of a balance between private research funding and Federal research funding. I think that is extremely important to the viability of an objective and

strong research community in this country and one which is partially free at least from specific dictates of the Federal Government.

Are you sympathetic with that philosophy and will your work in the NSF encourage private foundations to come back into the field where they previously were more active?

Dr. ATKINSON. As a matter of fact, Senator, I am going to be meeting in St. Louis tomorrow with a group of private foundations to review just that issue—the role of private foundations in relation to the Federal Government. It is certainly a major concern.

On the other hand, we can not rely heavily on private foundations as funders for basic research. There are just not enough dollars in the private foundations.

I believe the Government is going to have to be clearly committed to a strong and dominant role in the support of basic research.

Senator SCHMITT. I agree with that completely. It is just that there is a certain objectivity added to the research community in general if some funds are not specifically under the dictates of the Federal Government.

I think most of my colleagues in the academic world would agree with that.

Obviously, the total number of funds required in certain areas is now beyond the capacity of the private sector. You do not build a high energy accelerator with funds that are available in the private sector. That just does not happen. The basic science is becoming much more expensive than it was 50 years ago, and we have to recognize that.

Dr. ATKINSON. As I indicated earlier, I met with a group of French scientists last night, and I am intrigued by a model they are developing quite successfully.

They have, for example, what they refer to as the French Institute for Petroleum Sciences. In essence, this is a freestanding institute with heavy support from various French industries, and some government support. It is targeted at basic research problems in the petroleum field and a particular company will not have a dominant role. Rather the institute will have support from many companies and also receive government funds.

I can think of one or two similar types of institutes in the United States, but not very many. It may be that these types of institutes have to be fostered. It is the sort of program that has been discussed by the National Science Board, and relates to Senator Kennedy's remarks on industry and NSF relations.

Senator SCHMITT. Of course, we do have an excellent example of one of those in this country. That is Electric Power Research Institute in which the Federal Government participates indirectly through TVA contributions.

One of the reasons it has been cautiously growing is the threat of antitrust activity.

But I hope that threat now has diminished to the point where the institute can, in fact, participate in research in a very objective way that is not controlled by any specific company or aggregate of companies.

I am very much encouraged by that and hope that will be part of the discussion at the meeting you described.

Another question that is raised by some of your comments and also by what I alluded to in my opening remarks, is management of the NSF, particularly as it relates to the use of the Science Board for grant approval, project approval and so on.

Now, you may have made some changes in this regard. I apologize if I am somewhat out of date.

In my contact over recent years with NSF, we found what seemed to be a somewhat cumbersome process. Frequency of meetings was not high. Even RANN projects, as I recall, had to be approved by that Science Board. I suspect that is a statutory requirement.

Dr. ATKINSON. In the early days they were. But they are no longer reviewed by the Board.

Senator SCHMITT. That has been changed?

Dr. ATKINSON. Often new programs, when they first come into existence, are set up so that the Board literally reviews every grant made by that program for a brief period of time to assure itselfthat the program is functioning appropriately. That requirement no longer applies to the RANN program.

Right now, we have a new science for citizens program, and the Board will be examining all grants made by that program.

Senator SCHMITT. Do you feel that the National Science Board structure and approval of NSF activities occurs within a viable management scheme, considering the rate at which changes occur in our society?

Dr. ATKINSON. Senator, the National Science Board is a unique body. It is responsible for setting the policies governing the Foundation, but it is also responsible for the well-being and strength of American science. For this latter reason, the Board monitors the various scientific activities in this country and abroad. From that monitoring, it makes recommendations.

The Board's Science Indicators report is just one monitoring device. Frankly, I am amazed at the effectiveness with which the NSB handles its roles. I have observed many advisory groups, but I have never seen a group as dedicated and effective as the National Science Board.

It meets on a monthly basis, and the meetings run several days. They are intense, hardworking meetings, and Board members will prepare for those meetings by many prior days of reading materials, task force meetings and the like.

I am impressed that scientists are willing to give this sort of commitment and time. But I have no question about effectiveness. I am at times amazed by the workload.

The Board, for example, reviews all large proposals. There is a scheme for determining the size of the proposal that is reviewed. When it does review a proposal, it is not just for procedural matters, but also the quality of science.

The Board plays a unique role in the American science enterprise. I hope it will continue.

Senator SCHMITT. I do not want my line of questioning to be taken that I do not feel much the same as you do about the Board. It is just that I have been exposed before specifically within the Government, to situations where there seemed to be a delay in getting things going that needed to get going. The Congress was very much upset

with NSF and NASA for the better part of 2 years, some 2 years ago, because of a particular situation when energy research could not be consummated between the two agencies.

One of the problems seemed to be getting the approval of the Board for that particular project.

I think that experience shook up both agencies sufficiently that maybe that kind of problem will not occur again. I hope that is the case.

I also hope you will continue to look at ways in which you can streamline not only management within your own organization, but also the interagency cooperation that is required in so many of these programs.

Dr. ATKINSON. Senator, the issue of interagency cooperation is a key one in the science enterprise if NSF is to do its job properly. It must build strong bridges to other agencies and groups. We have been fairly successfully. It is a matter that has to be continually examined. I believe that Dr. Press will be very helpful in facilitating these exchanges.

Senator SCHMITT. One final question dealing with education in this country.

In particular, I would like to ask you whether you feel that our educational system, particularly higher education, is creating a sufficient number of people with a general background in engineering and science who can then subsequently become Directors of the National Science Foundation, can become managers of science and technology in our society, whether in government or industry?

My impression has been that we in the scientific community, particularly in the academic community in the past, have failed in the development of people with sufficient ability, background, and experience to enter the kind of job for which you are seeking confirmation.

Would you care to comment?

Dr. ATKINSON. Senator, your statement is one that I could spend an evening discussing, and I am not sure we have the time here. Let me make one remark.

Science education is of special interest to the National Science Foundation. NSF is concerned with science education in this country and the effectiveness of that education.

Just after Sputnik, the Congress asked the Foundation to assume responsibility for improving science education. We did, and since then NSF has had a major effort in the curriculum area.

The effort was targeted at science curricula designed to draw the very best students into science and maintain their interests.

Those curriculum projects have been very successfully. One only needs to look at science textbooks available now in high schools to realize the high level at which science is taught in this country.

If one looks, for example, at test scores of students who have gone through these NSF-sponsored curricula, those test scores have gone up year after year.

On the other hand, if one looks at the vast majority of students entering college and examines their test performance in scientific areas, it has been dropping rather steadily.

My concern is that by increasing the elegance and quality of the science curricula used in our schools, we have made those courses too

difficult. Increasingly, talented students who were not quite prepared to dedicate the time and effort as sophomores and juniors in high school that was necessary to do well in the USF-planned courses have tended to drop out and have not been able to reenter the system later.

I am concerned about the state of science literacy in this country. In a certain sense it is declining in a period when it should be increasing. I am a strong believer in the liberal arts, but liberal arts, in my judgment, means a solid program in the sciences as well as the humanities.

I believe this is a matter of national concern. Certainly we can produce enough Ph. D's to staff our research laboratories. But if we are producing a corps of elite scientists and, at the same time, not insuring an educational system that provides a broad base of science exposure for the typical citizens, then we are failing to meet the educational needs of the country.

The question of science literacy for the average citizen is something that we have to turn our attention to.

Senator SCHMITT. Would you agree that this problem detracts the movement of minorities and women into areas of science and technology as professionals, and that we are probably failing to increase the pool of people from which the Government and industry can select minorities and women?

Dr. ATKINSON. I believe that is one component of the problem.

If students are not given a reasonable exposure to science in high school, if the quality of that instruction is not adequate, it is hard to make up for those deficiencies at some later point.

Senator SCHMITT. Senator Kennedy, I am extremely impressed by the nominee. I wish him well. I certainly am looking forward to working with him and with your committee in those areas where we have mutual concerns.

I hope that we all realize that science and technology are not only the source of some of our problems but that they are the greatest source of potential solutions to these problems.

I know your committee has been working very diligently to insure that these solutions are available to all of the country.

I am sure Dr. Atkinson will support you in that regard. I hope we can support him also.

Thank you very much for your courtesy.

Senator KENNEDY. Thank you very much.

We appreciated your participation. It has been very helpful to us in the committee, and we look forward to working closely with you.

Senator Hatch?

Senator HATCH. I, too, am impressed with you and certainly will support you in this nomination process and for confirmation.

I can probably spend a lot of time talking philosophically with you but, frankly, I am very impressed with you and hope that you will continue these high-quality approaches to the National Science Foundation, being acquainted with you, and I just want you to know I will support you in this nomination.

Dr. ATKINSON. Senator, I very much appreciate those remarks. I hope I have a chance some other time to talk with you in more detail about these matters.

Senator HATCH. I have some ideas that might be somewhat helpful to you if you have the time. I would surely like to see you and would be happy to sit down with you at any time.

Dr. ATKINSON. I would welcome the opportunity to talk with you.

Senator KENNEDY. The nominee has demonstrated, over the time that he has had the responsibility, extraordinary accessibility to members of the committee.

Senator HATCH. That impresses me.

Senator KENNEDY. It has been something that we welcome.

Senator HATCH. I do not want you having Senator Kennedy dominate your time. [Laughter.]

Senator KENNEDY. I want to thank you.

[The prepared statement of Dr. Atkinson and responses to questions submitted to the nominee follow:]

Statement Of
DR. RICHARD C. ATKINSON
Nominee for Director
The National SCience Foundation
Before the Committee on Human Resources
UNITED STATES SENATE
May 2, 1977

Mr. Chairman:

It is a pleasure to appear before you today as President Carter's nominee for Director of the National Science Foundation. The last time I sat at this witness table, Senator Kennedy's Subcommittee was in session and the topic was NSF's Authorization. Today, I look forward to discussing not only the National Science Foundation but anything else the Committee may wish to review.

Two years ago I was appointed Deputy Director of the National Science Foundation and about nine months ago I became its Acting Director when Dr. Stever left the post to become the President's Science Adviser. I have appeared before this Committee twice to discuss NSF Authorizations and a third time last September to accompany Presidential Nominees at their confirmation hearings. On each occasion, I was impressed by the knowledgeable and perceptive questions raised by Committee members and by their willingness to exchange ideas. These dialogues were extremely productive and I hope they will continue.

The most significant change during my two-year tenure at NSF has been a turnabout in the government's attitude

concerning the value and importance of research. For too many years, there was a steady erosion in Federal support for basic research. With the assistance of this Committee, the situation has begun to change. There was real growth in the 1977 budget for basic research and I hope there will be additional growth in the 1978 budget.

If I am confirmed as Director of the National Science Foundation, my main objective will be to insure the continued strength and vitality of basic research. I believe that much of the success of American science--and in turn our technology and industrial progress--stems from the research that NSF has sponsored over the past 26 years. NSF has a distinguished tradition in the support of science--one that must be continued if our citizens are to prosper and if this country is to maintain a leadership role in world affairs.

The National Science Foundation and the scientific community must recognize that society is changing in ways that will influence the direction and conduct of research. The public is aware of the benefits of research, but also increasingly concerned with potential hazards. As science competes for limited Federal resources, the need to explain and justify research will become increasingly important. NSF must be responsive to these societal changes, recognizing not only its responsibility to pursue excellence in research, but also its responsibility to be cognizant of society's concerns and to meet them in an appropriate and public way.

Being Director of the National Science Foundation during the coming years will be an exciting challenge. If the Foundation does the job that Congress has mandated it to do, then the long-term benefits to this Nation and the world will be truly unbounded. I look forward to the challenge and the opportunity to serve science and my country.

RESPONSES TO QUESTIONS SUBMITTED TO DR. ATKINSON

(1) Several bills pending in Congress provide for including the entire National Science Foundation or at least all of the science education activities in a cabinet-level Department of Education. What is your position on transferring: (1) the National Science Foundation, or (2) all the science education activities to a cabinet-level department?

(2) What is your perception of the research and education missions of the National Science Foundation? Do you see these as two separate functions which are housed together in the agency or do you see the two as integrally related to a single national science effort?

I am not in favor of either of the two proposals noted in Question 1. I do not believe that either proposal will serve better to strengthen basic research and education in the sciences.

The fundamental objective of the National Science Foundation is to assure the health of the U.S. scientific enterprise across the total spectrum of scientific fields and disciplines. In discharging this responsibility NSF plays a unique "balancing" role among all Federal science-supporting agencies. I believe this essential purpose of the Foundation is best served by retaining its present status as an independent agency rather than subsuming it under a broader mission-directed department.

Further, I believe the research and education functions of the National Science Foundation are indeed integrally related. The connection between the discovery of knowledge through research and the transmission of that knowledge to scientist and nonscientist alike through the instructional process is a very basic one, historically and functionally. I believe it is essential to the overall health and progress of science and technology that this connection be maintained.

Graduate training cannot be effectively carried out without intensive involvement in research. Correspondingly, the strength of the academic science community is built on the twin functions of research and teaching and the vitality that results from their interdependence. Since advances in knowledge occur so rapidly in science and since science education must accurately reflect current scientific knowledge and techniques, science education can only be kept current when direct and continuous contact is maintained between the research and science education communities.

(3) It is my understanding that most NSF advisory and peer review panels are composed of scientists from industry and the large research universities. Do you think membership on some panels could be expanded to include scientists from other academic institutions?

Membership on most National Science Foundation advisory committees and panels includes scientists from other academic institutions in addition to the large research universities. Members of advisory and peer review panels at NSF are chosen to be fairly balanced in terms of the points of view represented and the functions to be performed, as specified in the Federal Advisory Committee Act. We try to achieve reasonable balance based on criteria such as individual qualifications, balance of speciality interest, user representation, geographic distribution, institutional representation, minority and female representation, and age distribution. We will continue to examine our practices to assure that reasonable balance is maintained.

(4) Last year a survey of the personnel in the Science Education Directorate found significant dissatisfaction on the part of the employees, when compared with other directorates of the Foundation. Has a follow-up survey been completed and do you have any steps in mind to improve morale among the Science Education staff?

A follow-up survey has been completed and all returns were sent to the Civil Service Commission for processing. The Foundation's Division of Personnel and Management (DPM) has recently received the computer runs and is conducting an analysis of the results. While it is not yet complete, I have asked DPM for all available information on the Directorate for Science Education survey. The preliminary results indicate a marked improvement over the earlier survey. In four of the six major areas surveyed (Job Information, Performance Evaluation, and Training; Rewards and Promotions; Services, Benefits, and Working Conditions; and Output and Organizational Effectiveness) there was improvement of 10 percentile points or more. While still lower than we would wish, the average percentile for the category "Job Information, Performance Evaluation and Training" more than doubled. There were no gains in either the "Work Organization and Manpower" or the "Human Relations" categories. Overall there was a gain of approximately eight percentile points. We shall carefully study the final results for their implications for specific actions which may be taken.

While the early results indicate there are still areas which need improvement, the results are gratifying in that they definitely show improvement.

91-750 O - 77 - 4

(5) What do you view as the scope and function of NSF support for undergraduate science education? What is the proper balance of support to the various types of institutions providing undergraduate education -- universities, public and private four-year colleges, community and junior colleges?

The scope and function of NSF support for undergraduate science education is to assist the academic community to (1) identify and conserve scientific talent in the system, (2) enable faculty to make their teaching more current, scientifically accurate and responsive to employment needs, (3) make available the most up-to-date and effective materials and techniques of instruction in the sciences, (4) encourage constant evaluation and updating of instructional programs in science in 2-year and 4-year institutions, and (5) encourage the nonscience undergraduate student to obtain sufficient science background to provide for an appreciation and understanding of the role and contribution of science in today's society. Because of the variety of objectives and the variety of situations within which they can be achieved, it is impossible to predict what a proper balance of support should be. Rather, objectives are stated in the announcements of the various programs. Having received proposals in response to these announcements from all the above types of institutions, NSF determines proper balance by the choice of the most meritorious of the ideas proposed to achieve these objectives through the peer review process.

(6) How do you view the importance of science education as compared with other functions of NSF? Do you think it has been getting adequate emphasis or would you propose increases or decreases in levels of support? What do you see as future priorities for science education?

I view the importance of science education as coequal with the other functions of NSF. The adequacy and quality of the Nation's future scientific research talent is directly linked to the quality of the total educational system that produces that talent. I believe that it is now on the increase as noted in my testimony and the testimony of Dr. Harvey Averch and several Members of the National Science Board before the Congress this year.

Future priorities include a focus on equality of opportunity for a broader range of individuals and institutions and a broadened understanding of the role of science in society for all people.

(7) What are your views on the role of NSF in supporting occupational and technical education courses, including the engineering technologies -- courses designed primarily for entry into the labor market rather than leading to a baccalaureate or higher degree?

I believe NSF has an important role to play in the support of innovative occupational education based on new technological developments or advances, although primary responsibility for vocational education rests with other Federal agencies. NSF has in the past considered college-level activities of this nature, typically leading to an Associate in Arts degree, eligible for support in the Directorate for Science Education and will continue to do so. Currently, such activities are eligible as the focus of a proposal in the following program areas:

Comprehensive Assistance to Undergraduate Science Education Program;

Undergraduate Instructional Improvement Program;

Development in Science Education Program.

In addition, a faculty member engaged in teaching science or engineering in such a curriculum in a 2-year or 4-year college or university is eligible to apply for an award in the Science Faculty Short Courses Program.

(8) The community and junior colleges believe they are being short-changed in NSF science education support -- they maintain that with one-third of total undergraduate students and one-half of entering freshman students their NSF support should be much greater than it now is. Do you see this as a problem? What steps do you think NSF should take to correct this and other imbalances in support -- would you advocate positive outreach to encourage the participation of types of institutions that are now underrepresented?

During the past several years greater numbers of community and junior colleges have participated in NSF science education programs as more programs have broadened their eligibility criteria to include this important group of institutions. In addition, the Foundation has taken steps to include greater representation of science faculty of community and junior colleges on peer review panels.

The Advisory Committee for Science Education, the Science Education Directorate's primary body charged with program oversight, has regularly had representation from this group of institutions. Currently, Dr. Bernard Luskin, President, Coastline Community College, Fountain Valley, California, is a member of this group.

I believe NSF is aware of and has been responsive to the concerns expressed by community and junior colleges. We will, however, continue to reexamine our programs in science education to assure adequate and appropriate participation by such institutions.

(9) In a series of papers prepared for the Joint Economic Committee on "Priorities and Efficiency in Federal Research and Development," (October 29, 1976), Dr. William Carey presents a proposition that a most likely pay off approach to addressing the science and technology needs of state and local governments could be a program based on leveraging the massive current Federal R&D expenditure to gain a greater yield to state and local governments. Carey suggests that one condition for carrying out such an effort would be if:

> "these jurisdictions could participate at low cost and zero risk in the early and middle stages of Federal R&D program formulation and project design, with expectations of results which are keyed to their adoption and benefit. If anything has been learned about "technology transfer," (Carey suggests) it is that the user must get in on the act at the start of the R&D, help to define the questions to be investigated, formulate both the end product (such as final user costs), and participate in evaluation and testing. If these conditions are met, there is a fighting chance that there will be a transfer of technology. The problem is that they seldom are met, and the transfer does not come off."

As to the issue of Federal policy leadership, Carey states:

> "Federal policy leadership to integrate State and local governments into the R&D enterprise has been centered in the National Science Foundation, where it has lived dangerously and survived by ingenuity. With modest resources but a lively imagination and an inclination towards risk, the Office of Intergovernmental Science Programs has fielded a striking menu of policy research studies, prototype State/local science and technology centers, and Federal-State working conferences on requirements/supply problems."

My question is ... what are your feelings or intentions, relative to the application of Science and Technology, to meet state and local needs?

I feel that science and technology can contribute significantly to the solution of many of the problems facing state and local governments. The significant issues involve identifying those problem areas in which science

and technology can be applied in cost-effective ways; ensuring that Federal R&D in those areas is responsive to the needs and priorities of state and local governments; formulating policies and developing organizational arrangements that will facilitate state and local government access to the products of Federally sponsored R&D; and designing and implementing programs that facilitate the appropriate use of science and technology in solving state and local problems.

NSF has an active and successful Intergovernmental Science Program which has had a major impact on policy formulation, administrative management, and program operations in a number of states and local communities in terms of their understanding of the potential of science and technology for meeting their needs. In addition, NSF programs of applied and policy research can contribute to resolution of problems faced by state and local governments, and to knowledge of how technologies are developed and applied to state and local problems and how Federal policies affect state and local government abilities to apply science and technology.

I am a member of the Intergovernmental Science, Engineering, and Technology Advisory Panel of the Office of Science and Technology Policy which has been set up to deal with many of the science and technology issues faced by state and local governments. I intend to work closely with this Panel and feel it has great potential for fostering linkages between Federal R&D and the needs of state and local governments for scientific and technical information and advice.

(10) In the same series of papers prepared for the Joint Economic Committee, Dr. Carey suggests that the Federal laboratories and research centers could, and should, be assembled into a unified science and technology system, which would have a multi-purpose use which would include functioning as centers of technical assistance for state and local governments' use. This is a position which has also been endorsed by public interest groups such as the U.S. Conference of Mayors. What are your views on this?

I view Federal laboratories as one of a number of potential resources that state and local governments can draw upon as they seek to apply science and technology to their problems. NSF will continue to create and strengthen linkages among the laboratories, and between them and state and local governments, as ways of exploring appropriate dimensions of the laboratories' role. These activities are in accord with the Foundation's more general functions of strengthening institutional linkages between Federal laboratories as sources of technology and technological expertise and state and local governments, and building a knowledge base for future policy decisions concerning relationships between Federal laboratories and state and local governments.

(11) I understand that an outside task force has been appointed by you, chaired by Dr. John Whinnery of the University of California, to conduct a study of the RANN effort at NSF. Could you elaborate on this activity and what do you expect to gain from this study?

Who are the members of this task force, and are there any from the "user" community, specifically "state and local government" who serve as members of this group?

Will this study include an evaluation of the Intergovernmental program?

The Science Applications Task Force, chaired by Dr. John R. Whinnery of the University of California, was established in December 1976 for a one-year period to provide advice and assessments and make recommendations to the Foundation's Director on NSF science applications programs and related organizational and management issues. While the Task Force will not be evaluating the NSF Intergovernmental Science Program as such, the Task Force will be considering the role of that program in the total spectrum of NSF science applications activities. The Task Force is to consider whether the elements of NSF's existing science applications programs should be altered to improve overall effectiveness and to recommend changes in Foundation management approaches and organizational structures better to carry out these activities.

The diverse membership of the Task Force includes members from state and local government and representatives of other user communities. A list of the Task Force members is attached.

SCIENCE APPLICATIONS TASK FORCE MEMBERSHIP LIST

Dr. William Bevan
Department of Psychology
Duke University
Durham, NC 27706
Phone: 919-684-4395

Dr. James Bliss
Telesensory Systems, Inc.
1889 Page Mill Road
Palo Alto, CA 94304
Phone: 415-493-2626

Dr. John A. Blume
President
John A. Blume Associate Engineers
130 Jessie Street
Sheraton Palace Hotel
San Francisco, CA 94105
Phone: 415-397-2525

Dr. Arthur M. Bueche
Vice-President
Research and Development
General Electric Company
P.O. Box 8
Schenectady, NY 12301
Phone: 518-385-8331

Dr. N. Bruce Hannay
Vice-President
Research and Patents
Bell Telephone Laboratories
Murray Hill, NJ 07974
Phone: 201-582-4211

Dr. Stephen J. Lukasjk
Senior Vice-President
RAND Corporation
1700 Main Street
Santa Monica, CA 90406
Phone: 213-393-0411

Dr. Robert Marshall
Dean
College of Engineering
University of Wisconsin - Madison
1513 University Avenue
Madison, WI 53706
Phone: 608-262-3481

Dr. Evelyn Murphy
Secretary
Environmental Resources
20th Floor - 100 Cambridge St.
Boston, MA 02202
Phone: 617-727-7700

Dr. John M. Neuhold
Department of Wildlife Science
Director
Ecology Center
Utah State University
Logan, UT 84321
Phone: 801-752-4100 x7411

Dr. Joseph M. Pettit
President
Georgia Institute of Technology
Atlanta, Georgia 30332
Phone: 404-894-5051

Ms. Claire Rubin
Director of Contract Research
International City Management Association
1140 Connecticut Avenue, NW
Washington, D.C. 20036
Phone: 202-293-2200

Dr. Eleanor B. Sheldon
President
Social Science Research Council
605 3rd Avenue
New York, NY 10016
Phone: 212-557-9521

Dr. Klaus D. Timmerhaus
Engineering Research Center
University of Colorado
Boulder, CO 80302
Phone: 303-492-7427

Dr. Sylvan H. Wittwer
Agricultural Experiment Station
101 Agricultural Hall
Michigan State University
East Lansing, MI 48824
Phone: 517-355-0123

Dr. John R. Whinnery
Department of Electrical Engineering and Computer Sciences
University of California - Berkley
Berkley, CA 94720
Phone: 415-642-1030

(12) The National Science Board is presently made up of members primarily from academia, yet through RANN, NSF supports studies that are aimed at state and local government. This Committee has for several years requested that Board membership be expanded to include individuals from state and local government. Would you in your capacity as Director recommend such an expansion of membership?

The National Science Foundation Act states that "persons nominated for appointment as members of the Board (1) shall be eminent in the fields of the basic, medical, or social sciences, engineering, agriculture, education, research management, or public affairs; (2) shall be selected solely on the basis of established records of distinguished service; and (3) shall be so selected as to provide representation of the views of scientific leaders in all areas of the Nation."

The membership of the National Science Board is determined by a complex process specified in the NSF Act, involving consultation with many concerned scientific and educational organizations. Each year, careful consideration goes into preparing recommendations for transmission to the White House. As Director and Member ex officio, I can have only a limited impact on this process.

The National Science Foundation has many sources of advice and counsel in managing its programs. In addition to the National Science Board there now exists a National Science Foundation Advisory Council. The Council has one-fourth of its members from nonscientist groups, including industry, state and local government, news media, and the public. The Foundation is also assisted by various advisory committees and panels in particular program areas as well as by ad hoc reviewers of proposals. I feel that these multiple sources of advice should be taken into account in considering whether there is sufficient input from any one source.

(13) The RANN Advisory Panel, I understand, has been appointed by Dr. Eggers. One of the functions of this panel is to provide guidance to the RANN Directorate as to relevant research needs of state and local government. Are state and local elected officials members of this panel?

The Advisory Committee for Research Applications Policy has among its members three individuals who have had distinguished careers in state and local government. Appointment of these three is consistent with the Foundation's concern for involvement of the user community in its policy and planning activities. These individuals have recently left public service but remain involved in the issues of state and local government. These three individuals are: Dr. Frank C. DiLuzio, former Staff Science Adviser to the Governor of New Mexico; Mr. David M. Bartley, former Speaker of the Massachusetts House of Representatives; and Dr. Edward K. Hamilton, former Deputy Mayor of the City of New York.

(14) If the SSET program is successful, this Committee will be considering an expanded program to provide support for implementation of the state plans. Could the NSF RANN Directorate provide necessary administrative support to oversee such a program?

Is consideration being given to putting the implementation stage in another agency, for example, the Department of Commerce?

While the Directorate for Research Applications could provide necessary administrative support within the current Intergovernmental Science Program organization, any substantial increase in the State Science, Engineering, and Technology Program (SSET) would require additional staff. Implementation of the study grant phase of the SSET Program to date has proceeded with heavy reliance on the resources of the National Governors' Conference and the National Conference of State Legislatures. While a good beginning has been made, a heavy commitment of NSF staff resources would be required for implementation of an expanded program beyond the study grant phase.

As I understand it, the objective of an expanded implementation component of the State Science, Engineering, and Technology Program would be to support the development and institutionalization of mechanisms in the executive and legislative branches of state governments to integrate scientific, engineering, and technological resources into the policy formulation and decision-making processes of those governments. One important consideration in the implementation of such an expanded program by the Federal Government is the issue of perceived mission neutrality by the agency administering the Program. I believe the Foundation can meet this significant criterion. There are other options that could be considered, including the Department of Commerce. I believe we will be in a better position to consider this issue after analysis of the reports from the study grants.

(15) Legislation written over the past three years and directed to its operation have advised the Foundation to (a) consult minority organizations regarding the increased representation of minorities in science and engineering and (b) to seek and incorporate minority scientists and engineers into the Foundation committees, peer review process, advisory panels and similar other consultant services. With respect to this advice and as it concerns Chicanos and Native Americans, what has the Foundation accomplished during your tenure as Acting Director on this matter?

Pursuant to P.L. 94-471, Section 7(c)(3) and the Joint Explanatory Statement of the Committee of Conference, the NSF established an Advisory Committee on Minority Programs in Science Education. NSF has further, as directed by P.L. 94-471, consulted with individuals and groups which have been active in seeking greater recognition of the scientific and technological capabilities of minorities. A Public Meeting of Experts on Ethnic Minority Participation in Science and Engineering was held in January.

The National Science Board has also carefully considered this area and has established a standing Committee on Minorities and Women in Science. A separate hearing on the subject was held on February 23, 1977, by a Subcommittee of the House Committee on Science and Technology at which Dr. Averch testified. A copy of his testimony is attached. A concerted effort has been made by all directorates to increase the participation of minorities on our peer review and other advisory groups.

STATEMENT OF DR. HARVEY AVERCH
ASSISTANT DIRECTOR FOR SCIENCE EDUCATION
NATIONAL SCIENCE FOUNDATION
BEFORE THE
SUBCOMMITTEE ON SCIENCE, RESEARCH, AND TECHNOLOGY
COMMITTEE ON SCIENCE AND TECHNOLOGY
AUTHORIZATION HEARINGS ON MINORITY GRADUATE CENTERS
HOUSE OF REPRESENTATIVES
FEBRUARY 23, 1977

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

Although the purpose of this hearing is to discuss a specific program--Minority Graduate Centers--I would like to begin by discussing the general problem of underrepresentation of minorities in science and engineering. I will also try to highlight differences in perception about the best ways to solve the problem. To provide context for minority graduate centers I will describe our overall program for 1978.

Of the approximately 500,000 practicing scientists in the U.S. today, only 5 percent are from minority groups. Half of those are Oriental and most of the rest are Black. Out of 840,000 engineers, less than 3.5 percent are from minority groups and two-thirds of the 3.5 percent are Oriental. As a nation, we have committed ourselves to equal

OPPORTUNITY AND IMPROVED REPRESENTATION OF MINORITIES IN EVERY ECONOMIC SECTOR. SCIENCE AND THE SCIENTIFIC LABOR FORCE ARE NO EXCEPTION.

THE UNDERREPRESENTATION AMONG PRACTICING SCIENTISTS AND ENGINEERS HAS BEEN MAINTAINED FOR A LONG PERIOD OF TIME. IT WILL NOT CHANGE QUICKLY DESPITE OUR BEST EFFORTS. THIS CAN BE SEEN BY THE EDUCATIONAL FLOW PATTERNS OF MINORITY STUDENTS AND BY THE ENROLLMENT PATTERNS OF MINORITY GRADUATE STUDENTS IN SCIENCE AND ENGINEERING. WHERE 85 OF EVERY 100 WHITE FIRST-GRADERS WILL FINISH HIGH SCHOOL, THE CURRENT FIGURE IS 76 FOR BLACKS, 60 FOR MEXICAN-AMERICANS AND NATIVE AMERICANS, AND 42 FOR PUERTO RICANS. OF THOSE 85 WHITES FINISHING HIGH SCHOOL, 5 WILL GO ON TO EARN A BACCALAUERATE DEGREE IN SCIENCE AND ENGINEERING. THE COMPARABLE FIGURE IS 3.5 FOR BLACKS, 1.5 FOR MEXICAN-AMERICANS, 1.5 FOR NATIVE AMERICANS, AND LESS THAN 1 FOR PUERTO RICANS. THE MOST RECENT FIGURES SHOW THAT BLACKS, MEXICAN-AMERICANS, NATIVE AMERICANS, AND PUERTO RICANS CURRENTLY REPRESENT ONLY 3.5% OF GRADUATE STUDENTS ENROLLED IN SCIENCE AND ENGINEERING AND RECEIVE THE SAME PROPORTION OF DOCTORATES AWARDED.

MANY FACTORS CONTRIBUTE TO THE LOW LEVEL OF PARTICIPATION. SOME ARE ECONOMIC; SOME ORGANIZATIONAL; SOME CULTURAL. SOME OF THE FACTORS THAT RESEARCH HAS IDENTIFIED ARE: LOW FAMILY INCOME, LOW ACADEMIC SELF CONFIDENCE, OVERUSE OF STANDARDIZED

TESTS TO SCREEN OUT MINORITY APPLICANTS, INADEQUATE COLLEGE PREPARATION FOR GRADUATE WORK, AND THE SCARCITY OF MINORITY SCIENTISTS AS ROLE MODELS. MY LIST IS NOT EXHAUSTIVE, BUT IS MEANT TO ILLUSTRATE THAT IF WE ARE TO HONOR OUR COMMITMENT, MANY THINGS WILL HAVE TO BE DONE. SOME OF THEM ARE WITHIN THE DOMAIN OF NSF; SOME OF THEM ARE WITHIN THE DOMAIN OF THE FEDERAL GOVERNMENT; SOME CAN ONLY BE ADDRESSED BY OUR SOCIETY AS A WHOLE. THE QUESTION BEFORE US TODAY IS, "WHAT ARE THE BEST WAYS IN WHICH NSF CAN MAKE A SIGNIFICANT INCREMENTAL CONTRIBUTION TO HONORING A NATIONAL COMMITMENT?"

MINORITY STUDENTS, SCIENTISTS, AND INSTITUTIONS HAVE ALWAYS BEEN ELIGIBLE TO COMPETE IN THE FULL SPECTRUM OF PROGRAMS SUPPORTED BY NSF. HOWEVER, THE UNDERREPRESENTATION OF MINORITIES IN SCIENCE AND ENGINEERING I DISCUSSED EARLIER WAS REFLECTED THROUGHOUT MOST OF THE 1950'S AND 1960'S IN THE LOW PROPORTION OF NSF FUNDS THAT WENT TO MINORITIES.

IN FY 1972, WE BEGAN THE MINORITY INSTITUTIONS SCIENCE IMPROVEMENT PROGRAM TO IMPROVE THE QUALITY OF SCIENCE EDUCATION AT PREDOMINANTLY MINORITY INSTITUTIONS. INITIALLY THIS PROGRAM WAS LIMITED TO HISTORICALLY BLACK COLLEGES. IN 1974, ELIGIBILITY WAS EXTENDED TO ALL INSTITUTIONS WITH PREDOMINANTLY MINORITY ENROLLMENTS. THIS ENABLES US TO GET BETTER GEOGRAPHIC SPREAD AND TO REACH OTHER UNDERREPRESENTED

91-750 O - 77 - 5

MINORITIES. THERE ARE NOW ABOUT 212 INSTITUTIONS WHICH ARE ELIGIBLE TO RECEIVE SUPPORT THROUGH MISIP, AND 87 OF THESE HAVE RECEIVED AWARDS THROUGH FY 1976.

MORE RECENT ACTIVITIES AIMED AT THE PROBLEM OF UNDER-REPRESENTATION OF MINORITIES HAVE INCLUDED SUPPORT OF STUDIES AND EXPERIMENTAL PROJECTS TO IDENTIFY AND OVERCOME BARRIERS TO SCIENTIFIC CAREERS AND, THE MINORITY INSTITUTIONS TRAINEE-SHIPS PROGRAM.

IN FY 1977, WE ARE ALSO GIVING SYSTEMATIC ATTENTION TO MAKING OUR TALENT IDENTIFICATION PROGRAMS-- STUDENT SCIENCE TRAINING AND UNDERGRADUATE RESEARCH PARTICIPATION--MORE RESPONSIVE TO THE NEEDS OF MINORITIES.

PROGRAM PLAN

OUR OVERALL BUDGET REQUEST FOR FY 1978 IS $75.7 MILLION. OF THIS TOTAL, ABOUT $8 MILLION IS DIRECTLY TARGETED SUPPORT FOR MINORITY SCIENCE EDUCATION. THESE FUNDS ARE SHOWN IN THE FOLLOWING TABLE: -

5

ETHNIC MINORITIES IN SCIENCE AND ENGINEERING
OBLIGATIONS BY PROGRAM ELEMENT

	Actual FY 1976	Budget Request FY 1977	Current Plan FY 1977	Estimate FY 1978	Difference FY 1978/77
High School and College Student Programs for Minorities	-0-	-0-	$ 500,000	$1,000,000	-0-
Minority Institutions Graduate Traineeships	-0-	$ 900,000	900,000	1,000,000	$ 100,000
Minority Institutions Science Improvement	$4,742,521	5,000,000	5,070,000	5,000,000	-70,000
Minority Centers for Graduate Education	-0-	-0-	800,000	1,000,000	200,000
TOTALS	$4,742,521	$5,900,000	$7,270,000	$8,000,000	$ 230,000

TARGETED FUNDS HAVE ALMOST DOUBLED BETWEEN FY 1976 AND 1978.

IN ADDITION, THERE ARE ACTIVITIES IN OUR OTHER MANPOWER AND RESOURCES DEVELOPMENT PROGRAMS ORIENTED TOWARD MINORITY STUDENTS. I ESTIMATE THE TOTAL SUPPORT FOR MINORITIES FROM THESE PROGRAMS WILL BE ABOUT 1 MILLION DOLLARS.

THE TABLE ILLUSTRATES THAT WE ARE NOW BEGINNING TO WORK AT MOST EDUCATIONAL LEVELS. THEY ADDRESS THREE MAJOR PROBLEMS: TALENT IDENTIFICATION, CONSERVATION OF TALENT WITHIN THE SCIENCE EDUCATION SYSTEM, AND INCREASING THE EDUCATIONAL RESOURCES AVAILABLE FOR THE TRAINING OF MINORITY SCIENTISTS AND ENGINEERS. THERE ARE A NUMBER OF IMPORTANT ISSUES THAT WE MUST RESOLVE IN THE FUTURE.

- WHAT LEVEL OF RESOURCES IS SUFFICIENT TO MAKE A DIFFERENCE? HOW DO WE RELATE NSF RESOURCES TO THE RESOURCES OF HEW AND OTHER FEDERAL AGENCIES?
- WHAT SHOULD BE THE DISTRIBUTION OF OUR RESOURCES AT DIFFERENT LEVELS OF EDUCATION--PRE-COLLEGE, COLLEGE, AND GRADUATE? FOR EACH LEVEL, WHAT KINDS OF PROGRAMS ARE FAIR AND EFFICIENT?
- WHAT SHOULD BE THE DISTRIBUTION BETWEEN DIRECT ASSISTANCE TO STUDENTS AND ASSISTANCE TO INSTITUTIONS?
- WHAT IS THE APPROPRIATE BALANCE BETWEEN RESOURCES FLOWING TO PREDOMINANTLY MAJORITY INSTITUTIONS WHICH NONETHELESS ENROLL LARGE NUMBERS OF MINORITY STUDENTS AND TO INSTITUTIONS WHOSE MAIN PURPOSE IS THE EDUCATION OF MINORITY STUDENTS?

AS I NOTED IN MY TESTIMONY ON FEBRUARY 9, DECISIONS ON THESE ISSUES INVOLVE VALUES AND BELIEFS AS WELL AS EMPIRICAL EVIDENCE AND STUDIES ABOUT COSTS AND EFFECTIVENESS. SINCE

THE CONGRESS AUTHORIZED A PLANNING EFFORT FOR MINORITY GRADUATE CENTERS, OUR CONTACTS WITH MINORITY SCIENCE EDUCATORS AND MINORITY GROUPS HAVE ACCELERATED. TO HELP US RESOLVE THE ISSUES, WE HAVE SET UP AN ADVISORY COMMITTEE ON MINORITY PROGRAMS IN SCIENCE EDUCATION. ALTHOUGH THE COMMITTEE IS CONCENTRATING ITS EFFORTS INITIALLY ON APPROPRIATE DESIGNS FOR THE MINORITY GRADUATE CENTERS, WE EXPECT IT TO ADDRESS THESE BROADER ISSUES AS WELL.

IN FACT, I BELIEVE THAT CLARIFICATION AND RESOLUTION OF THESE ISSUES ARE SO IMPORTANT THAT I AM COMMITTING THE SCIENCE EDUCATION DIRECTORATE TO DELIVER TO THE CONGRESS A FULL-SCALE ANALYSIS BEFORE OUR NEXT ROUND OF CONGRESSIONAL HEARINGS. THIS ANALYSIS WILL DESCRIBE THE VARIOUS BELIEF AND VALUE SYSTEMS CONCERNING MINORITY SCIENCE EDUCATION AND WILL CONTAIN AS MUCH SYSTEMATIC EVIDENCE ON BENEFITS AND COSTS OF ALTERNATIVE PROGRAMS AS WE CAN GATHER. IN THIS EFFORT WE WILL OBTAIN THE VIEWS OF THE INTERESTED PUBLIC IN MUCH THE WAY WE OBTAINED VIEWS IN THE SCIENCE FOR CITIZENS PROGRAM.

LET ME NOW TURN TO SPECIFIC PLANS FOR THE MINORITY GRADUATE CENTERS.

THE JOINT EXPLANATORY STATEMENT OF THE COMMITTEE OF THE CONFERENCE DIRECTED THAT THE FOUNDATION ESTABLISH THE PROGRAM OF MINORITY CENTERS FOR GRADUATE EDUCATION IN SCIENCE

AND ENGINEERING. WE WERE ASKED TO MAKE PLANNING AND STUDY GRANTS TO DEVELOP MINORITY GRADUATE CENTERS AND TO STUDY THE NEED FOR OTHER MEASURES AT THE GRADUATE LEVEL. WE WERE TO MAKE AN ASSESSMENT OF FEASIBILITY AS WELL.

OUR THINKING THUS FAR ON THE MINORITY GRADUATE CENTER PROGRAM HAS BEEN INFLUENCED BY INPUT FROM THE NATIONAL SCIENCE BOARD (PARTICULARLY ITS SUBCOMMITTEE ON MINORITIES AND WOMEN), A CONFERENCE WE HELD ON JANUARY 14-15 WITH REPRESENTATIVES OF GROUPS INVOLVED IN SEEKING GREATER RECOGNITION OF THE SCIENTIFIC AND TECHNICAL CAPABILITIES OF MINORITIES, FROM OTHER EXPERTS WHO HAVE COMMUNICATED TO THE CONGRESS AND THE NSF ABOUT THE PROGRAM, AND FROM INDIVIDUALS PROPOSED AS MEMBERS OF OUR ADVISORY COMMITTEE.

IT IS IMPORTANT TO BE CLEAR ABOUT THE ASSUMPTIONS BEHIND THIS PARTICULAR PROGRAM. IN A TIME OF SCARCE RESOURCES FOR GRADUATE EDUCATION, MANY GENERAL ARGUMENTS ARE PROPOSED ABOUT THE NEED TO SUSTAIN OUR GRADUATE SCHOOLS.

FROM THE LEGISLATION AND OUR PUBLIC INPUT, A CENTER'S PURPOSE IS TO ASSIST IN PROVIDING MINORITIES EASIER ACCESS TO QUALITY SCIENCE TRAINING. THEY WOULD THEN ATTRACT A SUBSTANTIAL NUMBER OF MINORITY STUDENTS AND FACULTY WHO WOULD HAVE THE OPPORTUNITY TO WORK AND STUDY TOGETHER. SUCH

AN INSTITUTIONAL SETTING, IT IS BELIEVED, WOULD ATTRACT AND HOLD LARGE NUMBERS OF MINORITY GRADUATE STUDENTS AND, ULTIMATELY, INCREASE MINORITY REPRESENTATION IN SCIENCE AND ENGINEERING CAREERS.

RESPONSE TO THE GENERAL IDEA OF CENTERS AND OF OTHER ALTERNATIVES TO AUGMENT SUPPORT FOR MINORITY GRADUATE STUDENTS HAS BEEN FAVORABLE. WE HAVE, HOWEVER, FOUND IMPORTANT CONCEPTUAL DIFFERENCES CONCERNING THE NATURE AND SCOPE OF CENTERS. ONE POINT OF VIEW HOLDS THAT THEY SHOULD BE BASED AT ESTABLISHED, TRADITIONAL INSTITUTIONS FOR MINORITY STUDENT EDUCATION, AND NOT ONLY PROVIDE ROLE MODELS FOR MINORITY SCIENTISTS BUT ALSO BE AN INTEGRAL PART OF A MINORITY COMMUNITY. STUDENTS FROM THE MINORITY COMMUNITY, IN THIS VIEW, SHOULD BE EDUCATED IN A RESPECTED INSTITUTION WHICH IS PART OF THE COMMUNITY. STUDENTS WOULD USE THEIR SKILLS AND PROVIDE LEADERSHIP IN THE COMMUNITY. ANOTHER POINT OF VIEW HOLDS THAT CENTERS SHOULD BE BASED AT PREDOMINANTLY MAJORITY INSTITUTIONS WITH EXTENSIVE EXISTING GRADUATE PROGRAMS, WHICH HAVE ALSO DEMONSTRATED A COMMITMENT TO MINORITY EDUCATION. SUCH CENTERS, IN THIS VIEW, WOULD NOT HAVE TO BE LOCATED AT TRADITIONAL MINORITY INSTITUTIONS.

ANOTHER CONCEPTUAL DIFFERENCE HAS TO DO WITH THE REQUIREMENT THAT CENTERS OPERATE DOCTORAL PROGRAMS. THIS IS

CURRENTLY IN THE LEGISLATION. ONE POINT OF VIEW HOLDS THAT DEVELOPMENT OR EXPANSION OF DOCTORAL PROGRAMS MUST BE A CENTRAL ELIGIBILITY CRITERION. A SECOND POINT OF VIEW HOLDS THAT EMPHASIS ON INSTITUTIONS WITH DOCTORAL PROGRAMS MIGHT DISCRIMINATE AGAINST MINORITIES INTERESTED IN ADVANCED CAREERS IN SCIENCE, BUT NOT ACADEMIC CAREERS.

IN DEVELOPING OUR GUIDELINES FOR THE FY 1977 PROGRAM FOR MINORITY GRADUATE CENTERS WE HAVE BENEFITTED FROM A WIDE RANGE OF THOUGHTFUL INPUT. WE HAVE TRIED TO STRIKE A BALANCE BETWEEN DIVERSE AND OFTEN COMPETING VIEWS AND VALUES. WE HAVE DECIDED THAT WE CANNOT FIRMLY SETTLE A NUMBER OF THE SUBSTANTIVE ISSUES WITHOUT EVALUATING ACTUAL PROPOSALS, EXPECIALLY THOSE CONCERNING LEVELS OF SUPPORT.

ACCORDINGLY, OUR GUIDELINES FOR FY 1977 OPEN THE COMPETITION FOR PLANNING GRANTS TO ALL INSTITUTIONS WHICH OFFER DOCTORAL PROGRAMS OR ARE IN THE PROCESS OF DEVELOPING THEM AND WHICH HAVE A MINIMUM TOTAL MINORITY STUDENT ENROLLMENT OF 800. WE ASK INSTITUTIONS TO GIVE US EVIDENCE ABOUT THEIR COMMITMENT TO MINORITY GRADUATE STUDY AND INFORMATION ON THE NUMBER OF STUDENTS THEY CURRENTLY SERVE AND BELIEVE THEY CAN ATTRACT. IN FY 1978, WE EXPECT TO MAKE SEVERAL PILOT PROJECT AWARDS. THESE WILL BE OF 12-36 MONTHS' DURATION. AT THE END OF THIS TIME, WE SHALL MAKE AN

EVALUATION AND FUND THOSE INSTITUTIONS THAT HAVE MADE SATISFACTORY PROGRESS FOR A MAXIMUM PERIOD OF THREE MORE YEARS. SOME INSTITUTIONS MAY BE ABLE TO COMPETE FOR FULL SUPPORT WITHOUT PLANNING GRANTS. THUS, WE PLAN TO RUN AN OPEN COMPETITION EACH YEAR UNTIL ADEQUATE GEOGRAPHIC COVERAGE IS ACHIEVED AND THE OTHER CRITERIA IN THE CURRENT LEGISLATION HAVE BEEN SATISFIED. THE EVENTUAL NUMBER OF CENTERS WILL BE BASED UPON WHAT WE LEARN FROM OUR PLANNING GRANTS AND PILOT PROJECTS.

WHENEVER WE EMBARK ON MAJOR PROGRAMS LIKE THE MINORITY GRADUATE CENTERS, EXPECTATIONS NATURALLY RISE. A REASONABLE QUESTION FROM AN APPLICANT'S PERSPECTIVE IS WHETHER THE AGENCY WILL STAY THE COURSE. A REASONABLE QUESTION FROM AN AGENCY PERSPECTIVE IS WHETHER THE PARTICULAR INVESTMENT WILL PAY OFF. FURTHER, AS PROGRAMS AGE, QUESTIONS NATURALLY ARISE ABOUT WHETHER DOLLARS SHOULD NOT BE SENT ELSEWHERE. THIS IS ESPECIALLY TRUE IN EDUCATION WHICH IS A DOMAIN SUBJECT TO CYCLICAL BEHAVIOR AND LARGE UPS AND DOWNS.

IN THE CASE OF THE CENTERS, THE DUAL REQUIREMENTS OF FAIRNESS AND EFFICIENCY SUGGEST THE PHASED APPROACH WE ARE TAKING. I BELIEVE THIS APPROACH GIVES LATITUDE FOR LEARNING, FOR FEEDBACK FROM ALL CONSTITUENCIES INVOLVED, FOR CONVERGENCE OF EXPECTATIONS. WE WILL IN ALL LIKELIHOOD HAVE TO MODIFY THE PROGRAM AS WE LEARN MORE ABOUT PERFORMANCE AND ABOUT THE DISTRIBUTION OF MINORITIES SERVED.

BEYOND THIS PARTICULAR PROGRAM, THE STEPS WE ARE TAKING TO EXAMINE THE WHOLE RANGE OF OUR MINORITY PROGRAMS SHOULD

PROVIDE A FIRM FOUNDATION FOR THE EFFORTS AHEAD. FROM TIME TO TIME, I AM QUESTIONED ABOUT THE FOUNDATION'S RESOLUTION OR COMMITMENT TO MINORITY SCIENCE EDUCATION. I BELIEVE THAT RESOLUTION IS FIRM AND CLEAR. AS I NOTED TWO WEEKS AGO, THIS MISSION MUST RECEIVE INCREASING PRIORITY. THIS PRIORITY HAS BEEN REAFFIRMED BY THE NATIONAL SCIENCE BOARD, THE DIRECTOR, AND BY THE SCIENCE EDUCATION DIRECTORATE.

THANK YOU, MR. CHAIRMAN. I WILL BE HAPPY TO ANSWER ANY QUESTIONS.

(16) In earlier legislative actions, NSF was requested to strengthen its affirmative action program to hire more minority scientists into policy-making levels. What is the present outlook for satisfying this request in the immediate future as it concerns the Chicano and Native American minorities? Do you plan to incorporate this into an affirmative action plan and report to Congress on its implementation? If so, when can the plan be made known?

On April 15, 1977, the National Science Foundation finalized its Equal Employment Opportunity Affirmative Action Plan for the period ending September 30, 1977. This plan (copy attached) identified specific recruitment problems which needed to be addressed (page 38) and objectives and actions to be undertaken to improve NSF's minority recruitment program (pages 68-70).

As can be noted, NSF currently has no American Indian employees. We have set as our objective that every effort will be made to employ at least two American Indians prior to September 30, 1977. We will be recruiting at all grade levels.

Chicanos is not an identified racial or national origin category established by the Civil Service Commission for statistical identification and reporting, but is a sub-category of the Spanish-speaking or Hispanic origin category.

As of 12/31/76, NSF employed 10 Hispanics, 6 of whom were in the GS 12-18 grade levels. We have set as our goal to increase this number from 10 to 14 by September 30, 1977.

These goals have been incorporated into the agency's Affirmative Action Plan. Quarterly reports will be submitted to Congress on NSF's minority profile showing our accomplishments toward meeting these stated objectives.

EQUAL EMPLOYMENT OPPORTUNITY PLAN

NATIONAL SCIENCE FOUNDATION
1800 G STREET, N. W.
WASHINGTON, D.C. 20550

For Period January 1, 1977 to September 30, 1977

RICHARD C. ATKINSON, DIRECTOR
NATIONAL SCIENCE FOUNDATION

R.C. Atkinson, April 15, 1977

HERBERT HARRINGTON, JR., DIRECTOR
OFFICE OF EQUAL EMPLOYMENT OPPORTUNITY

Herbert Harrington Jr., April 15, 1977

Interagency Report Control No. 1046-CSC-SA

PART A - INTRODUCTION

I. POLICY AND ORGANIZATION

A. EEO Policy. Executive Order 11478, August 8, 1969, states in part, "It is the policy of the Government of the United States to provide equal opportunity in Federal employment for all persons, to prohibit discrimination in employment because of race, color, religion, sex, or national origin, and to promote the full realization of equal employment opportunity through a continuing affirmative program in each executive department or agency. This policy of equal opportunity applies to and must be an integral part of every aspect of personnel policy and practice in the employment, development, advancement, and treatment of civilian employees of the Federal Government."

The Civil Rights Act of 1964, as amended, Title VII, Section 717, states in part, "All personnel actions affecting employees or applicants for employment...shall be made free from any discrimination based on race, color, religion, sex, or national origin."

The Age Discrimination in Employment Act of 1967, as amended, states in part, "All personnel actions affecting employees or applicants for employment...shall be made free from any discrimination based on age." Section 12 imposes the following limitation, "The prohibition of this Act shall be limited to individuals who are at least forty years of age but less than sixty-five years of age."

As is the case with the Civil Rights Act, "The Civil Service Commission shall issue such rules and regulations, orders, and instructions as it deems necessary and appropriate to carry out its responsibilities under this section." Such rules and regulations are contained in Chapter 713 of the Federal Personnel Manual.

Both Acts cited above require that the heads of each agency comply with such rules, regulations, orders, and instructions, as issued by the Civil Service Commission.

In conformance with Chapter 713 of the Federal Personnel Manual, the Foundation has developed an equal employment opportunity program which seeks to provide for:

- Recruitment activities to provide a wide range of job candidates including minorities and women.

- Personnel actions and employment practices that are based on merit and fitness for all employees and job applicants.

- Organizations and resources to administer EEO programs in a positive and effective manner.

- Full utilization of present skills of employees.

- Increased opportunity to all employees to enhance their skills so they may perform at their highest potential and advance with their abilities.

- Provide training and advice to management and supervisors to assure their understanding and implementation of the policy expressed in the Executive Order, the Civil Rights Act and the Age Discrimination in Employment Act.

- Participation in community efforts to improve conditions affecting employability.

- Prompt and fair consideration of all complaints of discrimination on the grounds of race, color, religion, sex, age, or national origin and for the just and expeditious disposition of each complaint.

B. Organization. Every manager and employee of the National Science Foundation will be provided with a copy of this Plan and the Affirmative Action Plan for their Directorate or Office. That employee has an obligation to know and understand the provisions of this Plan and to apply them in the performance of all official duties. Specific responsibilities are as follows:

- The Director of the National Science Foundation is responsible for assuring that adequate financial and human resources are committed to the achievement of the goals of this Plan, for providing executive direction in implementing the Plan, and for reviewing the performance of those who are assigned specific duties under the Plan.

- Assistant Directors, Office Heads, and all other managerial staff, in addition to the specific assignments made hereafter in this Plan, are responsible for assuring that the goals and objectives of the Plan are indeed achieved. They are also responsible for making recommendations for increasing the effectiveness of this Plan.

- The EEO Director is appointed by the Director of NSF and is directly responsible for all phases of the Foundation's EEO Program. This responsibility includes, but is not limited to, the direction of activities under this Action Plan, periodic reviews of performance and effectiveness, providing advice to the Director on program implementation and improvement, and administration of the discrimination complaint system in accordance with pertinent Federal regulations.

- The Deputy Director of EEO, who also acts as Federal Women's Program Coordinator, is appointed by the Director and functions in support of the EEO Director, and will be involved in every aspect of the Plan.

- EEO Counselors are appointed by the EEO Director and are responsible for the full and expeditious handling of all EEO complaints at the informal stage of the complaint process.

- EEO Investigators are appointed by the EEO Director and are responsible for making full and complete investigations of all formal EEO complaints assigned them.

- Affirmative Action Coordinators are appointed by Assistant Directors and Office Heads and are responsible for assessing affirmative action needs, developing Affirmative Action Directorate and Office Plans, evaluating and measuring progress and program effectiveness in meeting all objectives and goals, and for making recommendations to the Assistant Director and the EEO Director for increasing the effectiveness of the Plan.

- Personnel staff are responsible for incorporating the concept of equal opportunity in all personnel actions. The Personnel Office also has the responsibility for working with all EEO officials in carrying out their respective duties, particularly in the area of handling complaints and in carrying out affirmative action goals and objectives.

- Upward Mobility Training Coordinator and Upward Mobility Training Counselors have the primary responsibility for carrying out the agency's Upward Mobility Training objectives, in conjunction with good personnel and equal opportunity concepts.

- Women's Council has elected officers, the President of which works closely with the Federal Women's Program Coordinator. The organization is responsible for identifying affirmative action programs of interest to women throughout the Foundation, and advising the FWPC of such programs and recommending methods for their implementation.

- AFGE, Local 3403, consults with the Director of EEO on all policies and procedures affecting the agency's affirmative action plan, including the EEO complaint program.

II. CERTIFICATION OF QUALIFICATIONS OF PRINCIPAL EEO OFFICIALS

I certify that the qualifications of all staff officials concerned with administration of the EEO Program including the following:

Director of Equal Employment Opportunity
Deputy Director of EEO - Federal Women's Program Coordinator
Spanish-Heritage Coordinator (part-time)
Asian Coordinator (part-time)
Indian Coordinator (part-time)
EEO Counselors, Investigators and other EEO staff officials

have been reviewed by competent authority and the incumbents in these positions meet the standards outlined in Qualifications Standards Handbook X-118 under "Equal Opportunity Specialists GS-160" or Qualifications Guide for Collateral Assignments involving Equal Employment Opportunity Duties." Evidence that the review has been made and its findings are on file and available for review by Civil Service Commission officials.

Herbert Harrington, Jr., Director
Office of Equal Employment Opportunity
National Science Foundation

National Science Foundation

III. ALLOCATION OF PERSONNEL AND RESOURCES FOR EEO

Program Areas	Full-Time	Part-Time	Percent	Program Costs
1. EEO Program Administration and Management				
a. EEO Director	1			$ 35,485
b. EEO Officer		1	75	22,160
c. Federal Women's Coor.		1	25	7,386
d. Spanish-Speaking Coor.		1	05	786
e. Upward Mobility Coor.		1	05	750
f. Indian & Asian Coor.		2	03	1,230
g. Affirmative Action Coor.		7	03	6,300
h. EEO Counselors		7	04	5,000
i. EEO Investigators		7	05	10,500
j. Secretary	1			11,782
2. EEO and Personnel Management Training	2	8	01	2,500
TOTAL				$101,879

PART B - ACCOMPLISHMENT REPORT

I. REPORT OF ACCOMPLISHMENTS FROM CALENDAR YEAR 1976 EEO PLAN

1. OBJECTIVE--TO ASSURE THAT AN EFFECTIVE ORGANIZATION AND ADEQUATE RESOURCES ARE AVAILABLE TO EFFECTIVELY ADMINISTER A POSITIVE EEO PROGRAM.

ACTION ITEM	REPORT OF ACCOMPLISHMENTS
A. Assure that the leadership roles and assignment of EEO responsibilities of key officials are implemented as defined in NSF Circular No. 5.	The Director, NSF, and EEO Director have effectively carried out this responsibility in Management and Executive Council meetings as well as directives and personal discussions.
B. Through the network of Affirmative Action Coordinators, facilitate coordination of policies and procedures for fuller implementation to all staff.	Some of the AA Coordinators have done an outstanding job of communicating EEO policies and procedures and directing affirmative action.
C. Assure better understanding of policies and procedures by publicizing: (1) EEO Complaint System; (2) EEO Counselors, their organization, room and telephone numbers; (3) Agency-wide and Directorate Affirmative Action Plans; (4) Special programs designed to assist in meeting affirmative action objectives; and (5) Accomplishments. This will be accomplished through the use of publications, meetings (staff and agency orientation sessions) and seminars.	The NSF telephone book, published quarterly, has published EEO Counselors under an EEO heading. Additionally, articles have been written and published in the "NSF Week" on the EEO Counselors. The "NSF Week" is also being utilized to publish articles on various EEO regulations and legal mandates. One recent article praised the accomplishments of one Directorate for having made exceptional accomplishments in recruiting and hiring women at the upper grade levels. Special programs, such as a revision in the Upward Mobility Program, have been published through memoranda directed to all staff. EEO policy and procedures continue to be emphasized in orientation and supervisory training sessions. Affirmative Action Plans for 1975 were not pub-

	lished and disseminated to all staff, however, each Directorate was provided copies.
D. Maintains a well trained cadre of at least: - 7 EEO Counselors - 9 AA Coordinators - 5 EEO Investigators - 1 Spanish-Heritage Coordinator - 1 Federal Women's Program Coordinator.	All EEO officials have received training. The number of EEO Counselors has been reduced to six which is consistent with the complaint activity and the total number of NSF staff.
E. Provide training and orientation in personnel administration, counseling and investigative techniques and the effects of policy changes on the EEO program through CSC training, bi-monthly EEO Counselor meetings, training programs conducted by the Training Officer to: - AA Coordinators - EEO Counselors - EEO Investigators - Spanish-Heritage Coordinators	The EEO Director has conducted special EEO Counselor meetings on such topics as how to effectively use the FPM and labor relations. He has met with AA Coordinators and other management officials on the effects of policy changes on the EEO program, and has worked closely with them in areas of special concern.
F. Fuller utilization of EEO Council for obtaining advice and recommendations for improvement of the EEO Program. EEO Council to be provided quarterly status reports.	The Foundation does not have an EEO Council per se. Being a relatively small agency provides greater opportunities for individuals to participate in EEO activities. The EEO Office calls upon the Management Council, the Union, Ad Hoc Committees of women and/or minorities and individuals from varying grade levels for advice on a wide variety of EEO Program matters, particulary seeking methods of attracting more minorities and women to fill scientific and technical positions.

2. OBJECTIVE--RECRUITMENT ACTIVITIES DESIGNED TO REACH AND ATTRACT CANDIDATES FROM ALL SEGMENTS OF THE POPULATION.

ACTION ITEM	REPORT OF ACCOMPLISHMENTS
A. Confer with placement officers, counselors students and faculty members of educational institutions for the purpose of increasing opportunities for minorities and women. Sources of recruitment will include colleges and universities with appropriate minority and female enrollment and professional associations.	Extensive correspondence has been conducted between the EEO Director and universities and professional organizations to recruit scientific and technical staff. Correspondence has included letters to more than 1,200 colleges and universities, most of which offer a baccalaureate or higher and this listing includes many predominantly black colleges and universities. Letters were directed to 83 professional organizations, including several having either a women's caucus, a black caucus or some semblance of a talent bank operation for their members. The results of these efforts continue to be very productive and are yielding a high number of highly qualified candidates.
B. Accept and maintain a file of women and minority candidates interested in scientific and technical positions at NSF.	The EEO Office continues to maintain and keep up-dated, a file of women and minority candidates. As received, these candidates' resumes have been circulated to the appropriate hiring officials for consideration in filling positions.
C. Advise EEO Office of scientific and technical positions immediately upon approval of the Deputy Director of a "Request to Recruit" submitted by each office seeking to begin recruitment activities.	The EEO Office is provided copies of vacancies approved for recruitment.
D. Make copies of NSF vacancy announcements available to community and professional groups. Expand recruitment sources to ensure effective outreach to minorities and women.	Extensive efforts have been made to better publicize vacancy announcements, including the use of advertising in professional journals. The most effective resources for scientific and technical positions has been direct contact with universities and professional organizations.

E. Assure that Directorate and Office recruitment goals are achieved.

All Directorates did not establish specific goals during CY 1976 which gives no basis for determining whether established goals were achieved. However, there were general increases which should be noted. During the year ending September 30, 1976, the number of minorities in grades 12-18 increased by 12.5%. Continued emphasis has been made to assure that all Directorates set realistic achievable goals for FY 1977.

F. Assure that all applicants are given fair and equal consideration for all vacancies. Approximately 240 vacancies are anticipated during 1976; reviews will be conducted on individual actions and on an overall monthly basis to ensure that the recruitment and selection process does not discriminate.

Every effort is being made to ensure that all applicants are given fair and equal consideration for all vacancies. In addition to making every effort to ensure that minorities and women are included among the candidates for all vacancies, efforts are made to ensure that women and minorities are included on review panels.

The Personnel Office had projected that approximately 240 vacancies would be filled during 1976. For the year ending June 30, 1976 there were 278 new accessions and 253 promotion actions. Of all new accessions, 165 or 59.4% were women and 47 or 16.9% were minorities. Of all promotions, 157 or 62.1% went to women and 87 or 34.4% went to minorities. There were also 72 Quality Step Increases awarded during this same period of time; 55 or 76.4% awarded women and 24 or 33.3% awarded to minorities.

3. OBJECTIVE--IMPROVE UTILIZATION OF PRESENT SKILLS OF ALL EMPLOYEES WHO ARE IN POSITIONS NOT COMMENSURATE WITH THEIR EXPERIENCE AND/OR TRAINING.

ACTION ITEM	REPORT OF ACCOMPLISHMENTS
A. Review minority, sex, age, or national origin profile of each organizational unit. Where grade averages, or length of time in grade indicate differences based on race, sex, age, or national origin review personnel records and NSF Forms 500 to determine reasons for such differentials. Report findings and recommendations to Assistant Director.	Although several employees at the clerical level have B.S. and M.S. degrees, all studies have shown that the rate of progression of women and minorities greatly exceeds that of majority employees.
B. Counsel all employees on career development information, qualifications, special skill requirements and expected rate of progression. Identify various means available to obtain qualifications required for positions which offer greater career development opportunities. Supervisors will explore ways and means of providing training and encourage and assist employees in planning self-development activities. Plan to include career counsel or functions in employee counseling process. Emphasis is to be placed on: (1) employees in grades 1-9; (2) employees in grade for five years or more; (3) employees working below their qualifications or in positions not related to their education, experiences and capabilities; and (4) employee groupings determined by reviews to be disproportionately represented.	Career development is encouraged throughout the Foundation. Whereas the nature of the overall mission of the Foundation is such that employees in grades 1 through 9 are limited in the areas in which they can progress (the majority of the professional positions requiring highly specialized scientific skills and knowledge), every effort is made to advance employees within these limitations. Training and education is coupled with career counseling. Such counseling does not limit an individuals options to the limited development opportunities available within the Foundation. Within the last two years, approximately 62% of all promotions have gone to employees in grades 1 through 9. Only 3 employees in grades 1-4 (or 3.6%) have been in grade for over 5 years. Of employees in grade 5-8, 15.7% have been in grade for over 5 years. The higher the grade level the larger the percent of employees in grade for more than 5 years. Individuals who are accepted into the Foundation's Upward Mobility Training Program are required to

	meet with career counselors to discuss their goals and objectives and arrive at mutually acceptable realistic training courses. There are approximately 12 such counselors who serve on a part-time basis, each having a case load of 3 individuals. All persons participating in this program must be in grades 1 through 9. In addition, approximately 15% of NSF's employees in grades 1 through 9 have met with their supervisors who counseled them on training necessary to improve their experiences and qualifications to enable them to more effectively compete for higher level positions.
C. Develop and conduct seminars for staff in grades 1-9 on career development program.	Two Career Development seminars, each of three days duration, were given during the year.
D. Disseminate meaningful information to employees on career development program, training and advancement opportunities.	As such programs and information become available, it is disseminated to all employees.
E. As vacancies occur, determine whether positions can be restructured to provide additional advancement opportunities. Where possible, bridge positions between the secretarial-clerical and program assistant and administrative career tracks. These positions would provide an opportunity for employees who have enhanced their skills through training, education and experience.	Every effort is made to provide maximum opportunities for vacancies, within such constraints as grade point ceilings, and the nature of the work to be performed. The management intern program has been opened to Foundation employees. Other administrative positions have been restructured to hire at entry levels, providing additional opportunities for Foundation staff to move into career ladder positions. During the past 18 months the following "bridge positions" were established to permit additional advancement opportunities (see table on next page):
F. Every effort will be made to provide supervisory, management and executive development training to women and minorities in grades 12 to 18 to improve their management skills and enhance promotional opportunities. Listings of women and minorities in these grades, and the training they have	Management Council makes final decisions on all candidates for management and executive development training from nominees presented them by the various Directorates. In each case, the Council makes every effort to insure that minority and women candidates are among those nominated and

No. Positions	Occupational Code	Occupational Title	Grade
3	203	Personnel Clerk (Typing)	5/6
1	203	Personnel Assistant	7
1	203	Personnel Assistant	8
2	301	Administrative Clerk	6
1	301	Administrative Assistant	9
1	301	Congressional Liaison Assistant	7
1	301	Contract Technician	5/7
1	301	Data Management Technician	4
1	301	Data Management Technician	5
1	301	Documents Officer	7
3	301	Grants Technician	5
2	301	Grants Technician	6
3	301	Grants Technician	7
1	301	Information Assistant	6
1	301	Professional Assistant	6
1	301	Professional Assistant	7
2	301	Program Assistant	7
1	301	Program Technician	5
1	301	Proposal Processing Technician	7
2	334	Administrative Assistant	7
1	334	Computer Programmer	5
1	341	Administrative Assistant	7
1	501	Budget Assistant	7
1	1106	Procurement Assistant	7
1	1530	Statistician	5

91-750 O - 77 - 6

received has been provided all Deputy Assistant Directors to assist in their selection of training candidates.

selected for training.

4. OBJECTIVE--ENHANCING EMPLOYEES SKILLS IN ORDER TO PERFORM AT THEIR HIGHEST POTENTIAL AND ADVANCE IN ACCORDANCE WITH THEIR ABILITIES.

ACTION ITEM	REPORT OF ACCOMPLISHMENTS
A. Identify various means available to obtain qualifications required for positions which offer greater career development opportunities. Encourage employees to take advantage of training and education programs and provide opportunities. Encourage employees to take advantage of training and education programs and provide opportunities to participate. On-the-job training will be used where appropriate, as well as inter-agency training and course work in local colleges and universities. Funds are allocated among Directorates to insure more equitable use. Evaluation to be conducted in January to assure plan is working.	Employees are encouraged to take advantage of training and educational opportunities. In addition to employees working with their supervisors in establishing career objectives and availing themselves of training opportunities, the Foundation has developed a special upward mobility counseling and training program directed toward employees in grades 1 through 9 to assist them in achieving their career objectives. Prior to late Summer of 1976, the Foundation had a similar program which did not tie in the continuous counseling now being offered. From the inception of the program in the Spring of 1973 through the Summer of 1976, 243 individuals took 660 courses through this special training program. Of this total number, 90.5% were women and more than 51% were minorities. As noted above, this special training program is offered in addition to training approved at the Directorate level. The counseling element was added to better insure that training offered is more consistent with the individual's career objectives.
B. Provide supervisory training in the proper use of Form 500 to aid in the selection of career development plans for employees.	Several sessions were directed toward supervisors better utilizing From 500 in assisting their employees develop career plans. In addition, as indicated in the above section, the Foundation

has instituted a Career Counseling program available to all employees in grades 1-9, who participate in the Upward Mobility Training Program.

5. OBJECTIVE--TRAINING, ADVICE, INCENTIVES, AND PERFORMANCE EVALUATION TO ASSURE UNDERSTANDING AND SUPPORT BY SUPERVISORS AND MANAGERS.

ACTION ITEM	REPORT OF ACCOMPLISHMENTS
A. Encourage attendance at training courses covering EEO principles and information. During 1976, training has been planned for 30% of NSF's managers to attend courses given three times a year.	An EEO component is included in all orientation or supervisory training given within the Foundation. In 1976 the Administrative Directorate underwent a significant reorganization, placing internal training programs under new management. Rather than to continue all previously designed training programs, the new Personnel & Management Evaluation Branch sought to assess the Foundation's needs and then to structure training programs to meet such needs. As a result, no supervisory training was conducted in-house. An assessment on supervisory training needs is currently underway. Once the results are analyzed, training will be developed based on the identified needs. Some individuals requested and were provided supervisory training through CSC courses. However, the objective of training 30% of NSF's managers was not met.
B. All managers and supervisors are encouraged to seek daily advice on personnel and EEO policies and procedures from the Personnel Office and the EEO Office. The telephone directory lists the Personnel representatives assigned to work with each Directorate. EEO staff are also listed in the telephone directory and posted on bulletin boards.	Managers and supervisors frequently avail themselves of advice on personnel and EEO policies and procedures from both the Personnel Office and the EEO Office.

C. Training will be offered to all supervisors on proper utilization of NSF Form 500 for evaluating employees and developing career plans.	Several training sessions were conducted in early 1976 to train supervisors on better utilization of Form 500. Four such sessions were held which were primarily directed toward mid-management supervisors. All participants were encouraged to conduct similar workshops with their subordinate supervisors. It is estimated that at least 40% of all supervisors received such training.
D. Continue to include an EEO rating factor in evaluating the overall performance of all supervisors.	NSF policy continues to include a requirement that all supervisors be rated on their EEO performance.
E. Continue an award to the Foundation employee who has contributed most notably to enhancing the principles of equal opportunity either in the Foundation, scientific or local community.	Although the EEO Award was not given during 1976, the EEO Director was given a Meritorious Service Award for his numerous outstanding achievements in EEO.

6. OBJECTIVE--PARTICIPATION IN COMMUNITY EFFORTS TO PUBLICIZE OUR EMPLOYMENT REQUIREMENTS AND TO IMPROVE CONDITIONS THAT AFFECT THE EMPLOYABILITY OF MINORITY GROUPS AND WOMEN.

ACTION ITEM	REPORT OF ACCOMPLISHMENTS
A. Confer with women's organizations, civil rights groups, and other individuals and organizations concerned with minority and women's group activities.	The Director and Deputy Director (FWPC) frequently confer with a wide variety of women's organizations, civil rights groups, etc. Included among the numerous organizations are the Federal Women's Interagency Board, The Black Women's Agenda, Federally Employed Women, American Women in Science, various women's and minority scientific professional organizations, NAACP, Urban League, Asian American, and Indian organizations.
B. Cooperate with EEO Office in utilizing information developed by and for that office.	Directorates work closely with the EEO Office on a continuing basis.
C. Encourage employees to participate in activities of organizations concerned with improving the status of minority, women and disadvantaged groups. Use staff members' contacts with women's and minority associations and groups to confer with such groups.	Foundation employees are active in a variety of organizations, some of which are specifically concerned with the status of minority, women and disadvantaged groups. The Foundation has provided funding for minority conferences of scientists. Where such organizational affiliations are known the EEO office takes advantage of such associations in furthering the objectives of the Foundation's EEO Program.
D. Provide for positive development and cooperation, including technical assistance as resources permit, with community service organizations relative to their support of the special needs of women, minority and disadvantaged employees with emphasis on conditions affecting employability.	No accomplishments can be reported during 1976 due to limited staff and resources.

7. OBJECTIVE--TAKE TIMELY ACTION TO ASSURE PROMPT AND IMPARTIAL PROCESSING OF EEO COMPLAINTS IN ACCORD WITH PERTINENT DIRECTIVES.

ACTION ITEM	REPORT OF ACCOMPLISHMENTS
A. A training program has been developed to advise supervisors of their full responsibilities in the EEO complaint process. This training is to conducted three times annually to approximately 30% of all managers and supervisors.	All supervisory training sessions given during the year have included an EEO element. Following the release of results of a management evaluation, managers and supervisors were advised of results which tended to adversely impact on minorities and women and were asked to give special attention to correcting such problems.
B. A training program has been developed to advise employees of their rights and responsibilities in the EEO complaint process. This training is provided twice a year during orientation sessions for new employees. On request, this training will be provided to Offices and Directorates.	Two orientation sessions for new employees have been conducted during 1976 which included an EEO component.
C. A new EEO poster is being designed to reflect new EEO counselors and coordinators. A pamphlet is also being designed to highlight the EEO complaint system and identify EEO Counselors to staff.	Due to limited bulletin board space throughout the Foundation, it was determined that the best methods for accomplishing this action was to better utilize the telephone directory (published quarterly) and the weekly newspaper of the Foundation. Articles have been published on the EEO Counselors, and on specific elements of the EEO program which need further clarification. The most recent article was on the Age Discrimination in Employment Act.
D. New EEO Counselors, Investigators and the newly appointed Spanish-Heritage Coordinator, who have not received CSC training, will complete such training or be enrolled within the first quarter of 1976. All replacements during the year will receive CSC training prior to the end of the quarter following their appointment.	All EEO Officials have received CSC training.

E. All EEO staff are encouraged to attend in-house training programs concerned with personnel policies and procedures.	All in-house training has been well attended by employees. Special sessions have been conducted for EEO staff.
F. All EEO staff will receive training in labor-management relations and their requirements in working with the newly organized labor union. The EEO Director and EEO Officer will take appropriate CSC courses. In-house training will be provided to all other EEO Officials.	The EEO Director and EEO Officer have both received CSC training on labor-management relations. At the last EEO Counselor meeting, labor-management relations were discussed, particularly as it relates to their specific responsibilities. After the contract has been culminated more specific training will be conducted, which will relate more specifically to our contractual requirements.
G. Bi-monthly meetings will continue to be held for all EEO Counselors to discuss counseling techniques, provide information on new EEO or personnel procedures, and on methods to improve the EEO Counseling System.	Due to the limited number of EEO Counselors and the close working relationship of all Counselors to the EEO Office, it has not been necessary to have Counselor meetings as frequently as had been indicated. Where the EEO Director determines a need for specialized training or the need to provide additional information on procedures or methodologies, he calls a meeting.
H. A handbook is being developed for EEO Counselors, to assist them in carrying out their responsibilities.	All EEO Counselors were provided a copy of the handbook early in 1976 and have been provided updates as necessary.
I. To assist EEO Investigators in developing their skills, keeping current of EEO policies and procedures, keeping abreast of new enforcement procedures, etc., quarterly meetings will be conducted.	Due to the limited number of formal complaints received with NSF, it is difficult if not impossible, for the Investigators to develop and maintain the skills necessary for conducting the highly sophisticated investigations necessary. For this reason, the EEO Director has determined that a better quality investigation can be achieved by contracting out this service to highly qualified and experienced investigators.

J. Regular evaluations of the counseling and investigative programs will be made to improve the quality and timeliness in handling EEO complaints.	Evaluations of the content and time expended in making investigations has resulted in the decision to use contractors who are more skilled and experienced in this capacity. The greatest needs for improving the counseling program have been found to be (1) a better understanding of personnel policies and procedures and (2) a better understanding of the various court interpretations of discrimination.
K. Internal circulars, posters and EEO procedures will be reviewed at least annually and updated as necessary.	A recent review of several circulars indicates a need to update them. These same circulars will need further modifications to reflect union contract agreements. For this reason, revisions will be made following the finalization of the union agreement.

8. OBJECTIVE--A SYSTEM OF INTERNAL EEO PROGRAM EVALUATION: TO PERIODICALLY ASSESS THE EFFECTIVENESS OF ALL EEO ACTIVITIES WITH EMPHASIS ON RESULTS NOT BEST EFFORTS.

ACTION ITEM

A. Each Directorate is in the process of refining their recently developed Affirmative Action Plans for 1976. Such development requires in-depth assessments of their organizational units. Although priorities are established based on Directorate needs, priorities common to all Directorates for CY 1976 include:

- More extensive recruitment of minorities and women in grades 13-18.

- More emphasis on career development to increase the average grades of minorities and women.

- Better utilization of mechanisms for evaluating employees and enhancing their promotional opportunities.

REPORT OF ACCOMPLISHMENTS

A variety of techniques have been used during 1976 to increase the numbers of minority and women applicants for positions at the GS 13-18 level, some of which have proved more successful than others. Such techniques have included expensive advertisements in scientific journals; contact with colleges and universities and professional organizations; college referrals, etc. There has been no significant increase in the number of women employed in these grades, due to a fairly constant turnover which requires extensive recruitment to offset such losses. There has been an increase of 12.5% of minorities in grades 12-18, which has continued to be our greatest area for needed change.

The Foundation's Upward Mobility Training Program was considerably modified during the year to tie in the career counseling program, which should greatly assist employees in selecting training opportunities more specifically designed to help them achieve their career goals.

Training provided to supervisors in how to better utilize Form 500 has assisted them in discussing career objectives with their employees, and in establishing training priorities within their budget constraints.

B. Review and approve (or disapprove) Directorate plans for conformance to CSC and legal requirements, as well as providing for realistic and positive objectives and goals that are results oriented.	NSF appointed a new EEO Director in January, 1976. One of his official acts was to review Directorate plans and sit down with top managers to discuss realistic goals and methods for their achievement. He has continued throughout the year to work with Directorates in meeting their goals and re-establishing goals for the coming year.
C. Each Directorate is developing mechanisms for assessing and evaluating the effectiveness with requirements and stated goals have been met. These mechanisms are to be utilized in completing their first quarterly report effective 3/31/76.	Both the EEO Office and the Directorate review their accomplishments on a quarterly basis. The EEO Director and the Directorates interact regularly on areas that require more emphasis.
D. Directorates and Offices reporting to the Director, are to submit quarterly reports on accomplishments of their Affirmative Action Plans to the EEO Director.	As indicated above, the Directorates, and the EEO Director continually discuss accomplishments and methods for improving affirmative actions not met. They are continually seeking better methods of achieving results in all areas.
E. Conduct overall program evaluation and prepare necessary reports and recommendations to: - EEO Director - Assistant Directors	A report is prepared quarterly which points out accomplishments and areas where more improvement is needed. The EEO Director discusses these reports with each Directorate quarterly.
F. Maintain and analyze statistical data on employment of minority groups and women which reflect accessions, separations, promotions, awards, training distribution by grade and division. Also analyze data based on age of employees.	A variety of statistical studies are made on a quarterly basis for the EEO Director. In addition, the Management Analysis staff makes periodic statistical studies which supplement those made quarterly within the EEO Office.

G. Prepare comprehensive statistical reports on the EEO program for the purpose, among others of briefing key management officials on progress and problems. Such reports will be routinely directed to the attention of the Director and EEO Director.	From all of the statistical studies made, the EEO Director prepares comprehensive briefing materials which he then presents on a regular basis to the Director of the Foundation and Executive and Management Councils.
H. Prepare and submit all EEO reports required in Federal Personnel Manual (FPM) Chapter 713, Appendix C and FPM 713-25.	All reports are prepared and submitted to the CSC as required.

9. OBJECTIVE--TO ASSURE THAT SPANISH-HERITAGE AMERICANS HAVE A FULL AND FAIR OPPORTUNITY TO COMPETE WITH THEIR FELLOW AMERICANS FOR EMPLOYMENT AND ADVANCEMENT.

ACTION ITEMS	REPORT OF ACCOMPLISHMENTS
A. The Spanish-Heritage Coordinator will identify problems as they pertain to employees and applicants from the Spanish-Speaking community and recommend corrective action.	No specific problems have been identified pertaining to employees. The major problem identified continues to be in the area of recruiting and hiring more Spanish-Heritage employees. NSF currently employs 11 Spanish-Heritage employees which comprises less than 1% of the total workforce.
B. Provide appropriate orientation and training in personnel administration for the Spanish-Heritage Coordinator.	During the first quarter of 1976, the new Coordinator received CSC training. She has been included in all training sessions conducted in-house for EEO Counselors on personnel administration.
C. Actively participate in the development and implementation of the agency's Equal Employment Opportunity Plan in order to assure that specific actions addressing themselves to the needs of citizens of Spanish-Heritage, are included. Provide effective leadership and guidance to the EEO Director on the responsibilities of agency managers in implementing the program for Spanish-Speaking Americans.	The Spanish-Heritage Coordinator has not actively participated in the development of this plan, due to her current leave status (Maternity Leave), however, she has expressed what she feels are some of the greatest needs, which are also reflected in statistical studies. Her comments in the previous year's plan were valuable.
D. Maintain close liaison with Spanish-Heritage Coordinators from other Federal agencies through associations of Federal managers such as Federal Executive Associations, and Federal Personnel Councils.	The Spanish-Heritage Coordinator maintains close liaison with Coordinators from other agencies. She has attended meetings and conferences directed toward Spanish-Heritage Coordinators.
E. Participate as agency representative at meetings and conferences held by civic groups which are interested in improving the employability of Spanish-Heritage Americans. Assure	Limited time has been expended in this capacity. The primary recruitment resource utilized to date has been through the network of Spanish-Heritage Coordinators.

91-750 O - 77 - 7

	that effective relationships are established and maintained with appropriate organizations and civic groups (including those representing women). Obtain their cooperation and assistance in the agency's efforts to reach all manpower sources and to see that qualified applications are received from citizens of Spanish-Heritage, and considered for employment.	
F.	As job openings occur, to make every effort to insure that candidates of Spanish-Heritage are included for equal consideration.	The Spanish-Heritage Coordinator advises the recruitment contact representative from among the other Coordinators of NSF openings. The need for vacancy announcements to remain open for lengthy and extended periods of time in order to locate qualified minority candidates must be weighed against pressures to fill these positions as expeditiously as possible so that essential work efforts may be met. Frequently, insufficient time is available in which to locate candidates without causing a severe disruption of on-going work.
G.	Assist in assessing the agency's Spanish-surnamed employment practices to ascertain whether there are systematic barriers which have the effect of limiting opportunities for Spanish-Heritage citizens. Such special studies will include internal evaluations of the agency. Where they will be useful in encouraging affirmative action, the Spanish-Heritage Coordinator will assist in developing goals and timetables to aid in solving identified problems.	All studies and evaluations indicate the need to direct recruitment efforts toward reaching more Spanish-Speaking candidates far enough in advance to provide adequate time for the submission of applications.
H.	Review agency training courses to assure that they include information on the Spanish-Heritage Program.	All such courses are regularly reviewed by the Spanish-Heritage Coordinator.
I.	Participate in the development and implementation of upward mobility training and education program required by E.O. 11478 and the EEO Act	The latest modifications of the upward mobility program were made by Management Council and the Personnel-Management Offices. The Spanish-Heritage

of 1972.	Coordinator did not actively participate.
J. Counsel with employees of Spanish-Heritage to assure full access to equal opportunity within NSF.	The Spanish-Heritage Coordinator is available for counseling and counsels with employees as needed.

National Science Foundation

II. EEO Complaint Processing

Type of Action	Number Received	Number Processed to Completion	Average Number of Days to Complete
Decision on Merits	2	2	497 1/2
Cancellation	-	-	-
Rejection	1	-	-
Withdrawal	1	-	-
Total	4	2	497 1/2

National Science Foundation

III. Discrimination Complaints

a. Counseling Activity During Previous Plan Year

The ratio of counselors to full-time permanent employees is 1 to 170.

Kind of matter giving rise to the request for counseling:	Number of persons alleging discrimination on the basis of:							
	Race	Color	Religion	Sex female	Sex male	Nat'l Origin	Age	Total
Personnel Action								
Appointment								
Promotion	14			1				15
Reassignment	1			2				3
Separation	1							1
Suspension								
Other (specify) Unpleasant working cond., time & attendance, supervisory evaluation	4			1				5
Matter								
Detail								
Training								
Duty Hours	1							1
Reprimand	1			1				2
Other (specify) Reprisal	1							1
Total Number of Persons Counseled During the Year:	22			5				27
Total Number of Instances of Counseling During The Year:	23			5				28

b. Corrective Actions During Previous Plan Year

Number of instances of corrective action, taken during the year as a result of counseling. Identify such instances with the basis of the alleged discrimination issue, i.e., race, color, religion, sex, national origin, or age.

Kind of corrective action taken:	Alleging discrimination on the basis of:							
	Race	Color	Religion	Sex-Female	Sex-Male	Nat'l Origin	Age	Total
° Received personnel action								
appointment								
promotion								
reassignment	1							1
restored to duty								
other (specify) Policy Clarified				1				1
° Will receive personnel action								
appointment								
promotion (priority consideration)	1							1
reassignment (priority consideration)								
restored to duty								
other (specify) Resignation Withdrawn	1							1
° Received back pay								
° Received benefit								
detail								
training								
duty hours sought								
other (specify)								
° Other (specify)								
Total number of corrective actions	3			1				4
Total number of persons receiving corrective action	3			1				4

Attachment to FPM Ltr. No. 713- 35 (7)

c. Discrimination Complaint Processing during Previous Plan Year

(1) Number of complaints on hand at beginning of year 3
(Count each complainant in a consolidated complaint as a separate complaint.)

(2) Number of complaints received during the year 2
(Count each complainant in a consolidated complaint as a separate complaint.)

Kind of matter giving rise to the complaint:	Discrimination alleged on the basis of:					
	Race/Color	Religion	Sex- Female	Sex- Male	Nat'l Origin	Age	Total
Personnel Action							
Appointment							
Promotion	1						1
Reassignment							
Separation							
Suspension							
Other (specify)							
Matter							
Detail							
Training							
Duty Hours							
Reprimand				1			1
Other (specify)							
Total	1			1			2

(3) Number of complaints closed during the year 4
(Count each complainant in a consolidated complaint as a separate complaint.)

(4) Average time, in days, for processing an EEO complaint case (including all cases closed) during the previous plan year: 223.6 days

(5) Number of complaints on hand at close of year 1
(Count each complainant in a consolidated complaint as a separate complaint.)

(6) Number of allegations of reprisal 0

(7) Number of class actions 0

PART C - REPORT OF ASSESSMENT

I. ORGANIZATION AND RESOURCES

In assessing NSF's organization and resources, the instructions contained in FPM Letter 713-35, Attachment (9) served as a guideline.

In preparing this assessment, statistical studies were conducted by the EEO Office in all required areas. Discussions were held with members of the Personnel Management Evaluation Office on several assessment areas and studies made by that office were obtained and analyzed as a part of the assessment. All Directorates were required to submit various elements incorporated into the plan and assessment, particularly goals and timetables for increasing the numbers of women and minorities in grades 12 through 18. Once the total EEO Plan was completed, the draft was circulated to the Union and all Directorates for comment and any further input. The NSF Director and the Director of the Office of EEO discussed planning components at both Executive and Management Council meetings to encourage agency wide involvement and commitment. The Foundation's Federal Women's Program Coordinator was actively involved in compiling, assessing and drafting this overall EEO Plan.

The Personnel and EEO Offices consulted throughout the entire planning process.

Dr. Richard C. Atkinson, Director of the National Science Foundation has given his full support and commitment to an affirmative action program within the Foundation which affords all employees and applicants for employment the rights to enjoy the same privileges and benefits free from discrimination.

Mr. Herbert Harrington, Jr., Director of the Office of Equal Employment Opportunity, reports directly to the Director. As a member of the Management Council and as the Head of an Office reporting to the Director, he has direct access to top management and to agency supervisors. Mr. Harrington has been delegated full authority to prepare dispositions and resolve complaints of discrimination.

Although the only full time EEO staff are the Director, EEO, the Deputy Director of EEO and a Secretary, this staff is supplemented by six EEO Counselors who serve in a part-time capacity; a Spanish-Heritage Coordinator; an Asian Coordinator; an American Indian Coordinator; and Affirmative Action Coordinators within each of the Directorates. EEO Counselors spend approximately 5% of their time on EEO matters, with the remainder of their time devoted to their principal assignments. The EEO complaint workload of the Foundation has not necessitated that more time be expended in this capacity. The special program coordinators have not been devoting an adequate amount of time to carry out their primary responsibilities, which at this time are to identify recruitment resources. This activity could probably be carried out with a maximum of 2 to 3% of their time.

Although EEO program officials have all received EEO training, and some personnel training, it would assist the program considerably were they to have more personnel training, training on how the courts are interpreting

the laws they are enforcing, and management training would be advisable for the Deputy Director, EEO.

Every effort is made not to duplicate actions of the Personnel Office. EEO officials work closely with that office and advise them on practices and procedures which impact on the EEO program.

Although there are not written procedures to cover alternative delegations of authority in situations where a conflict of interest may arise by EEO officials handling certain complaint cases, it has been the practice of the Foundation that in such cases, the General Counsel's Office would assume the responsibilities of the EEO Office.

At the present time management and fiscal controls have not been established to track all of the various resources devoted to the EEO program. No criteria have been established to measure the productivity and cost-effectiveness of the EEO staff.

PROBLEMS IDENTIFIED:

1. EEO Officials need additional training
   a. EEO Counselors
      (1) Personnel training
      (2) Case Law training
      (3) Labor-Relations training
   b. Spanish-Heritage, American Indian and Asian Coordinator
      (1) Personnel training
      (2) Labor-Relations training
   c. Deputy Director, EEO
      (1) Personnel training
      (2) Management training
   d. Upward Mobility Coordinator and Counselors
      (1) EEO training
      (2) Career Counseling training

2. Greater allocation of time to be expended
   a. Spanish-Heritage, American Indian and Asian Coordinators

3. Revision of NSF Circular
   a. To up-date EEO procedures
   b. To permit alternate procedures for handling complaints in cases of possible conflict of interest
   c. To incorporate changes resulting from Labor agreement

4. Management tools need to be developed
   a. Management and fiscal controls to track EEO resources
   b. Criteria to measure productivity and cost-effectiveness of EEO staff

II. DISCRIMINATION COMPLAINTS

NSF has EEO Counselors at two physical locations, being readily available to all staff. One Counselor has been appointed for every 200 employees. Those Counselors who have had an adequate number of counseling cases to qualify for the Advanced Counselor Training course have taken this course. Two Counselors have not had basic EEO counseling but have taken other EEO courses and have participated in in-house meetings on personnel practices and procedures.

All EEO Counselors have adequate authority to review all of the circumstances surrounding a complaint and to make every effort to resolve all matters that come to their attention.

Performance of EEO Counselors is evaluated on the basis of:

(1) their ability to obtain relevant facts through both an oral interview and review of pertinent documents;
(2) their ability to maintain an unbiased posture;
(3) their ability to effectively communicate their findings to both the complainant and the alleged discriminating official;
(4) their ability to informally resolve all possible cases.

The most time-consuming process in reaching a decision in formal complaints of discrimination has been the amount of time involved in making the investigation. EEO Investigators may not be assigned more than one investigation during their entire tenure as EEO Investigators. This does not enable them the time to develop the skills and experience necessary to conduct a full investigation within a reasonable period of time. The Investigators also have a tendency to continue spending a considerable amount of time in their principal area of assignment while simultaneously making an EEO investigation.

The Director and Deputy Director of EEO both have sufficient delegations of authority to prepare dispositions in all cases of discrimination. These decisions are reviewed by the Office of General Counsel to insure that all evidence has been considered and that the decisions reached are in accordance with law.

The primary evaluation of the complaint process is based on a review of the counselor's report and the total investigative file.

No problems have been encountered as a result of the Privacy and Freedom of Information Acts.

PROBLEMS IDENTIFIED:

1. Additional training needed
   (a) The EEO Counselors who have not received CSC basic counselor training need to do so

2. Time expended in making EEO Investigations
   (a) More expertise needed
   (b) Need to be free from other work assignments

III. RECRUITMENT

All statistical studies made of the composition of the National Science Foundation's workforce by racial, ethnic and sex groupings, indicated that the Foundation compares favorably with the Government-wide statistics available in the vast majority of categories. When the numbers of persons having requisite skills for positions within the Foundation are compared to the workforce composition, the Foundation also compares favorably.

A wide variety of recruitment sources have been utilized in an attempt to attract qualified minority and women applicants who meet the needs of the Foundation, some of which are more successful than others. The Foundation is constantly seeking better recruitment sources, particularly for the highly specialized scientific and technical positions at the higher grade levels.

The Personnel Office constantly reviews qualification requirements to insure that they are realistic, job related, and do not have built in EEO barriers. Hiring procedures are frequently reviewed, and have been modified to better insure that minorities and women are given full consideration for all job opportunities. A new procedure was adopted in late 1975 and put into effect during 1976 requiring documentation of recruitment reports for NSF Statutory Excepted appointments. These new procedures have encouraged more extensive recruitment efforts, to include efforts to locate potential minority and female candidates. Recruitment literature, including job announcements reflect the Foundation's desire for a diversified workforce.

The EEO Office works closely with Personnel providing technical advice on recruitment efforts which may yield greater numbers of minorities and females and supplements recruitment activities for the higher level positions, through directed recruitment.

Reviews of the selection process have shown that minorities and women are not treated disparately. Criteria established in screening applicants is applied equally to all candidates and yields a number of minorities and females as being highly qualified which is proportionate to the number of candidates applying.

Although EEO officials do not participate in the development of new-hires estimate report data, they actively participate in establishing realistic goals for hiring minorities and women.

Public Law 94-471, enacted October 11, 1976, requires NSF to initiate intensive searches for qualified women, members of minority groups, and handicapped individuals to fill executive level positions. Such search has already been initiated but will be stepped up during the current fiscal year.

Additionally, this Act requires the Foundation to improve the representation of minorities, women and handicapped individuals on advisory committees, review panels, and all other mechanisms by which the scientific community provides assistance to the Foundation.

The Foundation utilizes approximately 40,000 scientists each year as advisors and reviewers. Since the vast majority are never seen by NSF staff, visual identification of these persons cannot be made.

Effective October 1, 1976 the sex of reviewers has been identified based on the first name of the reviewer. This information is entered into the computers as reviewers' services are utilized. Different means of obtaining race and handicapped status have been discussed, and it has been determined that such identifications will be limited to those reviewers who come together as a panel, meeting with an NSF official. The number of reviewers to be visually identified by race and handicap should constitute a valid indication of what is happening in the community to improve the representation of minorities, women and handicapped advisors and reviewers.

PROBLEMS IDENTIFIED:

1. Need for more extensive recruitment at all grade levels for:
   (a) American Indians (none employed)
   (b) Spanish-Speaking

2. Need for more selected recruitment of minorities and women in the mathematical, physical, environmental, biological, social, behavioral and engineering sciences, particularly to fill executive level positions in accordance with Public Law 94-471.

3. Need for more selected recruitment of minorities in mainstream support positions, e.g., public information specialists, writers, budget analysts, auditors, grants specialists, contract specialists, accountants, computer programmers and specialists, management analysts, and personnel management specialists.

4. Need to develop a system for identifying the sex, race and handicap status of advisors and reviewers and improve their numbers as appropriate, based on studies of their numbers among advisors and reviewers utilized by NSF.

NSF MINORITY STATISTICS

June 30, 1972

Grade	GS & Equiv Full-Time Permanent	Sex		Racial Ethnic Composition			
		Men	Women	Black	Hispanic	Oriental	Other
1	-	-	-	-	-	-	-
2	24	7	17	2	-	-	22
3	41	15	26	20	-	-	21
4	44	3	41	31	1	-	12
5	99	16	83	57	-	1	41
6	117	2	115	61	2	-	54
7	98	7	91	26	2	-	70
8	40	8	32	9	1	-	30
9	56	15	41	10	1	1	44
10	5	-	5	-	-	-	5
11	45	21	24	6	-	1	38
12	38	16	22	4	1	-	33
13	72	58	14	1	2	-	69
14	83	75	13	5	1	-	82
15	157	147	10	4	-	-	153
16	68	66	2	-	1	2	65
17	35	35	-	-	-	-	35
18	10	10	-	1	-	-	9
Total	1,037	501	536	237	12	5	783

NSF MINORITY STATISTICS

June 30, 1973

Grade	GS & Equiv Full-Time Permanent	Sex		Racial Ethnic Composition			
		Men	Women	Black	Hispanic	Oriental	Other
1	-	-	-	-	-	-	-
2	16	-	16	13	-	-	3
3	48	7	41	36	-	-	12
4	74	7	67	38	2	-	34
5	101	13	88	63	-	2	36
6	139	13	126	66	1	-	72
7	96	13	83	28	2	-	66
8	43	4	39	11	1	1	31
9	65	18	47	11	1	2	51
10	6	-	6	-	-	-	6
11	47	18	29	5	-	1	41
12	38	22	16	3	1	-	34
13	73	51	22	2	1	-	70
14	102	90	12	6	1	1	94
15	168	163	5	5	-	1	162
16	70	68	2	-	1	1	68
17	34	32	2	-	-	-	34
18	12	12	-	1	-	-	11
Total	1,132	531	601	288	11	8	825

NSF MINORITY STATISTICS

November 30, 1974

Grade	GS & Equiv Full-Time Permanent	Sex		Racial Ethnic Composition			
		Men	Women	Black	Hispanic	Oriental	Other
1	2	2	-	2	-	-	-
2	5	-	5	2	-	-	3
3	27	7	20	18	-	-	9
4	95	12	83	52	-	1	42
5	93	15	78	40	1	-	52
6	137	7	130	66	-	-	71
7	109	17	92	40	3	-	66
8	65	4	61	18	2	-	45
9	62	15	47	13	-	-	49
10	14	5	9	3	-	1	10
11	50	18	32	10	1	1	38
12	39	23	16	3	1	-	35
13	79	60	19	2	2	1	74
14	135	111	24	5	1	2	127
15	214	208	6	6	1	3	204
16	90	89	1	1	1	1	87
17	31	28	3	-	-	-	31
18	19	19	-	-	-	-	19
Total	1,266	640	626	281	13	10	962

91-750 O - 77 - 8

NSF MINORITY STATISTICS

June 30, 1975

Grade	GS & Equiv Full-Time Permanent	Sex		Racial Ethnic Composition			
		Men	Women	Black	Hispanic	Oriental	Other
1							
2	4	3	1	3	-	1	-
3	23	7	16	11	-	-	12
4	77	11	66	38	-	1	38
5	109	12	97	45	1	2	61
6	124	4	120	60	-	-	64
7	114	17	97	43	2	1	68
8	57	2	55	14	2	-	41
9	60	13	47	12	-	-	48
10	10	3	7	1	-	-	9
11	48	14	34	10	1	-	37
12	40	23	17	2	2	1	35
13	79	61	18	3	3	1	72
14	129	105	24	6	-	1	122
15	206	198	8	6	1	3	196
16	85	84	1	1	1	1	82
17	35	32	3	-	-	-	35
18	13	13	-	-	-	-	13
Total	1,213	602	611	255	13	12	933

NSF MINORITY STATISTICS

September 30, 1976

Grade	GS & Equiv Full-Time Permanent	Men	Women	Black	Hispanic	Oriental	Other
1	-	-	-	-	-	-	-
2	3	-	3	3	-	-	-
3	15	4	11	9	-	-	6
4	66	6	60	19	-	-	47
5	114	12	102	58	-	-	56
6	129	5	124	60	-	-	69
7	104	20	84	36	2	-	66
8	49	2	47	20	-	-	29
9	72	16	56	15	2	-	55
10	6	1	5	-	-	-	6
11	57	15	42	10	-	-	47
12	37	22	15	2	2	-	33
13	69	48	21	2	1	1	65
14	148	120	28	11	1	1	135
15	209	198	11	4	2	5	198
16	71	70	1	2	1	1	67
17	31	29	2	-	-	-	31
18	18	17	1	-	-	-	18
Total	1,198	585	613	251	11	8	928

NSF Five Year Numerical Distribution By Sex

	6/30/72	6/30/73	11/30/74	6/30/75	9/30/76
GS 1-4 (Total)	(109)	(138)	(129)	(104)	(84)
Women	84	124	108	83	74
Men	25	14	21	21	10
GS 5-8 (Total)	(354)	(379)	(404)	(404)	(396)
Women	321	336	361	369	357
Men	33	43	43	35	39
GS 9-11 (Total)	(106)	(118)	(126)	(118)	(135)
Women	70	82	88	88	103
Men	36	36	38	30	32
GS 12-13 (Total)	(110)	(111)	(118)	(119)	(106)
Women	36	38	35	35	36
Men	74	73	83	84	70
GS 14-15 (Total)	(245)	(270)	(349)	(335)	(357)
Women	23	17	30	32	39
Men	222	253	319	303	318
GS 16-18 (Total)	(113)	(116)	(140)	(133)	(120)
Women	2	4	4	4	4
Men	111	112	136	129	116
All Grades (Total)	(1,037)	(1,132)	(1,266)	(1,213)	(1,198)
Women	536	601	626	611	613
Men	501	531	640	602	585

NSF Five Year Percentage Distribution By Sex

	6/30/72	6/30/73	11/30/74	6/30/75	9/30/76
GS 1-4					
Women	77.1	89.9	83.7	79.8	88.1
Men	22.9	10.1	16.3	20.2	11.9
GS 5-8					
Women	90.7	88.7	89.4	91.3	90.2
Men	9.3	11.3	10.6	8.7	9.8
GS 9-11					
Women	66.0	69.5	69.8	74.6	76.3
Men	34.0	30.5	30.2	25.4	23.7
GS 12-13					
Women	32.7	34.2	29.7	29.4	34.0
Men	67.3	65.8	70.3	70.6	66.0
GS 14-15					
Women	9.4	6.3	8.6	9.6	10.9
Men	90.6	93.7	91.4	90.4	89.1
GS 16-18					
Women	1.8	3.4	2.9	3.0	3.3
Men	98.2	96.6	97.1	97.0	96.7
All Grades					
Women	51.7	53.1	49.4	50.4	51.2
Men	48.3	46.9	50.6	49.6	48.8

NSF Five Year Numerical Distribution By Race

	6/30/72	6/30/73	11/30/74	6/30/75	9/30/76
GS 1-4 (Total)	(109)	(138)	(129)	(104)	(84)
Black	53	87	74	52	31
Other Minorities	1	2	1	2	-
White	55	49	54	50	53
GS 5-8 (Total)	(354)	(379)	(404)	(404)	(396)
Black	153	168	164	162	174
Other Minorities	6	6	6	8	2
White	195	205	234	234	220
GS 9-11 (Total)	(106)	(118)	(120)	(118)	(135)
Black	16	16	26	23	25
Other Minorities	3	4	3	1	2
White	87	98	97	94	108
GS 12-13 (Total)	(110)	(111)	(118)	(119)	(106)
Black	5	5	5	5	4
Other Minorities	3	2	4	7	4
White	102	104	109	107	98
GS 14-15 (Total)	(245)	(270)	(349)	(335)	(357)
Black	9	11	11	12	15
Other Minorities	1	3	7	5	9
White	235	256	331	318	333
GS 16-18 (Total)	(113)	(116)	(140)	(133)	(120)
Black	1	1	1	1	2
Other Minorities	3	2	2	2	2
White	109	113	137	130	116
All Grades (Total)	(1,037)	(1,132)	(1,266)	(1,213)	(1,198)
Black	237	288	281	255	251
Other Minorities	17	19	23	25	19
White	783	825	962	933	928

NSF Five Year Percentage Distribution By Race

	6/30/72	6/30/73	11/30/74	6/30/75	9/30/76
GS 1-4					
Black	48.6	63.0	57.4	50.0	36.9
Other Minorities	0.9	1.4	0.8	1.9	-
White	50.5	35.5	41.8	48.1	63.1
GS 5-8					
Black	43.2	44.3	40.6	40.1	43.9
Other Minorities	1.7	1.6	1.5	2.0	0.5
White	55.1	54.1	57.9	57.9	55.6
GS 9-11					
Black	15.1	13.6	20.6	19.5	18.5
Other Minorities	2.8	3.4	2.4	0.8	1.5
White	82.1	83.0	77.0	79.7	80.0
GS 12-13					
Black	4.5	4.5	4.2	4.2	3.8
Other Minorities	2.7	1.8	3.4	5.9	3.8
White	92.7	93.7	92.4	90.0	92.4
GS 14-15					
Black	3.7	4.1	3.2	3.6	4.2
Other Minorities	0.4	1.1	2.0	1.5	2.5
White	95.9	94.8	94.8	94.9	93.3
GS 16-18					
Black	0.9	0.9	0.7	0.8	1.7
Other Minorities	2.7	1.7	1.4	1.5	1.7
White	96.5	97.4	97.9	97.7	96.6
All Grades					
Black	22.9	25.4	22.2	21.0	21.0
Other Minorities	1.6	1.7	1.8	2.1	1.6
White	75.5	72.9	76.0	76.9	77.4

NSF STUDY OF MAJOR (25 or More Employees) OCCUPATIONAL SERIES

May 31, 1976

Occ. Code	Occ. Title	Total	Men	Women	Minority	Black	Hispanic	Oriental	Other
101	Social Science	68	54	14	2	1	1	-	66
110	Economist	26	19	7	2	-	1	1	24
301	Gen Clerical & Admin	149	57	92	44	39	4	1	105
318	Secretary	291	-	291	127	126	1	-	164
322	Clerk-Typist	80	7	73	34	34	-	-	46
334	Computer Spec.	31	21	10	9	9	-	-	22
345	Prog. Anal.	26	17	9	2	2	-	-	24
401	Gen. Biol. Science	45	31	14	4	3	1	-	41
510	Accounting	33	29	4	6	6	-	-	27
801	Gen. Engineer	46	45	1	6	2	-	4	40
1101	Gen. Business & Industry	31	22	9	2	2	-	-	29
1301	Gen. Phy. Sci.	139	136	3	3	2	-	1	136
1720	Ed. Research & Program	45	37	8	5	4	1	-	40

GOVERNMENT-WIDE COMPARISONS TO NSF'S
MAJOR OCCUPATIONAL SERIES
(Percent Within Series)
May 31, 1976

Occ Code	Women		Total Minorities		Black		Hispanic		Oriental	
	NSF	Gov't-Wide	NSF	Gov't-Wide	NSF	Gov't-Wide	NSF	Gov't-Wide	NSF	Gov't-Wide
101	20.6	28.8	2.9	17.2	1.5	13.5	1.5	2.7	-	N/A
110	26.9	12.4	7.7	5.4	-	3.4	3.8	0.7	3.8	N/A
301	61.7	57.4	29.5	22.0	26.2	17.8	2.7	2.4	0.7	N/A
318	100.0	99.2	43.6	16.6	43.3	13.1	0.3	1.9	-	N/A
322	91.3	95.6	42.5	22.8	42.5	17.5	-	3.6	-	N/A
334	32.3	19.1	29.0	10.0	29.0	7.5	-	1.3	-	N/A
345	34.6	23.1	7.7	7.4	7.7	5.4	-	1.1	-	N/A
401	31.1	13.1	8.9	6.8	6.7	4.4	2.2	0.9	-	N/A
510	12.1	8.3	18.2	8.6	18.2	5.0	-	1.7	-	N/A
801	2.2	4.4	13.0	4.0	4.3	1.6	-	1.0	8.7	N/A
1101	29.0	18.7	6.5	12.3	6.5	8.2	-	2.6	-	N/A
1301	2.2	3.1	2.2	4.0	1.4	2.3	-	0.6	0.7	N/A
1720	17.8	26.7	11.1	20.5	8.9	15.9	2.2	3.6	-	N/A

GOVERNMENT-WIDE COMPARISONS TO NSF'S
MAJOR OCCUPATIONAL SERIES
(Percent Within Series)
May 31, 1976

Occ Code	Women		Total Minorities		Black		Hispanic		Oriental	
	NSF	Gov't-Wide	NSF	Gov't-Wide	NSF	Gov't-Wide	NSF	Gov't-Wide	NSF	Gov't-Wide
101	20.6	28.8	2.9	17.2	1.5	13.5	1.5	2.7	-	N/A
110	26.9	12.4	7.7	5.4	-	3.4	3.8	0.7	3.8	N/A
301	61.7	57.4	29.5	22.0	26.2	17.8	2.7	2.4	0.7	N/A
318	100.0	99.2	43.6	16.6	43.3	13.1	0.3	1.9	-	N/A
322	91.3	95.6	42.5	22.8	42.5	17.5	-	3.6	-	N/A
334	32.3	19.1	29.0	10.0	29.0	7.5	-	1.3	-	N/A
345	34.6	23.1	7.7	7.4	7.7	5.4	-	1.1	-	N/A
401	31.1	13.1	8.9	6.8	6.7	4.4	2.2	0.9	-	N/A
510	12.1	8.3	18.2	8.6	18.2	5.0	-	1.7	-	N/A
801	2.2	4.4	13.0	4.0	4.3	1.6	-	1.0	8.7	N/A
1101	29.0	18.7	6.5	12.3	6.5	8.2	-	2.6	-	N/A
1301	2.2	3.1	2.2	4.0	1.4	2.3	-	0.6	0.7	N/A
1720	17.8	26.7	11.1	20.5	8.9	15.9	2.2	3.6	-	N/A

IV. FULL UTILIZATION OF SKILLS AND TRAINING

Several studies have been made on training conducted, the length of time employees have remained in grade, and promotion and award ratios. In addition, studies have also been made on the amount of education employees have achieved.

Due to the current labor market, NSF has employed an exceptionally large number of employees in the lowest grade levels with a B.S. degree or higher. As of 9/30/76, 19% of all employees in grades 1-4 had a Bachelor's degree or higher; 17.4% of those in grades 5-8 had a Bachelor's degree or higher; and 37.8% in grades 9-11. Of those in grades 1-8 with a B.S. or higher, 72.9% are women and 18.8% are minorities.

Additionally, the Foundation provides a variety of training to its employees, categorized as "work related," "upward mobility" and "executive development." The overall distribution of training funds shows that 52% of the training funds were spent for training women, in spite of the fact that the amount spent per individual on training for men generally exceeds the amount spent on training for women. Lower individual costs of training for female employees is due primarily to the preponderance of relatively inexpensive work related and upward mobility training provided to females as opposed to the significant amount of executive development training provided to males. While there are a number of women in the Foundation's Executive Development Program, the relatively small number of women with NSF (GS-13 and above) eligible for such training significantly impacts the amount of funds devoted thereto. The actual occurrence of training shows that women far exceed men. An in-house college program sponsored by NSF enrolled approximately 243 individuals from the Spring of 1973 through the Summer of 1976. This program is directed toward employees in grades 1-8. Of this total, 90.5% were women, and 51.4% were minorities; of those in grades 1-8 74.4% were women and 36.7% were minorities.

As of 9/30/76, women comprised 51.2% of the workforce yet a study showing promotions from June 1973 through May 1976, showed that women received 63.3% of the promotions. Women equaled or exceeded a proportionate number of promotions based on their numbers within grade in all but two grade groupings; GS 9-11 and 12-13. Minorities received 34.1% of all promotions yet comprised only 22.6% of the workforce. In the two areas where the percentage of promotions did not exceed the percentage of minorities in grade, the percentage differences were only 1.1 and 1.7.

Studies also reveal that the average NSF employee has been in his or her present grade for 2.9 years. Among directorates, average time in grade varies from 2.1 years for Research Applications (RA) to 4.1 years for Science Education (SE). Males, on the average, have remained in their current grades for about 10 months longer than women.

A study made as of 9/30/76 showed that 41.6% of all women had been in grade for less than one year as compared to 28.5% of all men. For minorities, 37.4% had been in grade for less than a year as compared to 34.6% for caucasians. Of those in grade for five or more years; 27% of all men as compared to 15.5% of all women and 20.0% of all minorities as compared to 23.6% for caucasians. In grades 5-8 and 9-11 women did not compare as favorably to men in either the percentage in grade for less than a year or of the number in grade for five or more years. The only grade category in which minorities had a greater percentage than caucasians in grade for less than a year was in grades 14-15. The greatest difference was in grade 14, with 58.1% of all minorities being in grade for less than a year as compared with 83% of all caucasians. Of those in grade for five years or more, however, minorities had a lesser percentage in grade in all but two grade groupings (GS 9-11 and 12-13). In neither of these groupings was there a wide disparity.

Whereas the overall picture of the Foundation's upward mobility efforts shows that minorities and women receive training and promotions at a higher rate than their numbers in the workforce, additional efforts are indicated in the following areas:

PROBLEMS IDENTIFIED:

1. In grades 1-4 and 9-11, minorities are in grade for longer periods of time prior to promotion than are caucasians.

2. In grades 5-8, 9-11 and 12-13, women are in grade for longer periods than men prior to promotion.

3. Very few promotions to GS 14-15, although this grade range comprises 29.8% of all staff.

4. Greater emphasis is needed for providing Executive Development Training for women and minorities.

5. Need to better identify skills of existing staff in relation to skills required by NSF to permit better structuring of organization to best utilize existing skills.

National Science Foundation
TIME IN GRADE STUDY
September 30, 1976

Less Than One Year	Sex		Racial Ethnic Composition				
	Men	Women	Minority	Black	Hispanic	Oriental	Other
GS 1-4	4	58	18	18	-	-	44
5-8	25	136	64	64	-	-	97
9-11	17	41	9	8	1	-	49
12-13	23	8	2	1	1	-	29
14-15	73	12	8	4	1	3	77
16-18	25	-	-	-	-	-	25
Total	167	255	101	95	3	3	321
Five or More Years							
GS 1-4	1	2	1	1	-	-	2
5-8	4	58	20	19	1	-	42
9-11	3	21	6	6	-	-	18
12-13	19	7	2	-	2	-	24
14-15	95	7	4	3	-	1	98
16-18	36	-	1	-	1	-	35
Total	158	95	54	29	4	1	219
Total Employees							
GS 1-4	10	74	31	31	-	-	53
5-8	39	357	176	174	2	-	220
9-11	32	103	27	25	2	-	108
12-13	70	36	8	4	3	1	98
14-15	318	39	24	15	3	6	333
16-18	116	4	4	2	1	1	116
Total	585	613	270	251	11	8	928

National Science Foundation
TIME IN GRADE STUDY
Percent in Grade
September 30, 1976

Less Than One Year	Sex		Racial Ethnic Composition				
	Men	Women	Minority	Black	Hispanic	Oriental	Other
GS 1-4	40.0	78.4	58.1	58.1	-	-	83.0
5-8	64.1	38.1	36.4	36.4	-	-	44.1
9-11	53.1	39.8	33.3	32.0	50.0	-	45.4
12-13	32.9	22.2	25.0	25.0	33.3	-	29.6
14-15	22.9	30.8	33.3	26.7	33.3	50.0	23.1
16-18	21.6	-	-	-	-	-	21.6
Total	28.5	41.6	37.4	37.8	27.3	37.5	34.6
Five or More Years							
GS 1-4	10.0	2.7	3.2	3.2	-	-	3.8
5-8	10.3	16.2	11.4	10.9	50.0	-	19.1
9-11	9.4	20.4	22.2	24.0	-	-	16.7
12-13	27.1	19.4	25.0	-	66.7	-	24.5
14-15	29.9	17.9	16.7	20.0	-	16.7	29.4
16-18	31.0	-	25.0	-	100.0	-	30.2
Total	27.0	15.5	20.0	11.6	36.4	12.5	23.6

TOTAL NSF PROMOTIONS

June, 1973 - May, 1976

Grade	Total	Sex		Racial Ethnic Composition				
		Men	Women	Minority	Black	Hispanic	Oriental	Other
1-4	67	8	59	43	43	-	-	24
5-8	333	36	297	175	173	2	-	158
9-11	127	43	84	24	23	-	1	103
12-13	67	48	19	8	6	1	1	59
14-15	107	86	21	9	7	1	1	98
16-18	61	59	2	1	1	-	-	60
Total	762	280	482	260	253	4	3	502

TOTAL NSF PROMOTIONS

Percent Within Grade
June, 1973 - May, 1976

Grade	Total	Sex		Racial Ethnic Composition				
		Men	Women	Minority	Black	Hispanic	Oriental	Other
1-4	100.0	11.9	88.1	64.2	64.2	-	-	35.8
5-8	100.0	10.8	89.2	52.6	52.0	0.6	-	47.4
9-11	100.0	33.9	66.1	18.9	18.1	-	0.8	81.1
12-13	100.0	71.6	28.4	11.9	9.0	1.5	1.5	88.1
14-15	100.0	80.4	19.6	8.4	6.5	0.9	0.9	91.6
16-18	100.0	96.7	3.3	1.6	1.6	-	-	98.4
Total	100.0	36.7	63.3	34.1	33.2	0.5	0.4	65.9

TOTAL NATIONAL SCIENCE FOUNDATION
EDUCATIONAL STUDY
May 31, 1976

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	17	18	21	TOTAL
GS-0	10	-	-	5	6	-	1	7	2	1	-	-	-	-	1	-	-	-	33
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
3	9	-	-	1	6	2	3	1	-	-	-	-	-	-	-	-	-	-	22
4	33	-	-	1	11	3	6	7	5	-	-	2	-	7	1	-	-	-	76
5	26	-	-	3	15	3	15	16	8	3	2	3	1	14	3	-	-	-	112
6	11	-	-	4	34	8	24	23	14	9	-	1	2	7	-	1	-	-	138
7	9	1	-	1	30	1	19	13	12	2	2	-	-	15	7	2	-	-	114
8	3	-	-	2	13	3	10	9	6	2	2	-	1	1	1	-	-	-	53
9	1	-	-	2	10	2	7	16	3	3	-	3	-	7	6	4	5	1	70
TOTAL	108	1	-	19	125	22	85	92	50	20	6	9	4	51	19	7	5	1	624

See Attached for Level of Education Codes.

Level of Education Codes

01--Did not complete 8th grade.
02--Completed 8th grade.
03--Entered 9th grade, but did not complete high school.
04--Completed high school.
05--Completed high school and afterwards began additional job training program without completing.
06--Completed high school and afterwards completed additional job training program
07--Entered college and completed less than 30 semester hours or 45 quarter hours.
08--Entered college and completed from 30-59 semester hours or 45-89 quarter hours.
09--Entered college and completed from 60-89 semester hours or 90-134 quarter hours.
10--Received two year college associate degree.
11--Entered college and completed from 90-119 semester hours or 135-179 quarter hours.
12--Entered college and completed 120 or more semester hours or 180 quarter hours, but did not receive bachelor's degree.
13--Received bachelor's degree.
14--Received bachelor's degree and perfromed some academic work beyond, but no higher degree.
17--Received master's degree for Liberal Arts and Sciences after one or two academic years beyond the bachelor's degree or an advanced degree beyond the professional degree but below the Ph.D., e.g., the LL.M. in law, M.S., in surgery following the M.D.; M.S.D. Master of Science in dentistry; M.S.W., Master of Social Work.
18--Received Master's degree as described above and performed some academic work beyond, but no higher degree.
21--Received doctorate degree and performed some academic work beyond.

91-750 O - 77 - 9

NSF EMPLOYEES WITH BACHELOR DEGREES OR HIGHER

	Sex		Racial Ethnic Composition					
	Men	Women	Black	Oriental	Hispanic	American Indian	Total Minority	Total Other
GS 1-4	1	15	1	-	-	-	-	15
5-8	22	47	15	-	-	-	15	54
9-11	16	35	5	-	-	-	5	46
12-13	58	26	3	1	1	-	5	79
14-15	305	36	14	6	3	-	23	318
16-18	116	4	2	1	1	-	4	116
Total	518	163	40	8	5	-	53	628

PERCENT OF NSF EMPLOYEES WITH BACHELOR DEGREES OR HIGHER

	Sex		Racial Ethnic Composition					
	Men	Women	Black	Oriental	Hispanic	American Indian	Total Minority	Total Other
GS 1-4	10.0	20.3	3.2	-	-	-	3.2	28.3
5-8	56.4	13.2	8.6	-	-	-	8.5	24.5
9-11	50.0	34.0	20.0	-	-	-	18.5	42.6
12-13	82.9	72.2	75.0	100.0	33.3	-	62.5	80.6
14-15	95.9	92.3	93.3	100.0	100.0	-	95.8	95.5
16-18	100.0	100.0	100.0	100.0	100.0	-	100.0	100.0
Total	88.5	26.6	15.9	100.0	45.5	-	19.6	67.7

V. UPWARD MOBILITY FOR LOWER LEVEL EMPLOYEES.

As was pointed out under Item IV above, minorities and women receive training and are promoted at a greater rate than their numbers in the Foundation (particularly lower level employees).

Based on the fact that greater numbers of lower level employees are being hired with a more extensive educational background, plus the fact that a number of employees continue to increase their educational attainment and skills, the task of better utilizing the skills and education of all employees becomes greater. This places an additional burden on an agency such as NSF in that the nature of business necessitates that most of the scientific and technical positions be filled with highly qualified personnel, that cannot be obtained through a government upward mobility effort. To review scientific proposals for merit, for example, requires an extensive knowledge and experience within a specific scientific discipline.

The numbers and types of positions that can be considered for advancing lower level employees are limited, almost entirely to the administrative and support types of jobs. Within these constraints, continuing efforts are made to identify bridge positions, administrative career ladders, or opportunities to restructure organizational units to provide for greater responsibilities requiring a higher grade level.

The Foundation has increased the number of Management Intern positions normally offered to permit more in-house candidates the opportunity to participate. Nine Management Intern positions have been made available exclusively to NSF staff for calendar year 1977.

At least two directorates are in the process of preparing proposals to reorganize segments of their directorates to permit a wider range of administrative positions in a single service unit, providing some bridge positions and some career ladder positions.

PROBLEMS IDENTIFIED:

1. There is a need to expand the advancement opportunities for lower level employees.

VI. SUPERVISORY AND MANAGEMENT COMMITMENT

The Foundation has a continuing program for training supervisors and managers in personnel actions, including equal employment opportunity. Approximately 30% of supervisory and management staff receive this training each year. This training is supplemented by continuing articles in the Foundation's weekly news publication as well as through internal circulars and memoranda on equal employment opportunity matters.

Regulations require that performance evaluations of supervisory and managerial personnel include specific items evaluating understanding and support of equal employment opportunity objectives.

During 1976, one meritorious award was given for outstanding performance in equal employment opportunity.

PROBLEMS IDENTIFIED:

1. The need continues for regular training to be given to supervisors and managers on their equal employment opportunity responsibilities.

VII. COMMUNITY OUTREACH

All of the facilities out of which the Foundation operates are located within the District of Columbia. There is adequate public transportation throughout the Washington area. In addition, the Foundation assists employees through the computerized carpool matching system and the employees association has made arrangements for monthly parking rates for carpoolers.

District schools have not been consulted about their curricula and how it affects employment at the Foundation. Through NSF's grants program, however, NSF sponsors research programs aimed at identifying barriers women and minorities face in pursuing science careers. Additionally, NSF has funded a project aimed at retraining women in science and engineering.

Employees are encouraged to participate in civic, community and other groups interested in enhancing equal employment opportunity. Members of the National Science Board, the NSF Director and other management officials have given addresses on equal employment opportunity, particularly in science.

On the other hand, NSF has invited persons from other agencies and organizations to participate in Foundation activities directed toward equal employment opportunity. NSF has initiated an exchange of monthly statistical data with sister agencies and plans to follow-up with these same agencies with meetings on common issues, such as scientific recruitment. NSF and GSA, located within a block of each other, are planning some joint EEO Counselor meetings.

NSF participates in cooperative education programs and provides employment opportunities for student aides. No current plans are underway, however, to reinstitute the worker-trainee program.

NSF sends copies of job announcements to a wide variety of organizations and other Federal agencies. In addition, representatives of the Foundation actively participate in conferences on a wide variety of topics concerned with personnel and other EEO related matters.

PROBLEMS IDENTIFIED:

1. More community contacts need to be made with Indian and Spanish-Speaking groups to increase recruitment efforts directed toward these groups.

2. Although extensive letter writing efforts have been directed to various recruitment resources, personal follow-up is felt essential to this effort.

NSF UPWARD MOBILITY COLLEGE PROGRAM

	Spring 1973	Summer 1973	Fall 1973	Spring 1974	Summer 1974	Fall 1974	Spring 1975	Summer 1975	Fall 1975	Spring 1976	Summer 1976	Total**
Individuals Enrolled												
Women: Black	36	35	27	22	20	22	19	17	14	13	10	110
White	25	30	32	25	24	27	22	26	26	28	26	105
Spanish	2	1		1	1	1	1	1	1	1	1	2
Unknown		1			2							3
Total Women	63	67	59	48	47	50	42	44	41	42	37	220
Men: Black	3	1	3	2	2	1	2	2	2		1	13
White	1	1		1	2	3	3	2	3	2	2	10
Spanish												
Unknown												
Total Men	4	2	3	3	4	4	5	4	5	2	3	23
Total Ind. Enrolled	67	69	62	51	51	54	47	48	46	44	40	243
Total Courses Taken*												
Women: Black	36	35	29	25	22	23	22	19	19	13	19	262
White	25	31	32	29	26	28	28	31	29	32	39	329
Spanish	2	1		1	2	1	1	3	3	3	2	19
Unknown		1			2							3
Total Women	63	68	61	55	52	52	51	53	51	48	60	613
Men: Black	3	1	3	4	3	1	2	2	2		1	22
White	1	1		1	2	4	3	3	4	4	2	25
Spanish												
Unknown												
Total Men	4	2	3	5	5	5	5	5	6	4	3	47
Total Courses Taken	67	70	64	60	57	57	56	58	57	52	63	660

*Three courses were offered each semester. In several instances one person would enroll in more than one course.

**Since several employees were enrolled in more than one semester, this total represents the actual number of persons enrolled in the program.

VIII. PROGRAM EVALUATION

Equal employment opportunity planning at the Foundation is a continuing process. The Office of Equal Employment Opportunity, all of the Directorates, and the Division of Personnel and Management all actively participate in personnel and equal employment opportunity evaluations. These offices work together in identifying areas to be studied and methods of evaluation. All such evaluations are thoroughly reviewed for accomplishments and to identify areas that need more attention. Problem areas are immediately addressed rather than waiting for the "annual" EEO Plan development process. For this reason, there will generally be studies underway, the results of which will not be reflected in an EEO Plan. However, as noted above, the results of such studies dictate actions to be taken.

Persons directing personnel and EEO studies and evaluating the results are fully trained in both EEO and merit standards. Program staff frequently identify concepts or issues worthy of follow-up and may also participate in discussions and evaluation efforts with their Directorates.

Statistical data are generally published and received within the EEO office no later than 10 days following the end of each month. Such data reflects all personnel transactions through the end of the month the data represents, and are relatively accurate.

PROBLEMS IDENTIFIED:

1. The evaluation process needs to be refined to reflect specific Directorate problems and goals established to supplement the agency-wide affirmative action plan.

PART D - REPORT OF OBJECTIVES AND ACTION ITEMS

The Director of the Office of Equal Employment Opportunity is the primary official responsible for assuring that all NSF objectives are achieved.

I. ORGANIZATION AND RESOURCES

A. STATEMENT OF PROBLEM. EEO Officials need additional training in such matters as personnel, EEO Case Law, Labor-relations, management, EEO and Career Counseling (Problem: Part C.I.1.).

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To provide appropriate training to all EEO Officials, to enable them to perform their respective jobs in an effective and efficient manner.	As EEO and Upward Mobility Training Counselors are replaced, care will be exercised in selecting replacements who have a sensitivity to the complex motivational problems related to these fields.	EEO Director Personnel Officer	As needed
	The EEO Director and Deputy will receive science program orientation by attending program reviews and meeting on a selective basis with Program Managers.	Assistant Directors Office Heads	Continuing
	EEO Counselors are to be provided more training in personnel, EEO Case Law and in Labor Relations.	EEO Director	Quarterly
	Spanish-Heritage, American Indian and Asian Coordinators are to be provided more training in Personnel and Labor-Relations.	EEO Director	Semi-Annually
	Deputy Director, EEO to take CSC and other formal training in both Labor Management and in Personnel.	EEO Director	Throughout CY '77

	Upward Mobility Training Coordinators and Counselors are to be provided Career Counseling and EEO training both in-house and through CSC.	Assistant Directors	June 1, 1977

B. STATEMENT OF PROBLEM. Greater allocation of time needs to be expended by the Spanish-Heritage, American Indian and Asian Coordinators (Problem: Part C.I.2.).

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To improve the Special Emphasis	The Spanish-Heritage, American Indian and Asian Coordinators are to be provided up to 10% of their time in community contacts or in meetings with appropriate persons and organizations to identify more effective recruitment resources at all levels of employment.	Director, EEO Director, NSF	Continuing

C. STATEMENT OF PROBLEM. NSF Circular Number 5 on Equal Employment Opportunity needs to be revised (Problem: Part C.I.3.).

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To update NSF's procedures to incorporate procedures for handling complaints in cases of possible conflict of interest and to incorporate changes resulting from labor agreements.	Prepare and publish modifications to NSF Circular No. 5 on EEO.	EEO Director	March 31, 1977

D. STATEMENT OF PROBLEM. Management tools need to be developed (Problem: Part C.I.4.).

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To enable the Foundation to track all resources applied to equal employment opportunity program, there is a need to develop management and fiscal controls.	The Office of EEO, in cooperation with NSF's budget office, will work toward developing a system for recording and tracking all EEO resources.	EEO Director OPRM Director	9/30/77
2. NSF will improve the overall management of the total EEO program through the use of productivity and cost-effectiveness measures and evaluations.	Criteria will be developed and utilized for measuring productivity and cost-effectiveness.	EEO Director	9/30/77

II. DISCRIMINATION COMPLAINTS

A. STATEMENT OF PROBLEM. Basic EEO Counselor training needed (Problem: Part C.II.1.).

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To maintain a trained cadre of EEO Counselors.	As EEO Counselors are replaced, they are to enroll in basic EEO Counselor training given by CSC in the first possible course.	EEO Director Personnel Officer	As necessary

B. STATEMENT OF PROBLEM: EEO investigative time needs to be significantly reduced (Problem: Part C.II.2.).

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To reduce the time for processing EEO complaints from the current average of days per case to less than 180 days per case, by March 30, 1977.	Use CSC or contract investigators for most complex or time consuming types of investigations. Where in-house investigators are utilized, insure that they are free from all other assignments during the time they are assigned the case.	EEO Director	March 30, 1977

III. RECRUITMENT

A. STATEMENT OF PROBLEM. There is a need for more extensive recruitment for American Indians and Spanish-Speaking at all grade levels; for minorities and women in selected occupational areas. (Problem: Part C.III.1, 2, 3.).

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To increase the number of Spanish-Speaking employees by 4 or by 36.4% and to hire our first American Indians (2), consistent with merit principles.	The Special Program Coordinators will actively recruit Spanish-Speaking and Indian employees by expanding resources by making contact (through correspondence and personal visits) with organizations and individuals. Once effective resources have been identified, they will be provided copies of all job announcements.	EEO Director Personnel Officer Spanish-Speaking Coordinator Hiring Officials	9/30/77
2. To increase the percentage of women in grades 12-18 by 23 or by 29.1%; to increase the percentage of blacks in grades 12-18 by 16 or by 76.2%, consistent with merit principles.	To expand the resources to enable successful accomplishment of this objective, correspondence has already been initiated toward over 1,200 educational institutions throughout the U.S. Follow-up correspondence is currently being developed.	Assistant Directors Hiring Officials Personnel Officer EEO Director	2/28/77
	Correspondence is being directed to over 80 professional societies and associations in specialized vocations to further expand scientific and technical recruitment efforts.	EEO Director	2/28/77
	Contacts will be established through correspondence and visits to special emphasis groups to identify and encourage women and minorities to	EEO Director EEO Deputy	2/28/77 and Continuing Beyond

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
	apply for positions at NSF in professional categories. Periodic meetings with such groups will be initiated.		
3. To expand the resources for people to move into mainstream jobs, many of the numerous methodologies for recruitment such as the cooperative education program, the Stay-In-School Program, Intergovernmental Personnel Act, etc., will be more extensively utilized in attracting minorities and women.	An advisory committee with representatives from academia and special interest groups will be established to assist the Foundation in developing more effective means of increasing the numbers of women and minorities at the professional levels.	EEO Director	6/1/77
		Assistant Directors Hiring Officials	9/30/77

B. STATEMENT OF PROBLEM. There is a need to develop a system for identifying, recording, analyzing and improving (as appropriate) the numbers of minorities, women and handicapped serving on advisory committees, review panels and other mechanisms by which the scientific community provides assistance to the Foundation.

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To establish a system for measuring the numbers of minorities, women and handicapped serving as advisors and reviewers.	Program officials will be required to record the race, sex and handicapped status of all advisors and reviewers they come into personal contact with.	Assistant Directors	6/1/77

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
2. To analyze the numbers of women, minorities and handicapped and improve their numbers where it is found they are under-represented.	Statistical studies will be made of all advisors, panelists and reviewers identified by race, sex and handicap status. Directorates will be advised of the results of all studies and will be responsible for establishing goals and timetables for making necessary improvements.	EEO Director Assistant Directors	9/30/77

IV. FULL UTILIZATION OF SKILLS AND TRAINING

A. STATEMENT OF PROBLEM. In grades 1-4 and 9-11, minorities are in grade for longer periods of time prior to promotion than are caucasians; in grades 5-8, 9-11 and 12-13, women are in grade for longer periods than men prior to promotion; very few promotions are made to grades 14 and 15, although this grade range comprises 29.8% of all staff (Problem: Part C.IV.1, 2, 3 and 4.).

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To lessen the possibilities of minorities and women not being recognized for promotion as rapidly as males or caucasians.	Conduct supervisory sessions to make supervisors more sensitive to fair and equitable selection criteria and recognition for promotional opportunities.	EEO Director Assistant Directors	4/30/77 8/31/77
	Evaluate selection process to insure selection of candidates includes equitable determinations are made to select minority candidates with growth potential at the lower grades.	EEO Director Assistant Directors	6/1/77
	In the performance evaluation process more attention is to be given to improving skills to better prepare minorities and women for promotional opportunities.	Supervisors	4/30/77 9/30/77
	CSC training agreements will be utilized to help move individuals into occupational series where greater growth can be attained. Opportunities will be identified and utilized in developing such agreements.	EEO Director Personnel Officer Supervisors	6/1/77

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
	More extensive counseling will be provided by supervisors and Upward Mobility Training Counselors and Personnel Specialists to assist employees in setting and achieving their goals.	Supervisors Personnel Officer	Continuing
2. To better prepare minorities and women for management positions, every effort should be made to select at least one minority and one woman for each Executive Development Training course in which NSF participates.	Assistant Directors will continue to be encouraged to nominate women and minorities with management potential for Executive Development Training. Management Council will continue to select nominees on an equitable basis, where possible including minorities and women among those selected for training.	Assistant Directors Management Council Personnel Officer EEO Director	As courses are offered

B. STATEMENT OF PROBLEM. There is a need to better identify skills of existing staff in relation to skills required by NSF to permit better structuring of organization to best utilize existing skills (Problem: Part C.IV.5.).

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To develop more effective mechanisms for making skill surveys in an effort to better utilize employee skills and determine training needs.	Coordinate with EEO, the Personnel Office, and Assistant Directors in identifying essential elements in making a skills survey.	EEO Director Assistant Directors Personnel Specialists Career Counselors Personnel Officer	6/30/77

V. UPWARD MOBILITY FOR LOWER LEVEL EMPLOYEES

A. STATEMENT OF PROBLEM. There is a need to expand the advancement opportunities for lower level employees.

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To develop a viable program designed to provide upward mobility opportunities for employees below the GS-9 or equivalent levels who are in positions or occupational series which do not enable them to realize their full work potential.	Develop an NSF Upward Mobility Plan which is tailored to meet the needs of the Foundation and complies with the requirements of FPM Letter 713-27. Such plan will as a minimum contain the following elements: (1) identification of target positions (2) application of merit procedures for selection of employees in Upward Mobility programs (3) development and delivery of counseling services (4) involvement of supervisors in program planning and implementation (5) design and delivery of required training (Attachment 1 of Appendix II to FPM Letter 713-22) (6) development of evaluation and reporting procedures	Personnel Officer EEO Director	8/15/77

VI. SUPERVISORY AND MANAGEMENT COMMITMENT

A. STATEMENT OF PROBLEM. The need continues for regular training to be given to supervisors and managers on their equal employment opportunity responsibilities (Problem: Part C.VI.1.).

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To conduct supervisory training sessions at least twice annually to improve supervisory skills in effective communication with their staff.	In-house supervisory training will be provided all newly employed supervisory staff, and those not having previously received such training.	Assistant Directors Personnel Officer EEO Director	5/1/77 9/30/77
2. To conduct at least two EEO training courses for managers and supervisors so they can better understand and implement their full responsibilities under law and develop the techniques and sensitivity for carrying out their full responsibilities.	EEO seminars will be conducted in-house, primarily at the directorate level, so as to better direct training to relate to the specific problems and needs of each directorate.	Assistant Directors Personnel Officer EEO Director	5/1/77 9/30/77

VII. COMMUNITY OUTREACH

A. STATEMENT OF PROBLEM. More community contacts need to be made with Indian and Spanish-Speaking groups to increase recruitment efforts directed toward these groups (Problem: Part C.VII.1.).

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To expand resources to be utilized in direct recruitment for employing more Indians and Spanish-Speaking employees.	The Indian and Spanish-Speaking Coordinators will expend more time and effort expanding their resources and contacts, identifying individuals and organizations that can be of most assistance in referring candidates for specific job openings.	EEO Director Indian Coordinator Spanish-Speaking Coordinator	3/30/77

B. STATEMENT OF PROBLEM. Although extensive letter writing efforts have been directed to various recruitment resources, personal follow-up is felt essential to this effort (Problem: Part C.VII.2.).

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To convince recruitment resources of NSF's sincerity in attracting more women and minority candidates for scientific and technical positions and to expand the numbers and quality of potential job candidates, through more extensive letter writing, personal contacts and advisory committees.	The extensive recruitment efforts outlined under Part III of this section will be enhanced by personal contact and visits to university campuses, meetings with special interest organizations and societies, and through the establishment of an advisory committee made up of persons from these groups.	EEO Director Personnel Officer	5/1/77

VIII. PROGRAM EVALUATION

A. STATEMENT OF PROBLEM. The evaluation process, as it specifically relates to the Affirmative Action goals, objectives and actions to be undertaken in accomplishment of such goals, needs to be refined (Problem: Part C.VIII.1.).

OBJECTIVE	ACTIONS	RESPONSIBLE OFFICIAL	TARGET DATE
1. To design statistical data formats for distribution to directorates to enable them to make statistical comparison studies, etc.	Data will be compiled and circulated to each directorate at least quarterly, to assist them in making studies of their problems and accomplishments relating to actions identified within each respective directorate. Data provided each directorate will be tailored to meet problems identified within their areas of jurisdiction.	EEO Director	Each Quarter beginning 12/31/76
2. To better coordinate the Affirmative Action process to include a quarterly feeder system of information between the directorates and the Office of EEO and to management.	Information systems will be developed by the Office of Equal Employment Opportunity to better coordinate the affirmative action process. Such systems will include exchanges of data and internal evaluation results which will be utilized in evaluating directorate progress and preparing quarterly progress reports to management.	EEO Director Assistant Directors	3/31/77
3. To conduct EEO attitude surveys as a tool in measuring the effectiveness of the affirmative action plan.	EEO attitude surveys will be developed and undertaken in all directorates. Such surveys will include spot interviews of managers and supervisors.	EEO Director	6/30/77

(17) With respect to the Resource Centers in Graduate Education Program, can you state what funding levels you feel can be justified in future budget requests beyond FY 78?

This is a new program thrust initiated this year. Proposals for the first projects have not yet been received in the Foundation. The future directions of this activity and the concomitant need for funding will depend greatly upon several factors including the development of the program concept in this upcoming round of review and the advice of the recently established Advisory Committee for Minority Programs in Science Education. While we will be in a much better position at this time next year to predict future needs, I believe that a prudent, phased, well-designed program for the establishment of Minority Graduate Centers will be most effective in the long run. Based on the last information we have available, a reasonable 10-year estimate would be approximately $50 million for centers and ancillary activities.

(18) A number of inquiries and complaints have been forwarded to this Committee in that the Advisory Committee to the Resource Centers for Graduate Education in Science and Engineering does not include a sufficient number of practicing scientists from the minority groups.

Are you making serious attempts to incorporate Chicano scientists in this advisory group? Why is the Advisory Committee so heavily dominated by professionals in education and not practicing researchers in science? Doesn't the present makeup of the committee suggest a subservient role for increasing the number of practicing researchers from the minority communities?

Nominations for the Advisory Committee for Minority Programs in Science Education, which includes among its responsibilities the evaluation and assessment of activities within the Resource Centers for Graduate Education Program, were solicited from 28 organizations and from Foundation staff producing a pool of more than 230 nominees from which 12 persons were to be selected. Not less than 7 were to be representative of minority scientists, institutions with substantial minority enrollments, and groups serving important functions within the minority community. In selecting among persons of comparable experience and training, care was taken to insure, to the extent possible, representation with respect to sex, race, age, and specific ethnic minorities to be served by the various Foundation programs.

The following points relate to the specific concerns raised in Question (18):

(1) The Advisory Committee is to provide advice on all minority-focused programs in Science Education which would not suggest that the Committee's membership should be heavily research-oriented.

(2) Ten of the 12 members hold doctoral degrees in a variety of fields which indicates at least some research background on the part of each.

(3) According to biographical information on hand, more than 40 percent of the Advisory Committee members are active in research.

(4) The Committee's charter specifies representation from groups within the minority community and that three members should be nonscientists, thus reducing the number of members who are likely to be active in research.

(5) With a membership of 12 it would be very difficult to meet Charter specifications, insure adequate representation along sex, race, age, and ethnicity lines and simultaneously insure the presence of a scientist, a nonscientist, female, etc., from each specific ethnic group.

The Advisory Committee will not be making recommendations or decisions concerning programs to be funded in any of the minority-focused programs in the Foundation. In the case of the Minority Centers for Graduate Education Program, it is our judgment that panels assembled to review and make recommendations on proposals submitted to the program should be representative of:

(1) active research scientists in the natural or social sciences and/or engineering; and

(2) persons knowledgeable of:

(a) the various minority communities to be served;

(b) institutional planning/budgeting; and

(c) the conduct of broad-based studies.

(19) In your report to the Congress on this Resource Centers in Graduate Education in Science and Engineering Program it was pointed out that there is a lack of adequate and regular data collection on minority participation in science. Who is mostly responsible for the regular collection of reliable data on this subject? If you feel that such data collection is in the proper domain of the NSF, what criteria do you feel can be used to gauge whether any progress is being made by minorities in increasing their representation in science and engineering?

Whether or not there are adequate and timely data concerning minorities depends on the issues to be addressed. Basically, current data collection is considered sufficient in most areas with the exception of biennial, instead of annual, collection of data in many surveys. Data prior to the past several years have a number of limitations which make trend analyses very difficult.

Data on minority participation in science and engineering are collected by a number of Federal agencies including the National Science Foundation, the National Center for Education Statistics, the Census Bureau, the U.S. Department of Labor, and the U.S. Civil Service Commission.

Since its inception, the NSF has been legislatively assigned a primary role in developing information on demographic, educational, and professional characteristics of the U.S. science and engineering population. In addition to its broad legislative mandate in the field of science and engineering manpower, the Office of Management and Budget has assigned the NSF focal agency responsibilities in this field. We think both the legislative and executive mandates are proper, and the Foundation is developing a continuously improving statistical data base on scientific and engineering personnel.

Data useful for measuring the progress of minorities in science and engineering can be grouped into three categories. These are: (1) those concerned with the education of scientists and engineers; (2) those concerned with the labor market experience of scientists and engineers; and (3) those concerned with minorities as a human resource. Specific indicators include data on science potential of high school students, earned degrees, employment, unemployment, and salaries, as well as others designed to measure both the absolute and relative progress of minorities in science and engineering.

Current data on minorities in science and engineering indicate that extreme caution must be exercised in assuming

that Black and minority are synonymous. Of the 79,000 minority scientists and engineers in 1974, 42 percent were Asians and 37 percent were Black. Data on level of science potential during the high school years indicate that Black and Spanish surnamed persons faced problems different from those faced by Orientals. Thus, information must be developed for major racial and ethnic groups. Classification systems showing only minority-nonminority status do not address some of the more significant issues regarding "minorities" in science and engineering.

(20) Against the background of support that NSF extends to international cooperation in science of which experiments, international conferences, scientists working in foreign countries and foreign scientists working in this country are a part, how do you view NSF's responsibility in assisting the increased participation of American minorities in science and engineering in this country?

I do not believe that there is any conflict between these two program areas nor is there any substantial connection programmatically. International cooperation and assistance for American minorities in science and engineering co-exist as discrete efforts within a mosaic of activities whose overall goal is to improve the health of U.S. science.

NSF supports international activities primarily to strengthen science in the United States and to support U.S. foreign policy. Another part of the responsibility of NSF is to support affirmative action policies in scientific areas. Toward this goal, it seeks to effect long-range improvement in the basic scientific strength of minority institutions of higher education through the Minority Institutions Science Improvement Program. Another effort, the Minority Institutions Graduate Traineeship Program, seeks to strengthen graduate training in such institutions. The Minority Centers for Graduate Education in Science and Engineering Program has been established and will promote increased participation by minorities in scientific and engineering careers.

(21) The small business set aside in the applied research area appears to be working very well. The establishment of the Office of Small Business Research and Development, as well as the recent announcement that special awards will be made to encourage the participation of private venture capital as a follow-on to NSF grant support has been welcomed by the small business community. What future plans do you have for additional initiatives by NSF toward small business?

In December 1976 NSF established a new Office of Small Business Research and Development, which seeks to enhance opportunities for small firms in all parts of the Foundation. I expect this Office will continue actively to encourage small business to participate in NSF programs in appropriate areas.

We also plan to continue in RANN the small business innovation solicitation approach with a second solicitation late this year. Others may be issued at a later time if this approach looks promising. Further, we plan some follow-on Phase II awards. In the RANN area we will continue the Innovation Centers, Cooperative Research, and Regional Research programs which emphasize small business cooperation with academic institutions.

We have in the planning stages at this time a new initiative to increase the technical capabilities of small firms. This would involve a cost-shared program with industrial associations with a majority of small business members working on technical problems that are common to industry and that will increase their technical capabilities.

In addition to these initiatives, I have asked the newly appointed NSF Advisory Council to consider NSF practices on the support of research by private industry. Further, the National Science Board currently is continuing its reexamination of present NSF policies on the support of basic research in industry.

(22) Since your testimony on the NSF authorization, two amendments have been proposed to the pending bill - which we expect to take up on the Senate floor later this week. I know you have reviewed those amendments - one of which deals with the activities of local school boards, the other with geographic distribution of NSF funds. Would you like to make any comment on those amendments?

I believe that present NSF administrative procedures and requirements fully protect the interests of local school boards and students involved in using NSF-supported curricula. Every NSF grantee who is engaged in curriculum development must comply with procedures established by local school boards or comparable authorities. In addition, every grantee must include in all the materials developed under the grant the requirement that the materials be accessible for parental inspection and must obtain written permission for classroom testing from appropriate school authorities. All decisions on participation in the development and testing of materials, as well as their subsequent adoption and use, are made at the local level by school boards or other appropriate school authorities. For these reasons I do not feel the proposed amendment regarding local school boards is necessary.

The amendment that was proposed specifying that not less than one-quarter of one percent of NSF funds be allocated to each state is also one that I would oppose. The approach of providing a specified minimum percent of NSF funds to each state departs, in a very fundamental way, from the underlying rationale for all of the Foundation's programs - the support of competing proposals on the basis of merit as the best means of strengthening basic research and science generally. In addition, the total amount of NSF dollars a state receives is not necessarily an indication of how successful that state is in getting its proposals accepted for funding. Some states with very low dollar amounts from NSF actually have quite a high percentage of their proposals accepted for funding. On the other hand, only three of the states in the top ten in terms of dollars received from NSF were in the top ten in terms of percentage of proposals funded during fiscal year 1976.

NSF is, of course, concerned about the strength of science nationwide. Part of our mandate is to avoid "undue concentration" of research and education in science. The National Science Board is looking into this question and I personally am concerned that we find more effective means of understanding the factors that affect geographic distribution of the Foundation's funds. I do not think, however, that a fixed formula will help us understand or deal with these underlying concerns.

(23) As you know the Congress over the years has been concerned about providing a base of institutional support to undergird the project system. For example, in the National Institutes of Health there is the biomedical research support grant program which, as initially created, authorized up to 15 percent of NIH research funds to be spent as flexible grants to institutions which successfully compete for research support. As you are aware this Committee in the FY 78 authorization for NSF has taken a small step toward restoring to the NSF a comparable program of flexible research support which we are calling Basic Research Stability Grants. Do you feel that it is an essential Federal responsibility to provide relatively modest but flexible amounts of discretionary funds to undergird our project system?

Providing flexible support for discretionary use by academic institutions has in the past presented problems for NSF because the rationale for this type of support cannot be tied directly to the merit of a particular research undertaking. Such support is usually provided through some type of formula grant. For several years prior to fiscal year 1975, the NSF provided this type of support under Institutional Grants for Science, a formula-grant program based on the level of Federal funding given to academic institutions for science programs. Since these grants were based on the level of NSF funding obtained by the institutions, they were indirectly tied to the merit of research and other science projects conducted by colleges and universities.

While such a program has been used in the past by NSF and later stopped in favor of increased competitive project support, there are advantages to reinstating such a program. Since NSF grants are based on merit, it is possible for imbalances to be created in the institution's overall science programs, and consequently a program providing funds for discretionary use by the institutions could help colleges and universities to balance out their overall science program efforts. NSF will examine the proposed program carefully.

(24) There has been growing concern in the scientific community over the availability of funds to improve scientific instrumentation. The proposed budget for the NSF for FY 78 provides substantial increases in this area. How do you view the present situation and the impact of this new funding? Do you foresee further increases in future budgets?

Acquisition of specialized instrumentation will enable investigators to identify and measure phenomena that cannot be detected with older equipment. Of the $81.62 million increase proposed for research activities in NSF's fiscal year 1978 budget, more than 34 percent or $27.98 million would be used to develop and upgrade instrumentation, equipment, and facilities.

The program officers through proposal content, their contacts with the external scientific community, and their own expert knowledge in specific fields of science continuously monitor the needs of the scientific disciplines.

In 1971 the National Academy of Sciences conducted a survey of the instrumentation needs in a number of scientific disciplines. The resulting report concluded that there were serious needs for instrumentation that were not being met at that time.

During 1977 NSF conducted a telephone scan of the instrumentation needs of 10 departments (5 from the top-rated 10-15 departments and 5 from second-tier departments) in each of 8 fields of science to see how the situation had changed since the National Academy of Sciences survey on instrumentation in 1971. While the results are tentative and at best semi-quantitative, they unequivocally support the position that the state of instrumentation is a matter of serious concern for the future of American science.

There is a clear consensus among department chairman that research opportunities for faculty have been substantially limited by lack of instrumentation. There is no apparent difference across fields or among universities in the top tier and those in the second tier.

Therefore, there will be a continuing need in future budgets to provide the most advanced instruments in each of the science disciplines to realize the full potential of the NSF mission to support the highest quality science projects.

Senator KENNEDY. The committee stands in recess.

[Whereupon, at 11:24 a.m., the committee adjourned, subject to the call of the Chair.]

○