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RADIO AND ELECTRICAL ENGINEERING DIVISION**



ANALYZED

A BIBLIOGRAPHY ON SCIENCE AND SOCIETY

BY

L. R. McNARRY AND T. MOISEYEV

ANALYZED

**OTTAWA
DECEMBER 1970**

NRC NO. 11876

Moiseyev

ANALYZED

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A
BIBLIOGRAPHY
ON
S C I E N C E A N D S O C I E T Y

Prepared

by

L. R. McNarry and T. Moiseyev

December 1970

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Foreword

This bibliography has been prepared from my personal collection of articles obtained over the past 15 or so years. It is not exhaustive nor is it highly selective. The collection arose from my interest in education and the interactions of science and society.

The sources are primarily the periodicals appearing in the National Research Council Radio and Electrical Engineering Division library. That such a range of articles, papers and comment should appear in what is essentially a scientific and technical service library is mute testimony to the range of concern within the scientific and technological community about the current state of our society.

It is hoped that the preparation of this bibliography will be of use to those who have need to sample the current range of concerns about the interaction of science and society.

The need to catalog this collection arose from my recent activity with the Canadian Association of Physicists in an attempt to examine the attitudes of Canadian Youth towards science and technology.

The sorting of this material into categories and the preparation of quick-sort cards was the work of Miss Tanya Moiseyev, a first year Carleton student, whose major is language. That she would tackle such a job surprised me, that she finished it amazed me!

Reports have not been included, nor have books per se. These will be listed in a supplement at a later time.

December 1970.

L. R. McNarry.

A few of the items are not attributable to a particular source but are included because of their intrinsic interest.

Aerospace Technology
AMA Archives of Surgery
American Journal of Physics
American Scientist
Analytical Chemistry
The Argus
Astronautics and Aeronautics
The Atlantic Monthly
Australian Physicists
Aviation Week and Space Technology
The B.C. Teacher
Bell Laboratories Record
British Communications and Electronics
Broadcasting & Communication
Bulletin of the Atomic Scientists
Canadian Electronics Engineering
Canadian Magazine
Canadian Ontario Home and School
Canadian Refrigeration and Air Conditioning
Canadian Scientists
Canadian Weekly
Changing Times
Chatelaine
Chem 13 News
Chemical and Engineering News
Chemistry in Canada
Christian Science Publishing Society
College of Education (University of Toronto)
Commerce Perspective
Commission on College Physics Newsletter
Computers and Automation
Crucible
Cumberland Home and School

Daily Express
Data Processing
Datamation
Dimensions in Education
Discovery
Education Canada
Education in Science
Educational Technology
Electrical World
Electron
Electronic Design
Electronics and Power
Encounter
The Engineer
The Engineering Journal
The Ethical Education Association
Financial Times
Flying Sucer Review
Fortune
Gazette Business Review & Forecast
Globe and Mail
Guardian Weekly
Halifax Chronicle
Harvard Business Review
High Fidelity Magazine
Horizon
IEEE Spectrum
IEEE Student Journal
IEEE Transactions on Education
IEEE Transactions on Engineering Management
Industrial Banker
Industrial Research
International Science and Technology
IRE Transactions on Engineering Management
Journal of the American Medical Association
Journal of Chemical Education
Journal of Educational Thought

Journal of Environmental Sciences
Journal of Research in Science Teaching
Journal of the Royal Astronomical Society of Canada
Kingston Whig Standard
Life Magazine
The Listener
London Evening Free Press
MacLean's
Manas
Minerva
Missiles and Rockets
Modern Data
Montreal Star
Nature
New School Science
New Scientist
New Society
New York Times
New York Times Book Reviews
The New York Times Magazine
Ontario Department of Education
Ottawa Citizen
Ottawa Journal
Personnel Journal
The Photographic Journal
Physics Education
Physics in Canada
Physics Teacher
Physics Today
Planetary and Space Science
Playboy
Professional Public Service
Research and Development
Royal Bank Monthly Newsletter
Saturday Review
The School Board
School Science Review

Science
Science and Children
Science and Technology
Science Forum
Science Journal
Science News
The Science Teacher
Scientific American
Scientific Research
Sky Telescope
Soviet Astronomy
Space Aeronautics
Space World
Sunday Times Magazine
Technology and Culture
Think
Time Magazine
Times
Toronto Daily Star
Unitarian Universalist Association
United Church Observer
University Affairs
Vancouver Sun
Weekend Magazine
Westinghouse Engineer
Winnipeg Free Press
Wireless World
Womans Day

Organization

Since each article listed is filed and immediately available the material is organized by author name for easy access. Otherwise the material is arranged alphabetically by title within any given subject area.

1. Book Reviews -

- a) Social Science
- b) Education
- c) Science, Science & Society
- d) Natural Science

2. Education -

- a) Elementary Schools
- b) High Schools
- c) Universities
- d) Teachers, Teaching
- e) Students
- f) Science Education
- g) General Education
- h) New Methods, Approaches
- i) Learning, Creativity, Intelligence, I.Q., Reading, Problem Learning
- j) Swing from Science

3. Natural Science -

- a) Brain, Mind and Behaviour, Learning and Memory
- b) Evolution, Extinction
- c) Early Man, Old Civilizations
- d) Genetics, Eugenics
- e) Medicine, Surgery
- f) Nervous System
- g) Animals, Insects
- h) General Biology (including plants)

4. Science & Society -

- a) Science and Society
- b) Scientists
- c) General Science
- d) Science and Government, Politics, Warfare, Economy
- e) Employment, Management
- f) Space & Astronomy
- g) Geophysics, Weather
- h) Research
- i) Engineering, Maths

5. Social Science -

- a) Business, Economy
- b) Youth (Drugs, Unrest)
- c) Law
- d) Communications
- e) Pollution
- f) General Social Science & Society
- g) Population & Food (crisis)
- h) Politics, War
- i) Psychology, Psychiatry
- j) Religion

B O O K R E V I E W S

a) Social Science

Branscambe, L., The Need for Long-Range Goals, Physics Today, Nov. 1968, pp 69-70

1. THE PROMETHEUS PROJECT by Gerald Feinberg (Doubleday N.Y. 1968)
- Feinberg wants the human race to determine rational goals for itself. He wants it done now before the power of modern science to change man is misapplied.

Devereux, E.C., Liberalism, Violence and Social Change, Bulletin of the Atomic Scientists, Dec. 1969, pp 36-38

1. THE POVERTY OF LIBERALISM by Robert Paul Wolff (Beacon Press 1968)
2. VIOLENCE AND SOCIAL CHANGE by Henry Bienen (Univ. of Chicago Press 1968)
- no society can ever undergo really fundamental change within the framework of its own rules.

Galbraith, J.K., The Affluent Society After Ten Years, Atlantic Monthly 1969, pp 37-44

1. THE AFFLUENT SOCIETY by J. K. Galbraith (Houghton Mifflin Company)
- the former Kennedy Ambassador to India looks back into the origins of the book, discusses its relevance to the contemporary scene and the instances in which developments have impelled Galbraith to change his mind.

Gilpin, R., The Two Ethics: Ultimate Ends or Ethical Responsibility, Science, Vol. 145, July 24, 1964, pp 374-378

1. STRATEGY AND CONSCIENCE by Anatol Rapoport (Harper & Row 1964)
- on a new approach to peace and disarmament on the grounds of man's unalterable irrationality.

Gilpin, R., Two Prescriptions for a Sick World, Science, Vol. 139, March 15, 1963, pp 1040-1043

1. AN ALTERNATIVE TO WAR OR SURRENDER by Charles Osgood (Univ. of Illinois Press 1962)
2. KILL AND OVERKILL: THE STRATEGY OF ANNIHILATION by Ralph Lapp (Basic Books 1962)
- is the driving motive in international relations today reciprocal fear?

Kerr, C., Society and the Status Quo: The Individual and the Innovative Society, Science, Vol. 144, April 10, 1964, pp 164-165

1. SELF-RENEWAL: THE INDIVIDUAL AND THE INNOVATIVE SOCIETY by John W. Gardner (Harper & Row 1964)
- a society that has reached heights of excellence may already be caught in the rigidities that will bring it down.

Lowry, R.P., In the Army Now, Science, Vol. 169, 1970 pp 570-571

1. THE AMERICAN ENLISTED MAN by C. C. Moskos, Jr. (Basic Books N.Y. 1970)
- an important assessment and debunking of myths about the military life.

Riecken, H.W., Quick Thinking, Science, Vol. 164, May 9, 1964, pp 663-665

1. MAXIMUM FEASIBLE MISUNDERSTANDING, by Daniel P. Moynihan (Free Press N.Y. 1969)
- on the need for "community action" in a society to combat the war of poverty.

Snow, J.A., Taking Thought for the Morrow, Science, Vol. 164, April 18, 1969, pp 285-186

1. THE PROMETHEUS PROJECT by Gerald Feinberg (Doubleday N.Y. 1968)
- on mankind's search for long-range goals.

Thorpe, W.H., Science, Faith and Society, New Scientist, March 20, 1969, pp 646-647

1. THE HUMANIST OUTLOOK by A. J. Ayer
- written by 19 members of the Advisory Council of the British Humanist Association of which Ayer is President. On the purely social and humanitarian concerns of these 19 men.

Tinker, J., Revolutionary From the Wilderness, New Scientist, Jan. 8, 1970, pp 69-70

1. THE ENVIRONMENTAL REVOLUTION, by Max Nicholson (Hodder & Sloughton)
- "either we master technology or it will destroy us".

Toynbee, A.J., N.Y. Times Book Reviews, Feb. 9, 1969, pp 3, 37

1. THE RELIGIOUS EXPERIENCE OF MANKIND, by Ninian Smart (Charles Scribners N.Y.)
- a book for Christians, ex-Christians and non-Christians. It is a history of mankind, centered on religion, not on war, politics or economics, although in many cases the latter three are inevitably involved.

Wright, Q., An Analysis of Conflict, Science, Vol. 138, Dec. 28, 1962, pp 1385-1388

1. CONFLICT AND DEFENSE, A GENERAL THEORY, by Kenneth Boulding (Harper N.Y.)
- on Boulding's "continuing conviction that the war is the major moral and intellectual problem of our age".

b) Education

Adams, B.S., Recalculation, Science, Vol. 164, May 9, 1969 pp 662-663

1. CROSSCURRENTS IN COLLEGE ADMISSIONS by Humphrey Doermann (Teachers College Press, Columbia 1968)
- an institutional response to student ability and family income.

Barr, Donald, Taught to the Tune of a Hickory Stick, Book Week Paperback, Jan. 10, 1965, pp 22-25

1. McGUFFEY'S FIFTH ECLECTIC READER ed. 1879 (New American Library)
2. McGUFFEY'S SIXTH ECLECTIC READER ed. 1879 (New American Library)
3. THE TRANSFORMATION OF THE SCHOOL by Lawrence A. Cremin (Vintage)
4. OLD-TIME SCHOOLS AND SCHOOL-BOOKS by Clifton Johnson (Rover)
5. THE MONTESSORI METHOD by Maria Montessori (Schocken)

Bowles Frank, International Educational Programs, Science, Vol. 137, Aug. 17, 1962 pp 519-520

1. THE WORLD ROLE OF UNIVERSITIES by Edward Weidner (McGraw Hill 1962)
- American higher education commitment to world education is one of our most important undertakings.

Burt, C., What is Intelligence? New Scientist, Feb. 13, 1969, pp 356

1. CONTEXTS OF EDUCATION, ed by J. F. Morris & E. A. Lunzer (Staples Press U.K.)
- on some of the practical problems of a teacher in the classroom.

Colvin, E.W., In the Limbo of Learning, Saturday Review, Dec. 16, 1967, pp 72

1. THE SHADOW CHILDREN: A BOOK ABOUT CHILDREN'S LEARNING DISORDERS by Careth Ellingson (Topaz 1967)
- a description of the learning problems of many, many children and what can be done about them

Curtis, M.C., Taking Students Seriously, Atlantic May 1969, pp 101-104

1. STUDENTS WITHOUT TEACHERS: THE CRISIS IN THE UNIVERSITY, by Harold Taylor (McGraw Hill)
- on the rebelliousness of university students and the university policies and systems.

Deason, H.J., Evaluating Science Books for Children, Science and Children, Nov. 1965 pp 9-11

- several suggestions to follow on evaluating a book.

Enarson, H.L., Free Universities and National Policy, Science, Vol. 138, Nov. 2, 1962, pp 581-586

1. THE FEDERAL INTEREST IN HIGHER EDUCATION, by Homer D. Babbidge, Jr., & Robert M. Rosenzweig (McGraw Hill 1962)
2. THE EFFECTS OF FEDERAL PROGRAMS ON HIGHER EDUCATION, edited by Harold Orans (Brookings Institution 1962)
- the government and the higher education community have been brought together to an unprecedented degree.

Friesen, J.W., Journal of Educational Thought, Vol. 2, 1968, pp 189-191

1. EDUCATION AND HUMAN VALUES by John Martin Rich (Addison-Wesley 1968)
2. ON WHAT IS LEARNED IN SCHOOL by Robert Driebe (Addison-Wesley 1968)
- schools should provide opportunities for students to become ethically selective and responsible.

Havinghurst, R.J., Education for Contemporary Society, Science, Vol. 143, Feb. 7, 1964, pp 556-558.

1. EDUCATION IN AN INDUSTRIAL SOCIETY by G.H. Bantock (Faber & Faber London 1963)
- a philosophy of education for a contemporary society, taking the position of the humanists as opposed to that of pragmatic scientists.

Ivany, J.W.G., Resource Letter EP-1 on Educational Psychology, American Journal of Physics, Vol. 37, No. 11, Nov. 1969 pp 1-8
- a guide to college physicists to some of the literature and teaching aids that may help them improve course contents in specified fields of physics.

Lynch, W.S., Good Old School Days Are Gone, Bulletin of the Atomic Scientists, Oct. 1969, pp 38-41

1. THE AMERICAN UNIVERSITY by Jacques Barzun (Harper & Row 1968)
2. CRISIS AT COLUMBIA by the Cox Commission (Vintage 1968)
3. UP AGAINST THE IVY WALL by Jerry L. Avorn and members of the staff of the Columbia Daily Spectator (Atheneum 1969)
4. REVOLUTION AT BERKELEY edited by Michael V. Miller & Susan Gilmore (Dell 1968)
5. DEMOCRACY AND THE STUDENT LEFT by George F. Kennan (Bantam 1968)

Marsh L., Journal of Educational Thought, Vol. 2, 1968 pp 182-189

1. SOCIETY'S CHILDREN: A STUDY OF RESENTMENT IN THE SECONDARY SCHOOL by Carol Nordstrom, Edgar Freidenberg & Hilary Gold (Random House N.Y. 1967)
- this book could be the breakthrough in the study of alienation.

Marsh, L., What Culture? What Heritage?, Journal of Educational Thought, Vol. 3, April 1969, pp 58-62

1. WHAT CULTURE? WHAT HERITAGE? by A. B. Hodgetts (OISE 1968)
- a study of civic education in Canada.

Miller, A.S., Universities in Crisis, Bulletin of Atomic Scientists, April 1969 pp 45-46

1. THE CLOSED CORPORATION: AMERICAN UNIVERSITIES IN CRISIS by James Ridgeway (Random House 1968)
- the author exposes the pretense that universities are communities of scholars dispassionately pursuing and teaching the truth.

Morrison, J.A., & Morrison J.A., Science Forum 6, December 1968, pp 27-28

1. ARTS V. SCIENCE, A COLLECTION OF ESSAYS edited by Alan S. C. Ross (Methuen)
- until scientists and humanists realize each other's merits and respect each other's points of view, a reform in education will be delayed.

Rosenhead, J., New Scientist, September 10, 1970, pp 542-543

1. THE RISE OF THE STUDENT ESTATE IN BRITAIN by Eric Ashby and Mary Anderson (MacMillan)

- discussion of "the student voice" in educational affairs, particularly the National Union of Students (NUS).

Selden, W.K., Administration as the Villain, Saturday Review, Dec. 15, 1962, pp 61

1. THE COMMUNITY OF SCHOLARS by Paul Goodman (Random House)

- the author's view of what is wrong with contemporary American higher education and what should be done about it.

Sproull, R.L., Universities of the Future, Bulletin of the Atomic Scientists, Nov. 1969, pp 43-44

1. CAMPUS 1980 (a collection of articles) edited by Alvin C. Eurich (Delacorte Press 1968)

- the views of more than one man concerning the universities of the future.

The Classroom Scene: Report From the Faculty, Center for Research on Learning and Teaching, Univ. of Michigan, May 1970

- a book list to inform teachers of what is available in the book world with which they can teach.

The Editor's Bookshelf, Saturday Review, May 18, 1963, pp 77-79

1. THE MISEDUCATION OF TEACHERS by James Koerner (Houghton Mifflin)

- a critical examination on the present program for teacher education

Science Books for Intellectually Gifted High School Students, Science Education, The Library of Science pp 1-8

- a criteria for selecting supplementary reading for those students who are intellectually gifted and want more than the text to read.

Science Education Information Report, ERIC Info. Analysis Centre for Science Education, Ohio State Univ. July 1969, pp 1-15

- on the information on materials disseminated on science education to teachers, administrators, supervisors, researchers and the public.

c) Science, Science & Society

Babitt, J.D., Science Forum, June, 1969, pp 41

1. SCIENCE IN POLITICS: THE ATOMIC SCIENTISTS MOVEMENT: 1945-1946 by Donald A. Stickland (Purdue Research Foundation)

- an account of the steps taken by scientists of the Manhattan Project to influence political decisions that would set, for future development of atomic energy, a pattern in U.S.A.

Berle, A.A., Scientists in National and World Affairs, Science, Vol. 143, Jan. 24, 1964, pp 341-344

1. THE ATOMIC AGE edited by Morton Grodzins and Eugene Rabinowitch (Basic Books 1963)

- Science and Society - science gave human beings the power to destroy current civilization by means of the atomic bomb and nuclear power.

Bernstein, D., Science is Culture Too, New Scientist, May 8, 1969, pp 314

1. SCIENCE: MEN, METHODS, GOALS edited by Boruch A. Brody and Nicholas Canaldi (W. A. Benjamin)

- science is also a culture and a great part of man's heritage, Bernstein concludes, "I hope that books like this will pave the way for the rebirth of interest in Science before the source of scientists dries up."

Bonn, G.S., Literature of Science and Technology, McGraw Hill Encyclopedia of Science and Technology (reprint) 1966 pp 2-7

- knowledge of Science-technology literature is essential to the continuing professional and technical development of all students, practical engineers and scientists.

Brown P., Stars, Planets and Life: The Evolution of the Cosmos, New Scientist July 17, 1969, pp 153

1. STARS, PLANETS AND LIFE: THE EVOLUTION OF THE COSMOS by Robert Jastrow (Heinemann)

Cade, C.M., New Scientist, Sept. 11, 1969, pp 541-542

1. MAN MODIFIED: AN EXPLORATION OF THE MAN MACHINE RELATIONSHIP by David Fishlock (Jonathan Cape)

Cardell, A.J., Science Forum, Vol. 16, August 1970, pp 30-31

1. TECHNOLOGY AND GROWTH: THE PRICE WE PAY by Mishan (Praeger)

- the cost of production is not only economic, it also is manifested in pollution and social tensions.

Coulson, C.A., God, Newton and the Nature of Man, New Scientist, Aug. 22, 1962, pp 398

1. ISSUES IN SCIENCE AND RELIGION by Ian G. Barbour (SCM Press)

- the author is concerned with; methods of inquiry in science and religion: man's relation to nature; God's relation to nature.

Cowen, R., America's Military - Industrial Machine, New Scientist, June 25, 1970, pp 644

1. REPORT FROM WASTELAND: AMERICA'S MILITARY - INDUSTRIAL COMPLEX by Senator William Proxmire (Praeger)

- "a factual, angry book"

Crane, D., The "Science of Science", Physics Today, Oct. 1969, pp 87-89

1. PUBLIC KNOWLEDGE: AN ESSAY CONCERNING THE SOCIAL DIMENSION OF SCIENCE, by John M. Ziman (Cambridge Univ. Press 1968)

- "Ziman's thesis is that the goal of science is not knowledge per se but public knowledge..."

Crowther, J.G., The Heavens in Literature, New Scientist, Feb. 6, 1969, pp 301

1. THE HIGH FIRMAMENT A SURVEY OF ASTRONOMY IN ENGLISH LITERATURE, by A. J. Meadows (Leicester Univ. Press)

- Dr. Meadows has reviewed the references to astronomy in English literature during the past 500 years.

Delin J., New Scientist, July 17, 1969, pp 153

1. SCIENCE HAPPENINGS, VOLUMES 1, 2 and 3 by Michael Holt (Ginn)

- should be required reading for all scientists

Dixon, B., The Compleat Scientist, New Scientist, Nov. 14, 1968, pp 386

1. J.B.S. THE LIFE AND WORK OF J.B.S. HALDANE by Ronald Clark (Hodder & Stoughton)

- the biography of a man who had a wide range of talents and interests.

Ermenc, J.J., Warfare for Science, Physics Today, Feb. 1969, pp 80

1. THE GERMAN ATOMIC BOMB by David Irving (Simon & Schuster 1967)

Freeman, M., Your Child's Physics Books, Physics Today, Dec. 1966, pp 67-74

- although more than 2,000 new titles for children are published each year, good reading in physics is not plentiful.

Goldhaber, M.H., Technological Man: Exploding the Myths, Bulletin of the Atomic Scientists, Nov. 1969, pp 41-42

1. TECHNOLOGICAL MAN THE MYTH AND THE REALITY, by Victor C. Ferkiss

- an example of a non-scientist trying to interpret the scientifically derived technological society.

Goodlad S., New Scientist, July 2, 1970, pp 38-39

1. CENTURY OF MISMATCH: HOW LOGICAL MAN CAN RESHAPE HIS ILLOGICAL TECHNOLOGICAL SOCIETY by Simon Ramo (David McKay U.K.)

- an inchoate collection of loosely linked chapters on the use of the systems approach to societies problems.

Greenberg, D.S., The Quest for Knowledge is Not Free of Glory-Seeking, New York Times, Nov. 17, 1968, pp 1 & 72

1. THE NEW BRAHMINIS, Spencer Klaw (William Morrow)

- "you must never believe all these things which the scientists say, because they always want more than they can get - they are never satisfied" - N. Khrushchev.

Hall M.B., New Scientist, June 25, 1970, pp 644

1. CLERKS AND CRAFTSMEN IN CHINA AND THE WEST by Joseph Needham (Cambridge University Press)

- the origins of modern science are even more complex than might be supposed.

Hamilton D., Man Versus Machine, New Scientist, July 2, 1970, pp 38

1. LABOUR PROBLEMS OF TECHNOLOGICAL CHANGE, by L. C. Hunter, G. L. Reid, D. Baddy, (Allen & Unwin U.K.)

- how some British industries have adjusted to technological change, particularly regarding human problems.

Hamilton, David, New Scientist, Sept. 11, 1969, pp 542

1. NUCLEAR POWER by W. G. Jensen (Foulis and Co.)

Hartley, H., The Elusiveness of Creativity, New Scientist, March 26, 1964, pp 833

1. ESSAYS ON CREATIVITY IN THE SCIENCES edited by Myron A. Coler (New York University Press 1963)

- different men of different professions discuss the various aspects of creativity, especially in science.

Hawkes, N., New Scientist, July 30, 1970

1. GERMAN SECRET WEAPONS: BLUEPRINT FOR MARS by Brian Ford (Macdonald & Co. U.K.)

- the German war effort also suffered from inefficiency.

Heitler, W., American Scientist, 55, 1967, pp 347-352

1. THE RELEVANCE OF PHYSICS by S. L. Jaki

- an essay review

Hynek, J.A., The Condon Report and UFOs, Bulletin of Atomic Scientists, April 1969, pp 39-42

1. SCIENTIFIC STUDY OF UNIDENTIFIED FLYING OBJECTS, by Dr. Edward U. Condon, (Bantam)

- a scientific investigation of U.F.O.s

Jeffrey, P. & P. & H. & T. & B., No Inspirational Apple?, Scientific Research, Sept. 16, 1968, pp 31

1. THE IDENTIFICAL TWINS AND DR. EINSTEIN by Napoleone Applebaum (H.L.I. Productions N.Y. 1966)

- Einstein's theories simplified and woven to a children's story. It undergoes criticism by 5 children aged 7 to 14.

Johnson, W.C., Creative Problem-Solving, IEEE Student Journal, Sept. 1968, pp 17-20

1. HOW TO SOLVE IT, by George Polya (Princeton Univ. Press 1957)

- the book is concerned with the techniques of thought that underlie analysis, invention, discovery and creative design. It is only mildly mathematical in content.

Kelley J.B., Lab Manuals: Telling it Like it Is, Physics 10 Day, Dec. 1968, pp 85

1. DISCOVERY IN PHYSICS by Leonard H. Greenberg (Saunders 1968)

- a discovery of the fun and adventure involved in the experimental process.

Kranzberg, M., Form or Substance: A Matter of Precedence, Science, Vol. 144, May 8, 1964, pp 666-667

1. MACHINES by Robert O'Brien, and the editors of Life (Time Inc. 1964)

- an accurate historical survey of the evolution of machines.

Lakoff S.A., Essays in Ambiguity and Ambivalence, Physics Today, June 1970, pp 67-69

1. THE SWIFT YEARS: THE ROBERT OPPENHEIMER STORY by Peter Michelmores
(Dodd Mead 1969)
 2. THE OPPENHEIMER CASE: SECURITY ON TRIAL by Philip M. Stern (Harner
& Row 1969)
- the Oppenheimer case continues to be examined and debated

Levy, H., New Scientist, July 30, 1970

1. METAPHYSICS AND THE PHILOSOPHY OF SCIENCE by Gerd Buchdahl (Basil Blackwell U.K.)
- "...every scientist who hopes to grasp the limitations of science and scientific
procedure ought to study it."

Low, I., New Scientist, April 10, 1969, pp 81

1. THE AGE OF DISCONTINUITY GUIDELINES TO OUR CHANGING SOCIETY by Peter
F. Drucker (Heinemann)
- on the need to recognize that the time has come for a multinational approach
to industrial production

Low, I., A Question of Conscience, New Scientist, Sept. 3, 1970, pp 485

1. POPULATION, RESOURCES, ENVIRONMENT: ISSUES IN HUMAN ECOLOGY by Ehrlich
P.R. & A.H. (Freeman Press)
- people need to care.

Maddox J., Science Intended to be Read as Literature, Nature, Vol. 318, May 18,
1968, pp 630-631

1. THE DOUBLE HELIX, Prof. James Watson (Widenfeld & Nicolson, U.K.)
- on the controversial origins of the model of double-stranded DNA.

Marton, L., In Defense of People, Physics Today, March 1969, pp 76-77

1. WHO SPEAKS FOR CIVIL DEFENSE by Eugene P. Wigner (Charles Scribner's Sons 1968)
- long-term solutions are the monopoly of science fiction writers.

McCarter, J.A., Science Forum 11, October 1969, pp 35-36

1. FUNDAMENTAL RESEARCH AND THE UNIVERSITIES: SOME COMMENTS ON INTERNATIONAL
DIFFERENCES by Joseph Ben-David (Organization for Economic Co-operation and
Development)

Merzbacher, E., Evolution of Ideas, Physics Today, March 1967, pp 102-106

1. THE CONCEPTUAL DEVELOPMENT OF QUANTUM MECHANICS by Max Jammer (McGraw Hill 1966)
- a study of the evolution of ideas and knowledge that in the mid-twenties
culminated in the formulation of quantum mechanics as we know it.

Mielczarek, E.V., Nature of the Physical World, Physics Today, March 1969, pp 77

1. THE CHANGELESS ORDER: THE PHYSICS OF SPACE, TIME AND MOTION by Arnold
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2. EDUCATION IN AN INDUSTRIAL SOCIETY by G. H. Bantock (Faber & Faber 1963)
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E D U C A T I O N

a) Elementary Schools

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Cooper, D.J., "Elementary School Science Workshops", Ontario Teachers Federation, - on workshops for elementary school science teachers and pupils.

Gardner, J.C., Ottawa H. & S. Council - condensed summary outline of the curriculum in grammar and composition from grade one to grade eight in Ottawa public schools.

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Karplus, R., "Beginning a Study in Elementary School Science", American Journal of Physics, Vol. 30, No. 1, Jan. 1962, pp 1-9 - on the problems of science teaching in elementary schools and the preparation of a new course (with the aid of practising scientists).

Karplus, R., "Teaching Physics in the Elementary Grades", Physics Today, Oct. 1964, pp 34-38 - author has designed an experimental elementary school science program.

Kownacki, S., "Elementary School Science - What Local Community Can Do About It", IEEE Transactions on Education, Vol. E-10 No. 1, March 1970, pp 12-15 - recommendations made (based on experience) which will lead to a definite upgrading of elementary school science education.

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Playfair, G., Burlington Board of Education, July 1968 - the new science curriculum K-6, its philosophy, objectives and goals and the role of the principal in its implantation. (contains extensive bibliography).

Richter, A., Maurice Cody School, Toronto, 1 page - this boy writes on "asternots" and capsules and what he knows about them.

Simendinger, E.A., "Our President Speaks Out", Science and Children, Jan-Feb. 1969, pp23 - (editorial) how do you think the hardware explosion in elementary science is effecting the teacher involvement in the changing of the teaching of science?

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"A Philosophy and Scheme for Implementing a Science Program", 12 pages - on designing a science program, years four and five.

"The Ottawa Committee for the New School Announcement" - on a new independent primary school to be opened in September 1969.

"Ottawa Public Schools" - a sheet to be filled in by parents re their child's medical history for the school nurse and the Department of School Health.

"Physics in the Elementary Grades", American Journal of Physics, 1964, pp 825-849 - from a symposium on the science teaching in elementary schools:

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Smith, J.H.,	"Three Roles of the Physicist in Science Teaching"
Calandra, A.,	"A Program in Science and Mathematics"
Karplus R.,	"One Physicist Experiments with Science Teaching"
Hawkins, O.,	"Laboratory Science in Elementary Schools"
AAPT Committee,	"Summer Study Opportunities for College Physics Teachers"

"Summer Course in Elementary Science (Grades one to six)", Ontario Dept. of Education, - on a summer science course for teachers of grades one to six.

b) High Schools

- Callwood, J., "High Schools: Holdouts in the Classroom Revolution", Maclean's June, 1967, pp 33, 62-68 - High Schools are still clinging to 19th century ways. Here's what they could be, and inevitably will be - some day.
- Cooley, W.W., "The Potential Scientist Pool", Journal of Research in Science Teaching, Vol. 2, 1964, pp 24-32 - a study of movement toward scientific careers reveals the importance of the junior high school. It is possible to identify potential scientists. Decisions "for" science occur about Grade 11.
- Davis, W.G., "Address to: The Ontario Secondary School Headmasters' Council at the Park Plaza Hotel, Toronto", March 17, 1969, 18 pages - Davis talks about the secondary schools of Ontario and makes some suggestions, to help the overall system.
- Day, J.W., "Summer Physics Program For Talented High School Students", American Journal of Physics, Vol. 27, 1959, pp 169-171 - a report on the physics course offerend at Texas Technological College during the summer of 1958 for especially gifted high school students.
- Enns, J.G., Fisher Park High School, Feb. 18, 1969 - a letter to the parents about evaluation of student progress.
- Gehret, K.G., "Unique High-School Space Program", Christian Science Monitor, June 28, 1968, 2 pages - a high school space program at North-East High School, Philadelphia, U.S.A.
- Grantham, R., "Greater Greedom is Students' Plea", Ottawa Citizen, June 9, 1967 - students want greater freedom of choice and activity in todays' education. (report on Physics Teaching Conference organized by CAP SES Committee).
- Grantham, R., "High School Trends - More Individual Study, Less Emphasis on Exams", Ottawa Citizen, 1968 - new high school trends are that new courses have anneared, less emphasis is placed on exams in rating students and more individual study is carried out.
- Grantham, R., "Transition in Education - Ottawa High Schools Go Modern" Ottawa Citizen, Sept. 8, 1965 - on the advancement of many fronts in the secondary schools.
- Jacob, C., "The Author Replies", The Physics Teacher "letters", pp 310 - Jacob replies to a writer who commented on his article "Physics-Phooey".
- Jacob, C., "Physics-Phooey", The Physics Teacher, Dec. 1968, pp 450-453 - the author, a physics teacher himself, says that physics should not be taught to high school students - he gives reasons why and discusses them.
- Jenkins, E.W., "Curriculum Development Section", The School Science REview, Vol. 50 1968, pp 391-413 - some further implications of the Nuffield O-level project for courses in physics, chemistry and biology. Contains an interesting questionnaire.

- Kozol, J., "A Junior High That's Like a College", The New York Times Magazine, Oct. 29, 1967, pp 32-132 (8 pages) - a junior high school which has almost as much and sometimes more freedom than many universities, (Meadowbrook School Newton Mass. U.S.A.)
- Kruglak, H., "Evaluation of High School Physics Courses by College Students", American Journal of Physics, Vol. 27, 1959, pp 630-634 - physics students at Western Michigan University rated their high school physics course and instructor.
- Lions, J., "The Ontario School Scheduling Program", The Computer Journal, Vol. 10, No. 1, May 1967, pp 14-21 - a described method has been successfully implemented in a computer program for the construction of high school time tables.
- Martin, H.J., "Secondary School Science Courses; Purposes - Principles - Problems", Science Teacher's Conference, Ottawa March 1966, 10 pages - on the importance of science in education and what should be done to improve science courses.
- May, R.E., "A Landmark Year for Computers in High Schools", Computers and Automation, July 1970, pp 26-28 - instructional methods using computers will bring more meaning and depth to secondary education.
- Messel, H., Barker, E.N., Physics Education (UK) pp 26-31 - the general philosophy behind the new integrated and coordinated science courses in New South Wales and the Science Foundation for Physics Textbook series.
- Needham, R.J., "Let's Get Rid of the Classroom", Globe and Mail, March 10, 1967 - some suggestions on how to improve high schools - centered on the student, the teacher and the library.
- Patten, F. G., Collegiate Institute Board of Ottawa, Oct. 26, 1960 - a letter on the growth of the secondary school population.
- Powers, S.R., "Physical Sciences in Our Secondary Schools", American Journal of Physics, Vol. 27, Sept. 1959, pp 419-423 - on the historical recognition of physical sciences in high school, with two guiding objectives in mind.
- Richards-Jones, P., "Astronomy at O-Level" Physics Education, Vol. 3, 1968, pp 35-39 - an article designed to bring the O-Level astronomy course to the notice of schools not directly connected with the subject. (Syllabus attached).
- Roche, Marcel, "The Humanities in the Scientific Curriculum", Science, Vol. 141, Aug. 23, 1963, pp 698-701 - in both North and South America greater emphasis on the humanities is needed in a secondary education.
- Schaff, J.F., Westmeyer, P.H., "Comparison of Students in Modern and Traditional High School Courses", Journal of Chemical Education, Vol. 47, No. 1, Jan. 1970 pp 82-85 - comparison between two types of chemistry curricula to help determine the good and bad points in order to develop the best possible curricula.

2 b) continued -

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Thistle, M., "On Going to University", June 19, 1964 - a speech to the Grade 12 graduating class of South Mountain Road High School, Ontario.

Trudel, P.H., "The Unit Equation", Hillcrest High School, April 1962 - an explanation of the unit equation concept in mathematics for secondary schools.

Weisbord, M.R., "Now, Focus on High School Unrest", Think, Sept.-Oct. 1969 pp 3-7 - the author described creative alternatives to violence and unrest in secondary schools.

Welch, W.W., "Some Characteristics of High School Physics Students: Circa 1968", Journal of Research in Science Teaching, Vol. 6, No. 3, 1969 pp 242-247 - about the students in high schools who take physics. Henmon-Nelson J.O. test results. (references).

Biological Sciences Curriculum Study - a criticism of secondary school biology teaching, and possible remedies.

"Biology", Ontario Department of Education - an optional course for grade eleven or grade twelve in the four-year program. Curriculum RP50.

"Biology", Ontario Dept. of Education - a grade thirteen biology course for introduction in Sept. 1965. Curriculum S17B.

"Broader Curricula by Half", Nature, Vol. 224, Dec. 13, 1969, pp 1046 - on the specialization in secondary schools and breaking it down.

"CIB's Career Expo Already a Sell-Out", Ottawa Journal - an exhibition to explain possible future careers to high school students.

"The Central Students' Council!!?" Central Students' Council Bulletin, Feb. 1969 pp 1-8 - C.S.C. is for high school students and is simply an informative bulletin on high school activities written by H.S. students.

"Chemistry", Ontario Dept. of Education - an optional course for grade eleven or grade twelve of the four-year program. Curriculum RP51.

"Chemistry", Ontario Dept. of Education - a grade twelve, five year program chemistry course, for introduction in Sept. 1966. Curriculum S17D.

"Course of Study" - Grade Nine and Grade Ten courses of science 1962/63.

"Course of Study. Grade Twelve - Chemistry", Ontario Dept. of Education - a grade twelve chemistry course, from curriculum S-17.

"Courses of Study. Grade Thirteen - Chemistry", Ontario Dept. of Education - a grade thirteen chemistry course, from Curriculum S-18.

"Curriculum Reform at Last?", Nature, Vol. 220, Dec. 28, 1968 - there is a glimmering hope that British schools and universities can make progress with the reform of the sixth form curriculum.

"Curriculum Study Guide for Grade 13 Biology", Ontario Dept. of Education - a grade thirteen biology course outlined. Circular GS17B, 1965.

"Curriculum Study Guide for Grade 13 Physics", Ontario Dept. of Education - an outlined physics course for grade thirteen. Curriculum GS17C, 1965.

"Geology", Ontario Dept. of Education - an optional course for grade eleven and grade twelve of the four-year program. Curriculum RP-47.

"Getting the Worst of Both Worlds", Nature, Vol. 224, Dec. 13, 1969, pp 1041-1042 - a criticism of the secondary school system. A reform is being discussed.

"Grade 13 Courses Said Too Crammed", Ottawa Citizen, Dec. 24, 1965, pp 16 - reports on the difficulties of the new grade 13 physics and biology courses.

"Grade 13 Needs Overhaul Says Retiring Principal" - too many students take grade 13, there are too many subjects and too much cramming.

"Help for Grade 13 Students", Ottawa Citizen, Dec. 24, 1965 - attempts are being made to reduce pressure on grade 13 students and lower university entrance requirements.

"H.S. Courses 'Too Soft, Dull'", Ottawa Journal, June 9, 1969 - high school courses are too soft and boring and fail to deal with the wide range of student ability and motivation. (Report on Physics Education Conference organized by CAP SES Committee).

"1 Latin = 2 Chemistry?", Chem 13 News, Univ. of Waterloo, Nov. 1969 - a criticism of the credit system in grade 13 where a language equals 2 credits and a science, one. As a result students are shunning the sciences.

"Ninth Grade Science Course Dull? U.S. Professor Urges New Approach", The Ann Arbor, pp 16 - U.S. professor urges new approaches to the teaching of science. He has tested one particular system already.

"Ontario Educational Television", Ontario Dept. of Education - a television broadcast for Grade 13 PSSC Physics "macrocosms and microcosms".

"Physical Science Study Committee", Physics Today, March 1957, pp 28-29 - a committee met to discuss and plan improved and modernized courses in physical science for secondary schools. Lists original Committee members.

2 b) continued -

"Physics", Ontario Dept. of Education - a grade 11 physics course, to be introduced in Sept. 1963, Curriculum S17A.

"Physics", Ontario Dept. of Education - a grade 11 physics course replacing Curriculum S17A. To be introduced in Sept. 1966.

"Physics", Ontario Dept. of Education - Physics course for grade 13, for introduction in Sept. 1965, Curriculum S17C.

"Reporting on the Teaching of Biology in the High Schools of Canada", 1968, 19 pages - a report on a survey carried out to examine the teaching of biology in Canada and thus enable Biological Council of Canada to make the necessary changes.

Sir Robert Borden High School, Ottawa, July 31, 1970 - a summer course for science teachers interested in developing their own curriculum units for grades 7-10.

"Sir Wilfrid Laurier High School", Ottawa, May 25, 1966 - on the opening of S.W.L.H.S.; its staff, principal, facilities and layout.

"Student Information Booklet", 28 pages - Fisher Park High School - organization and diploma requirements, 1969-1970.

"Teachers Say Courses Too Tough", Ottawa Citizen, December 24, 1965 - a complaint that grade 13 physics and biology courses are too tough.

"Workshop Hears Students Get Feeling for Chemistry", Ottawa Citizen, Jan. 31, 1967 - Grade 11 students are developing their feeling for chemistry in an experimental CHEM study class.

c) Universities

Artsimovitch, L., "Studying Physics at Moscow State University", Physics Today, Jan. 1970, pp 34-40 - this master's degree program combines general instruction with specialized research experience. It is a tough course and the graduates are in great demand.

Banks, L., "The View Through Youthful Eyes", Fortune, April 1970, pp 76-121 (4 pages) - U.S. business has a lot to offer the college generation if the students can comprehend.

Boffey, P.M., "Campus Unrest: Riots Bring Danger of Punitive Backlash", Science, Vol. 164, April 11, 1969, pp 161-165 - universities, already buffeted by waves of student unrest, face another problem - the possibility that irate lawmakers will encroach on traditional academic autonomy with a spate of punitive legislation.

Boffey, P.M., "Stanford: Why Pitzer Resigned as President", Science Vol. 169, 1970, pp 561 - 565 - the pressures on a university president. In particular those on Pitzer - too much administration - not enough time for planning and innovation.

Bowden, L., "Universities and Society", New Scientist, March 26, 1970, pp 601-604 - students may yet transform society but if they tear the universities apart in the process, there seems little hope for civilization as we know it.

Brewster, K., "If Not Reason, What?", American Scientist, Vol. 58, March-April, 1970 pp 171 - 175 - the president of Yale discusses the confrontation between impatience and the university.

Campbell G., "The Community College in Canada", Universities and Colleges of Canada, 1970 (AUCC 1969) 19 pages - on the expansion of post-secondary education in Canada.

Dedijer, St., "The Brain Drain: An Age-Old Problem", Bulletin of Atomic Scientists, March 1970, pp 9-11 - author's article is on the history of dissent and migration by the university community since the first schools in ancient civilizations.

Dehn, M., & Ernst, E.W., "A Degrading Experience?", IEEE Student Journal, Sept., 1969, pp 36-39 - colleges and universities have been experimenting with various gradeless - course options. Students' and critics' point of view on grades and the existing pass-fail schemes.

Dingle, H., "The University College Affair", New Scientist, March 27, 1969, pp 675-676 - discussions are now in progress with a view to closing both the history and philosophy of science departments, University College, London. Author explains why this would be a shame.

Drushka, K., "Construction Boom Grips Universities", Globe and Mail, Dec. 30, 1964 - \$600 million earmarked for 16 Ontario campuses.

Edelson, E., "Stony Brook: A Try for 'Instant Excellence'", Scientific Research, Jan. 6, 1969, pp 28-33 - on the development, expansion and problems of The State University of New York at Stony Brook.

Ford, B., "Staffing the New Universities", U.K. Newspaper Clipping - on the importance of having a good university faculty.

Gale, J., "Lord Bowden", The Sunday Times Magazine (UK) 3 pages - on the man who wants to bang Britain's universities into the twentieth century.

Gaudry, R., "Learning to Learn", Canada 2000 published 1969 pp 42, - communication and individualization will be the mainstays of tomorrow's university.

Greer, H., "How Much University Can a Province Afford?", Halifax Chronicle, Jan. 21, 1970, pp 30 - the Ontario Government faces the sobering question of how much university it can afford.

Hawkes, N., "Innovation and the Universities", Science Journal, March 1970, pp 75-79 - the traditional isolation between British universities and industry seems to be breaking down and a new relationship is emerging.

Herrmann, R., "Crisis at Cornell", IEEE Student Journal, Sept. 1969, pp 29-30 - a Cornell engineer reflects on the events of April when neuro students rebelled against the administration.

Hershfield, C., Heinke, W.G., "Civil Engineering Education in Canada, Present and Future", Engineering Journal, Jan. 1970, pp 7-11 - the results of a curriculum survey of Canadian and American Universities. It is concluded that the engineering curriculum should primarily be aimed at educating - not skill training.

Hewitt-White, J., "Was the Revolt at Sir George Just a Blunder?", Ottawa Citizen, (letter to the editor) - a reader's view of the Sir George Williams University crisis.

Hillesheim, J.W., "The Scholar as Educator? A Nietzschean View". Journal of Educational Thought, Vol. 3, April 1969, pp 20-28 - today's educators are witnesses to a paradox - the institution which has made possible the scientific successes - the modern research oriented university - is increasingly criticized and under attack.

Holister, G.S., & Pentz, M.J., "Science and Technology at 'the Open'", New Scientist, March 26, 1970, pp 606-611 - about the new Open University and its science course.

Holt, J., "The Radicalization of a Guest Teacher at Berkeley", The New York Times Magazine, Feb. 22, 1970, pp 30-75 (11 pages) - Holt's change of opinion after several strikes at Berkeley.

Holton, G., "Harvard Project Physics", Physics Education (UK), pp 19-25 - a report of the project aims and its current status.

Kraft, J., "Black Studies Can Help", Ottawa Citizen - in the light of the destructive violence at Sir George Williams University, this American assessment is particularly relevant.

Lacey, R., & Janmohamed, P., "The University Stakes", The Sunday Times Magazine (UK) pp 52-55 - an eight part survey on the courses and facilities by every British University, polytechnic - designate and major college.

- Ligomenides, P.A., "Demands on Engineering Education", IEEE Transactions on Education, March 1967, pp 52-53 - education has a certain responsibility to engineers.
- MacArthur, B., "Silent March of the Polytechnics", The Times, March 2, 1968, (one page) - on the development and growth of the polytechnics in England.
- Munro, R.H., "Kirkland Campus Nearly Empty:", Globe and Mail, March 5, 1970, pp 37 - on a new university of Kirkland Lake which is very good, very new and very expensive - it is also nearly empty.
- Munro, R.H., "Ontario Universities' Building Outpacing Needs, Study Finds", Globe and Mail, Jan. 13, 1970 - Ontario universities have more space than really needed.
- O'Connell, S., Wilson A.W., Elton L.R.B., "Preknowledge Survey for University Science Entrants", Nature, Vol. 222, May 10, 1969, pp 526-528 - in preparing university courses it may be necessary to accept a common initial achievement by students well below that which is suggested by the A-level papers they have taken. A possible method for testing knowledge at this lower level is described, with some results. Questionnaire included.
- Osborne, R.E., "Religion Breaks Out on the Campus", United Church Observer - many universities are experiencing a great increase in the number of students taking religion courses.
- Peterson, A.D., "A Bridge From Arts to Science", Discovery, Sept. 1961, pp 374-378 - on the division between the arts and science students and how it might be bridged.
- Petrovski, I.G., "Higher Education in Moscow", International Science and Technology, May 1964, pp 33-36 - the rector of Moscow State University has problems: the overcrowding, keeping education abreast of new sciences. But his 28,000 students are eager for knowledge and he is resolved to make them something more than specialists.
- Potter, V.R. et al "Purpose and Function of the University", Science, Vol. 167, March 20, 1970, pp 1590-1593 - university scholars have a major responsibility for survival and quality of life in the future.
- Raskin, A.H., "Berkeley, 5 Years Later, is Radicalized, Reorganized, Mesmerized", New York Times, Jan. 11, 1970, pp 28-86 (11 pages) - a change at Berkeley has taken place, author reports. The young people are still asking the same questions and getting unsatisfactory answers.
- Reid, J.H.S., "The Evolution of Canadian University Organization", Professional Public Service, Vol. 42, No. 10, Oct. 1963, pp 2-10 - on the development and the present situation of universities.
- Robertson, H.R., "No More Formal Instruction - the University Community", Canada 2000, McGill University, 1969, pp 59 - on the probabilities which will most likely become realities in future universities.

Rosenhead, J. & Norden T., "Threats to University Independence", New Scientist, March 26, 1970, pp 604-606 - it is right that the universities help to solve society's problems - but they should not forget their independence in doing so.

Rosenhead, J., "University Science for Sale", New Scientist, Sept. 18, 1969, pp 582-584 - how can British universities preserve their traditional academic independence as they dismantle their ivory towers and begin to accept more research grants from government and industry? There are substantial dangers in the new situations, which will be aggravated if the universities do not acknowledge and debate their changing role in society.

Scheie, C.E., "A Plea for Excellence in our Four Year Liberal Arts Colleges", - presented at the 37 annual meeting of the American Association of Physics Teachers, Jan. 29 - Feb. 1, 1968.

Sheffield, E.F., "Enrolment to 1976 - 77", Canadian Universities Foundation, 1964 - on the prediction for enrolment numbers in Canadian Universities in 1976-77 (booklet).

Singer, R., "Industry and Academe", New Scientist, March 5, 1970, pp 454-457 - the desirability or otherwise of close collaboration between universities and industry is hitting the headlines in Britain.

Steele J., & Mathews, R., "The Struggle for Canadian Universities, With Particular Reference to Carleton University" - a brief presented to the Commission on relations between Universities and Governments. They make four specific recommendations.

Sypnowich, P., "The Man Who Made a University", Canadian Weekly, The Gazette, Aug. 29, -Sept. 4, 1964, pp 2-4 - Dr. Gordon Shrum wants instant tradition. The high-powered new chancellor of Simon Fraser has cut through the ivy-encrusted tradition of Canadian colleges to create a B.C. university at which even dropouts will be welcome.

Taylor, D., "U.S.S.R. Graduates in Science and Technology Reported Two to Three Times Annual Rate of United States", National Science Foundation, Jan. 15, 1962, pp 1-5.

Todd, R., "The 'Ins and Outs' at M.I.T.", The New York Times Magazine, May 18, 1969, pp 32-94 (17 pages) - on the problems and successes at M.I.T. Is it possible that we have had enough science?

Vaizey, J., "The Future of Higher Education", New Society, May 21, 1970, pp 866-869 - a shift towards diversity is necessary.

Vaizey, J., "People's Universities", Nature, Vol. 220, Nov. 30, 1969, pp 859-860 - a critical discussion on some of the points made by Eric Robinson in his book "The New Polytechnics". It is on the higher or tertiary education.

Van der Eyken, W., "Plan for Polytechnics", Financial Times, March 9, 1968, (one page) - about the Polytechnic Colleges in England.

Von Hoffman, N., "The Class of '43' is Puzzled", The Atlantic Monthly, pp 69-77
- on the reunion of the Harvard men (and wives) of the 1943 class. Hoffman found a yawning generation gap before him.

Verity, C., "Is it all Worth it?", The Sunday Times Magazine, (2 pages) - the lucky few who get degrees or who study for a degree - why did they succeed? and, are they satisfied with the guidance they received? (incomplete)

Walsh, J., "California Higher Education: The Master Plan Faulted", Science Vol. 164, pp 811, 812, 813, May 16, 1969 - the Master Plan of California for higher education has come under attack.

Walsh, J., "Postdoctoral Education: Report Emphasizes Recognition Problem", Science, Vol. 166, Nov. 28, 1969, pp 1129-1130 - on the increasing number of Ph.Ds doing post-doctoral studies.

Webb, C.W., "The Special Problems of Specialization" Globe and Mail March 25, 1966 pp 7 - Webb criticizes the specialization of honours degree courses and the rigid structure which does not allow many students to take a subject outside of his prescribed course. The result is the production of narrow-minded and incompetent honours graduates.

Wiles, D.R., "More on Research and Graduate Studies", Science Forum 11, Oct. 1969 (2 pages) - a report on a research of graduate studies and graduates. (Letter to the editor).

Wright, D.T., "Convocation Address", Carleton University April 10, 1967 - a convocation address by Dr. Wright at the Special Engineering Convocation, Carleton University April 10, 1967.

"A Look At University Science" - Carleton University offers a series of lectures designed to give senior high school students some insights into university science (advertisement only)

"A New Bachelor's Degree for Adults" - a new program in liberal education for adults leading to a Bachelor's degree is now offered by University College, the adult education division of Syracuse University.

"A Special Issue: the Undergraduate Curriculum", Physics Today, Vol. 21, No. 3 March 1968, pp 23-62 - the undergraduate curriculum in five four-year colleges, four universities and an English University.

"After School", The Sunday Times Magazine 1969, pp 48-49 - on the struggle and competition and increasing numbers of the students to get to universities.

"Alumni", Time, July 4, 1969 - a look at the situation of "more student riots - fewer alumni gifts" () True, () False?

Alumni Gazette, Jan. 1969 - University of Western Ontario student magazine, feature article on Russian invasion of Czechoslovakia.

"An Eye in the Hurricane", Nature, Vol. 222, May 17, 1969, pp 609-610 - the University of Oxford has produced a very constructive comment on the management of student problems.

Arizona Wildcat, Feb. 2, 1969 - a student newspaper from the University of Arizona.

Campus, Vol. 1, No. 2, Dec. 1968 - "Campus" is Canada's national student magazine.

Campus, Vol. 1 No. 3, Jan. 1969 - a national student magazine in Canada.

"Campuses and Conscience", Science News, Vol. 93, May 4, 1968, pp 423-424 - university ferment over accepting Federal money for war-related research produces a variety of answers - and more questions.

"Chemistry", AAAS Berkeley Meeting - ratings of various chemistry department of universities in the States.

College Canada, Vol. 1, No. 4, Feb. 1970 - a newspaper by the Canadian Commission for the Community College.

"Extramural Studies", Nature, Vol. 222, April 12, 1969, pp 113 - the extramural departments of British Universities continue to expand at a rate of more than six per cent a year.

The Georgian, Jan. 28, 1970 - a student's published paper from Sir George Williams University.

"Getting the Balance Right", Nature, Aug. 9, 1969 - the NRC of Canada is questioning the basis on which it provides support for universities.

"History is not Bunk", New Scientist, March 27, 1969 pp 669 - University College, London is considering closing its history and philosophy of science departments. The article bemoans this fact and offers ideas why it should not take place.

"How to Get a Degree", Nature, Vol. 224, Nov. 29, 1969, pp 836 - at Open University a new system of obtaining a degree and a new system is open to prospective students.

"It Takes a Good Deal to Send Your Child to University", University Scholarships of Canada - an advertisement for the enrolment of a child into the scholarship program to financially aid him.

"Living with Crisis at Berkeley", Nature, Vol. 220, Nov. 2, 1968, pp 427 - on the trouble at Berkeley, California in Oct. 1968.

McGill Reporter, Vol. 2, No. 7, Oct. 31, 1969 - a university newspaper from McGill University, Montreal.

"Mr. Aubrey Jones and the Universities", Nature, Vol. 220, Dec. 28, 1968, pp 1277-1278 - on the uproar between the British government and teachers' salaries.

"NRC Aid to Universities", Canadian Electronics Engineering, Dec. 1969, pp 21-22,
- on the aid NRC gives to help keep Canada's technology on an ascending path.

The Paper, Jan. 26, 1970 - a student paper from Loyola College and Sir George
Williams University.

"The Purists", Time, May 16,, 1955, pp 64-75 - on the role of California Institute
of Technology and the people who guide Cal Tech.

"Queen's University Reaches for the Sky" - Queen's Univ. will soon be the only
Canadian University with its own radio telescope near the campus.

"Recipe for Change at Universities", Nature, Vol. 224, Oct. 25, 1969, pp 305-306
- the House of Commons Select Committee on Education and Science has proposed
sweeping changes in the British system of higher education.

Ryersonia Magazine, 1970 - a magazine by the students, for the students at Ryerson.

SGWU Issues and Events, Jan. 29, 1970 - a weekly newspaper from Sir George Williams
University.

"Student Flats as a Crisis Measure", 1962 - British Universities are spending
millions of pounds on providing student accomodation.

"Summer Courses 1969", Ontario Department of Education - a list of courses,
centers and other information concerning the 1969 summer courses. (Booklet)

Telescope, March 17, 1970, Vol 1 #13 - Algonquin College produced newspaper.

"Troubles for IDA", Science News, Vol. 93, May 18, 1968, pp 471-472 - several universities
have already severed connections with the think tank; more to come.

"Universities and Industry", New Scientist, Oct. 2, 1969, pp 42 - two opinions on
university - industry collaboration.

"What Students Think", U.B.C. Reports, Vol. 15, No. 16, Sept. 25, 1969 - a newspaper
printed for the students by the University of British Columbia. Results of
a student survey.

What's Happening? 1969-70, Univ. of Waterloo (27 pages) - about the University
of Waterloo by the students, for the students.

d) Teachers, Teaching

Allen, N.L., "Postgraduate Training in Engineering and Technology", Nature, Vol. 223, September 13, 1969, pp 1105-1106 - the proposal that postgraduate research in engineering and technology should be concentrated into large groups in relatively few departments appears to ignore the value of smaller departments. (teaching vs research).

Baker, J.R., "How Can Teachers Keep Up-to-Date?", Physics Education (UK), pp 241-246 - on the problems of communications facing physics teachers.

Barnett, S.A., "The 'Instinct to Teach'", Nature, Vol. 220, Nov. 23, 1968, pp 747-749 - the course of development of imitation and of teaching, at least among human beings, has scarcely been discussed.

Blosser, P.E., & Howe, R.W., "An Analysis of Research", Science and Children, Jan/Feb. 1969, pp 50-60 - on elementary teacher education related to the teaching of science. (references)

Borrowman, M., "Conant, the Man", Saturday Review, Sept. 21, 1963, pp 58-60 - a discussion of Conant's influence on teachers and teaching.

Buchta, J.W., "Preparation of High-School Teachers of Science", Physics Today, Sept. 1959, pp 35-37 - comments, opinions and what is going on about preparation of teachers of high school science.

Callwood, J., "What Good Teachers Don't Teach Any More", Maclean's, May 1967, pp 34-63 (5 pages) - on the changing emphasis from 'teaching' to 'learning' and the great need for teachers who can respond to increased freedom in the classroom.

Cheong, G.S.C., "An Integrated Approach to Teaching Effectiveness", Journal of Educational Thought, Vol. 3, #2, Aug. 1969, pp 88-97 - on identifying the teaching effectiveness of teachers today. (references)

Clifford, E., "High School Teachers to Make Own Study of Education Needs", Globe and Mail, Dec. 30, 1964, pp 5 - "Secondary school teachers voted yesterday for a \$150,000 program of educational studies." The program is taken in conjunction with more emphasis on professional development and improvement.

Cohen, S., "Report Seeks Bold Changes in Teaching" - a report from the Parent Royal Commission on Education - urges changes in teaching.

Conant, J.B., "A Quarrel Among Educators", Saturday Review, Sept. 21, 1963, pp 53-74 (7 pages) - on the hostility between arts and science faculties and the faculties of education. The former group saw "no excuse for the existence of people who sought to teach others how to teach. Includes numerous recommendations.

Engman, B.D., "Behavioral Objectives: Key to Planning", The Science Teacher, Oct. 1968, pp 86-88 - a criticism of teaching and what can be done to improve it.

France, N., "Teachers in Canada: Supply and Demand for the 70's", pp 2-7 - Dr. France put out a forecast based on the birth-rate, pupil-teacher ratios, and teacher training.

- Frank, N.H., "Critique of Teaching Objectives in Colleges", Physics Today, June, 1955, pp 19-20 - on the lack of competence of physics teachers in high schools and colleges.
- Grantham, R., "Teachers Tour School TV Studio", Ottawa Citizen, - History teachers visited the television production studio at Sir Wilfrid Laurier High School to see the crew (mostly students) demonstrate a T.V. production.
- Hazell, M., "He Who Can, Does", The Listener, May 13, 1965, pp 703-704 - on the teachers' role today and the need to collaborate with local experts.
- Higson, L.E., "Physics Teaching in the Early Twentieth Century", Physics Education Vol. 3, 1968, pp 119 - on an approximate outline of the syllabus followed in the early twentieth century (approx. 1905-9) physics course.
- Howery, D.G., "A Master's Level Laboratory Course for High School Teachers", Journal of Chemical Education, Vol. 47, Jan. 1970, pp 84-85 - a brief description of a course given at Brooklyn College CUNY New York.
- Isaacs, C.S., "A J.H.S. 271 Teacher Tells It Like He Sees It", The New York Times Magazine, Nov. 24, 1968, pp 42-79 (9 pages) - the part teachers play in this school in connection with pupil-teacher relations, parent-teacher relations and the new teaching methods.
- Judge, H.G., "Teachers of Physics", Physics Education, pp 267-270 - the author blames the physics teacher for the decline in the number of students entering physics.
- Krebs, H.A., "The Making of a Scientist", Nature, Vol. 215, Sept. 30, 1967, pp 1441-1445 - scientists are not so much born as made by those who teach them research.
- Lutes, C., "Teacher Shortage Still a Big Problem", Ottawa Citizen (1968), - teacher shortage is a serious factor in education and television and other audio-visual aids will not solve the manpower shortage.
- Maeots, K., "Lack of Teaching Materials Rapped", Ottawa Citizen (1969?) - high school teachers (those teaching English) have been counselled to be bolder about asking for the research materials necessary for experimentation in teaching methods.
- Mayer, M., "The Full and Sometimes Very Surprising Story of Ocean Hill, the Teachers' Union and the Teacher Strikes of 1968", The New York Times Magazine, Feb. 2, 1969, pp 18-71 (21 pages) - on the teacher strike of 1968 and what prompted its occurrence.
- McDiarmid, G.L., "Revolution in Curriculum or Revolution in Society", Education Canada, Vol. 10, June 1970, pp 7-11 - "It is necessary for schools to adapt, but the school's work, by itself will never be sufficient to change society".
- McKay, A.G., "Staff Improvement and Quality Education", The Argus, June 1965, pp 229-120 - the primary purpose of education and administrative activities is the improvement of instruction and level of individual pupil and teacher contacts.

- Michels, W.C., "The Teaching of Elementary Physics", Scientific American, April, 1958, pp 57-64 - to give more students a better understanding of the nature of physical science, a new approach to high-school physics is evolving. (on the work of the Physical Science Study Committee)
- Musella, D., "Improving Teaching: An Alternative to Supervisory Evaluation", Journal of Educational Thought, Vol. 3, April 1969, pp 5-14 - improved teaching, one of the ultimate objectives of much educational activity, continues to pose problems for theorists, researchers and practitioners.
- Nyholm, R., "Editorial", The School Science Review, Vol. 49, Sept. 1968, pp 5-6 - on the shortage of science teachers in school and what can be done to ease the situation.
- Parks, K.E., "The Teaching of Physics in Girls' Schools", Physics Education, Vol. 3, 1968, pp 120-121 - on what is involved in teaching physics to grammar school girls.
- Parlett, M., "Undergraduate Teaching Observed", Nature, Vol. 223, Sept. 13, 1969, pp 1102-1104 - an investigator must look beyond the classroom to understand teachers and their pupils. On syllabus-free and syllabus-bound students.
- Pasternak, M., "Teachers Told They Must Change if New Ideas to Succeed", Ottawa Citizen, Dec. 8, 1969, pp 5 - teachers will have to change and become more aware of their techniques and objectives if implementation of new educational concepts is to be successful.
- Pethick, R., "Attitude of Teachers Criticized", Ottawa Citizen, May 15, 1965, pp 5 (letter to editor) - one student's dislike and criticism of teachers.
- Raskin, A.H., "He Leads His Teachers Up the Down Staircase", The New York Times, Magazine, Sept. 3, 1967, pp 4-30 (5 pages) - on the teachers' protests in New York - why they protest and what they want.
- Roberts, I.F., "Science Crisis in the Schools", New Scientist, Oct. 16, 1969, pp 132-134 - advances in science and changing teaching methods in schools, demand a new flexibility in the professional training of our mathematics and science teachers.
- Rosenthal, R., Jacobson, L.F., "Teacher Expectations for the Disadvantaged", Scientific American, Vol. 218, No. 4, April, 1968, pp 19-23 - it is widely believed that poor children lag in school because they are members of a disadvantaged group. Experiments in a school suggest that they may also do so because that is what their teachers expect.
- Scarfe, N.V., "Educating for Value Judgement", Education Canada, Vol. 10, June 1970, pp 12-14 - there are some universal beliefs with which young people should be acquainted.
- Schofield, R., & Harding, D., "The Teaching of Physics over Fifty Years and More", Physics Education, Vol. 3, 1968, pp 115-119 - to gain insight into the teaching of physics in the early days of the Institute of Physics (UK) interviews were held with three older physics teachers.

- Sears, F., "International Conference on Physics Education", American Journal of Physics, Vol. 29, 1961, pp 151-160 - a report on a conference shows that concerns about the improvement of physics teaching exists throughout the world.
- Sipe, C., "Teacher Education for the Eighties", Science Vol. 155, Feb. 17, 1967, pp 906-908 - teachers need a better science education, a better teaching system and more new approaches to enable them to teach science better.
- Thomsen, D.E., "College Changes Urged", Science News, Vol. 93, May 1968, pp 431 - special courses for prospective high school physics teachers are needed to combat disinterest.
- Voelz, S.J., "Changing Teachers' Attitudes Toward Change", Educational Technology, Nov. 1969, pp 75-78 - a suggestion to make teachers more enthusiastic about educational innovation - place more responsibility for introducing changes upon staff members, and giving them credit for it.
- Vogt, A., "Teacher Education: Items for Teachers of English", pp 21-27 - the responsibility of English teachers to keep the lines of communication open between the generations, between opposing ideas, between the "two worlds" of arts and sciences and all within the confines of a single "discipline" or subject. (Booklet)
- Woodburn, J.H., "The Future Scientists of America Foundation", Physics Today, June 1955, pp 21 - on a foundation designed to help teachers improve science teaching.
- Wright, J.S., "A Plea to Experienced Physics Teachers", Crucible (1966?), pp 10, - teachers are abandoning techniques which have been useful for many years in favour of inferior techniques.
- Young, T.R., Beardsley P.; "The Sociology of Classroom Teaching: A Microfunctional Analysis", Journal of Educational Thought, pp 175-186 - it is up to the teacher to make learning enjoyable and going to school a pleasure.
- Zwicker, B., "Teachers Fight Tradition", The Globe and Mail, Aug. 1, 1968 - the prime responsibility for innovation rests on the teacher's shoulders.
- "Application for Summer Courses 1968" - an application for summer courses for teachers, 1968.
- "Arithmetic is on the Skids Mathematics Has Arrived at Last" - teachers will have to know and understand the new maths in order to teach it.
- "Basic and Popular Opinions and Reoccurring Words" - elementary school teachers answered the question, "Why is science taught in primary schools?" (K-6 teachers, Ont. Dent. of Education, Science Summer Course, Watford, Ont. 1969)
- Commission on College Physics, Sept. 1969, Newsletter #20 - several articles on teachers and teaching are included in this publication.

"COPFIC Report on Teaching Physics", Physics Today, May 1964, pp 36-40 - "how can the four year colleges keep a good physics faculty in the face of present competition with other demands for physicists?"

"Educating the Intelligent" - not only is a good curriculum needed but a good teacher is very important.

Federation Reports, 1966 - a report from Ontario's public school women teachers to the communities in which they work and live.

"Graduate Student Revolution Kit", Commission on College Physics, Newsletter, March 1970 - written by physics graduate students, for physics graduate students, addressing a single problem - "How can the graduate years produce better teachers of physics?"

"Human Needs are What Matter", Nature, Vol. 227, 1970, pp 1090 - the use of computers in education is not an unmixed blessing.

"Making Science Teaching Live", New Scientist, Oct. 19, 1967 (2 pages) - teachers and the teaching system, unless good, can discourage many students from making engineering a career.

"New Directions for Science Curricula", Physics Teacher, May 1967, pp 209-211 - the profession of physics teaching is in trouble and college physicists should be actively concerned about it. (incomplete)

"Non-Graduate Specialists", New Scientist, June 12, 1969 - on the shortage of non-graduate specialist science and math teachers. (statistics)

"Physics Teachers and the Schools", Physics Teacher, Oct. 1967, pp 333 - not enough attention is being paid to the physics teachers - the ones who have to deal with the new courses and ideas which are handed out.

"Physics Teaching: The Dilemma", New Scientist, pp 376 - on the 'classical' vs 'modern' methods of teaching physics.

"Plan for Teaching Science", New Scientist, Dec. 4, 1969 - a new system for teaching science to interest teacher and pupil alike. "To get the best people, the teaching job must be made more exciting".

"Playing Hooky by Turns", Nature, Vol. 224, Nov. 29, 1969, pp 833-834 - on the Teacher's Unions and the strikes, and the situation in which the teachers are in the U.K.

"Science Teachers Form Group" - Canada's first national association of science teachers was established.

"Showing the Teacher How Industry Lives"- on the need to inform school science teachers, through practical experience, the realities of life in industry.

"Take a Tip on Training Teachers, Told", Ottawa Citizen, March 5, 1966 - industry can teach teachers a lesson when it comes to training programs.

2 d) continued -

"Teachers Studying New Physics" - several high school teachers are taking a special course designed to make them familiar with the new Grade 13 physics which is to be taught.

"Test Yourself, Teachers Told", Ottawa Citizen, - education, being an essential of our society, relies heavily on teachers. Teachers should undertake a critical analysis of what they are doing.

"Uproar About Teaching", Nature, April 23, 1966, pp 337-338 - the administration of primary and secondary education and the terms of service of teachers, are too rigid for a society seeking to transform itself.

"Willey on the Warpath", New Scientist, March 5, 1970, pp 444 - on the training of science teachers.

e) Students

- Anderson, C.A., "Research and the Changing Campus Environment", IEEE Spectrum, Dec. ,1969, pp 61-63 - today's students, reared in affluence, have had time to concentrate on social and political problems. The result is rebellion on the campus - and industry may well be the next target. We must recognize that these are changing times, and that it is up to us to adapt to them.
- Argyris, C., "Students and Businessmen: The Bristling Dialogue", Think, July-Aug. 1968, pp 26-31 - college students bear a mutual grudge because neither side listens to the other and because each is weak where the other is strong.
- Brasseul, P., "Pour Mieux Comprendre Nos Eleves", 1969 - student opinions of what their schooling should be like. These are high school students in France. (the article is in French)
- Burbidge, M., "The Status of Students", Journal of Educational Thought, Vol. 3, Aug. 1969, pp 79-87 - the status of students is under discussion - are students really just slaves, or are they capable of acquiring citizenship as responsible young people?
- Butler, C.C., "The Graduate Student - How Does He Fare in Britain?", Physics Today, March, 1969, pp 39-42 - now that university posts are rare, British industry will have to be urged to employ more PhDs.
- Crane, H.R., "Students Do Not Think Physics is Relevant. What Can We Do About It?" American Journal of Physics, Vol. 36, 1968, pp 1137-1143 - in the students' view, the "noncalculus" physics courses do not justify themselves on their own merits.
- Duberman, M., "On Misunderstanding Student Rebels", The Atlantic Monthly (1969), pp 63-70 - a continued discussion of "the war against the young" which was initiated by Richard Poirier in the October Atlantic Monthly.
- Eisenberg, L., "Student Unrest: Sources and Consequences", Science, Vol. 167, March 27, 1970, pp 1688-1692 - changes in adolescence, universities and society have radically altered the experience of being young.
- Ellis, S.D., "The Graduate Student - Where Does He Come From? Where Does He Go?" Physics Today, March 1969, pp 53-57 - the typical graduate student is male and 25 and has a bachelor's degree from a large PhD-granting institution. The draft and cuts in support are changing his luck.
- Ford, B.J., "Qualified - But for What?", New Scientist, May 30, 1968, pp 452-453 - professional and amateur commentators are searching grimly for the causes of the present student discontent. Perhaps it lies in the very nature of our university courses and the people who teach them.
- Glazer, N., "The Campus Crucible", The Atlantic Monthly, July, 1969, pp 43-53 - on the unrest at universities and student politics.
- Grant, C.B.S., "Will Students Wreck Your Computer Center?" Data Processing Magazine, May 1969, pp 62-63 - on student rebellions - and Sir George Williams University, and what can be done or what should have been done to prevent the shocking loss of the computer center.

- Halleck, S.L., "Why They'd Rather Do Their Own Thing", Think, Sept.-Oct. 1968, pp 3-7 - parents live by one set of values, students by their own, and each contradicts the other. The author explains how the value crisis came about and what might be done about it.
- Hook, S., "The War Against the Democratic Process", The Atlantic Monthly, 1969 pp 45-49 - a counterblast to the defenders of student demonstrators.
- Horowitz, I.L., "The Trade-Unionization of the Student Seventies", New Society, July 9, 1970, pp 70-71 - the trade-union ideology may well clarify the university role and restore it to its original purpose - a search for equity through wisdom rather than distinction through degrees.
- Hutchins, F.G., "The Campus Crucible - Moralists Against Managers", Atlantic Monthly, July, 1969, pp 53-56 - on the issues which the university, the faculty, the students and the community face.
- Kennan, G.F., "Rebels Without a Program", The New York Times Magazine, Jan. 21, 1968, pp 22-71 (7 pages) - a comment on the radical left on campus by a member of the "establishment".
- Konvitz, M.R., "Why One Professor Changed His Vote", The New York Times Magazine, May 18, 1969, pp 60-61 - after campus riots at Cornell University one professor saw light and the student point of view.
- Kunen, J.S., "Notes From the Journal of a Gentle Revolutionary", The Atlantic Monthly, 1969, pp 50-54 - an admitted sympathizer with the radical aims of the younger generation tells why the students rebel. From excerpts out of Kunen's book, "The Strawberry Statement".
- Kunen, J.S., "Why We're Against the Biquees", The Atlantic Monthly, 1969, pp 65-68 - a student tells why they protest against the establishment.
- Littig, L.W., "Anxiety and Achievement of Grammar School Boys", Nature, Vol. 226, May 2, 1970, pp 411-412 - questionnaires administered in 1962 and 1966 have shown that there is a relationship between social classes of occupations aspired to and actually achieved by grammar school boys. Anxiety seems to affect achievement but not aspirations.
- Maddox, D., "Student-Directed Research - the Tools for Change", Scientific Research Oct. 13, 1969, pp 22-26 - an experiment at Caltech in student-directed research on socially relevant problems such as pollution and education.
- McCarthy, G., "The New Youth and the New Schools", pp 10-21 - author takes a penetrating and admiring look at today's youth and says they do everything better than any generation before them.
- McGuire, S.A., "More On the Student Rebellion", Bulletin of Atomic Scientist, Dec. 1968, pp 33-34 - a student's reason why students rebel - against the ineffectuality of the elders of harnessing technology, of their fight against the arms race and nation states which has led to nowhere.
- McNarry, D., "Students Conemts", April 3, 1969 - the author's views on an ideal schooling system. (a perceptually handicapped child)

- McNarry, L.R., "Some Thoughts on the Students of Today", Oct. 3, 1969 - Education must adapt to the needs of the children's curiosity and intelligence.
- Meunier, J.L., "Information on Graduate Students", Physics in Canada, Vol. 25, pp 26-31 - a brief review and analysis of an NRC report on characteristics of graduate students at Canadian Universities.
- Michel, L.; de Brancion, B.C., "The Paris Barricades", IEEE Student Journal, Sept. 1969, pp 27-28 - like his American counterpart the French student revolutionary demands curricula reform. But there the similarity ends. His first concern is for a degree that will increase his chances of gainful employment.
- Parker, F., "After Student Protest, What University Reforms?", Journal of Educational Thought, Vol. 3, Dec. 1969, pp 133-140 - what the students want when they rebel and what actually happens as a result.
- Pileggi, N., "Revolutionaries Who Have to Be Home by 7:30", The New York Times Magazine, March 16, 1969, pp 26-123 (7 pages) - on the unrest caused by high school students who are concerned about their schooling system.
- Poirier, R., "The War Against the Young", The Atlantic Monthly, 1968, pp 55-64 - the war is a real one, though many of the elders who wage it will not acknowledge it. Campus after campus blows up. The "hot minority" of the disenchanted grows in number and in anger.
- Slater, J.C., "The Graduate Student - Why Has He Changed?", Physics Today, March 1969, pp 35-37 - practical necessity and changes in research, education and specialization have produced more conformity and conservatism, resulting in relatively fewer scientific leaders.
- Spender, S., "What the Rebellious Students Want", The New York Times Magazine, March 30, 1969, pp 56-74 (11 pages) - on why the student rebels, and different student attitudes in different countries and what the student himself thinks he is achieving.
- Strassenburg, A.A.; Llano, M.T., "The Graduate Student - What does He Study?" Physics Today, March, 1969, pp 45-51 - a varied program of course work, research, major examination and language requirements awaits the prospective physics graduate student when he has fulfilled the equally varied entrance standards. (data included)
- Walsh J., "ACE Study on Campus Unrest: Questions for Behavioral Scientists", Science, Vol. 165, 1969, pp 157-160 - on the instigation of a study of campus unrest by the American Council on Education and its problems. (article on confidentiality attached).
- Willis, H.L.; Halpern, G., "A Survey of How Students Perceive Their High Schools" Education Canada, Vol. 10, June 1970, pp 29-33 - a survey, using controls, of student activities in Ottawa and what they want from their schools. Most students want teachers and principals to really listen to them.

- "Are Graduate Students Worth Keeping?", Nature, Vol. 225, March 14, 1970, pp 985-986 - on whether graduates should continue studies at university or not.
- "Children Pushed Into Adult Roles", Ottawa Citizen - too many parents push their children into adult roles - the result is a problem of discipline.
- "Don't Blame Them All", Toronto Daily Star- unfortunately, most students who are good students and law-abiding citizens are smeared by the trouble caused by "the acts of the lawless minority".
- "The Graduate Student", Physics Today, March 1969, pp 23 - on the graduate student of today, a special issue.
- "The Graduate Student - How Does He See Himself", Physics Today, March, 1969, pp 24-33 - despite the usual grumbles about their courses and everything concerned with it, most graduate students appear reasonably content with their lot.
- "Sociology of Postdoctoral Students", Nature 224, Dec. 20, 1969, pp 1150 - on what happens to the high number of postdoctoral students.
- "Student Riots Upset Science in Japan", Scientific Research, March 31, 1969, pp 17 - increasing student unrest in Japan is seriously disrupting scientific research.

f) Science Education

- Aicken, F., "Blinders Off in Science Teaching", New Scientist, Dec. 25, 1969, pp 650-651 - a much greater part of the trainee science teacher's time should be devoted to educational matters and less to the accumulation of scientific facts.
- Aldridge, B.G., "Physics in the Open-Door College", Physics Today, March, 1970, pp 46-51 - a wide range of student goals and motivations, and a lack of defined objectives for the courses provided, add up to a colossal challenge.
- Alexander, D.J., "Books for Schools the Work of the Inner London Education Authority", Physics Education, Vol. 4, No. 2, March 1969, pp 75-76 - on the need for better textbooks and the importance of the teachers getting away from the old traditional books.
- Alley, R.E. - a report on proposals by engineering mechanics teachers for changes in introductory physics courses for engineers.
- Altman, O., "Education of Engineering Technicians", The Journal of Environmental Sciences, April 1965, pp 17-20 - on education and the technical manpower shortage.
- Arthur, G.R., "Education for the New Age" - on the need for improved education in order to be able to cope with our age of "science and technology".
- Astin, A.W., "Undergraduate Institutions and the Production of Scientists", Science Vol. 141, July 26, 1963, pp 334-338 - the talented student's decision to become a scientist can be influenced by the type of college he attends. (references)
- Barton, H.A., "Education and the Employment of Physicists", Physics Today, Jan. 1960, pp 20-22 - on the distribution of physicists in industry and education in the U.S.A. (graphs & data)
- Barton, H.A., "Projected Output of Physicists", Physics Today, April 1960, pp 24-25 - data on the number of physicists as compared to graduates in other fields.
- Beswick, T.R., "Another Way of Thinking", New Scientist, June 26, 1969, pp 694-695 - the primary aim of school science teaching should be to lead pupils along the path of discovery and to stimulate an appreciation of the place of science in everyday life. Able pupils can read for themselves about the history and philosophy of science, subjects that are often beyond the grasp of the less able.
- Biedenbach, J.M., "Continuing Education for the Engineering Manager", IEEE Spectrum, Nov. 1968, pp 99-101 - industry has found it necessary to implement continuing education programs of its own design to prevent educational obsolescence in upper-level engineering and technical personnel.
- Billings, F., "Science at Summer School", 1964 - on a special science summer course for especially gifted students in the science field.
- Bishop, A.A., "Science Teaching in the U.S.A. - Some Impressions from a Brief Visit", The School Science Review, Vol. 50, Nov. 1968, pp 417-422 - an

appraisal of science education in the U.S.A.

Boercker, F., "Education and Manpower in Physics", Physics Today, September 1964, pp 42-50 - current physics education is ok for physicists but fall short in its obligations to general education. (graphs and other data)

Brady, C., "Science Teaching and Transfer From Primary to Secondary Education", The School Science Review, Vol. 50, Nov. 1968, pp 245-248 - on the problems encountered in teaching science during transitional years and suggestions on the areas where possible solutions may be found.

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Clowes, R.M., "Influence of the Space Effort on Secondary Education" - a speech appraising the influence of space effort on secondary education.

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Davies, D.S., "Education for a Restless Society--2", New Scientist, Sept. 26, 1968, pp 663-664 - we have been slow to grasp the "obvious and compelling truth" that the educational and industrial sectors which not long ago were entirely independent of each other, are now almost entirely interdependent. This has some serious consequences.

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Dessel, N.F., "Prediction of Success in Physics for High-Ability Students - a Small Sample Study", American Journal of Physics, pp 197-199 - success in physics not significantly related to Otis I.Q., Social Studies sub-tests of ACI, High School grad point average, nor rank in H.S. class. Suggests need for better evaluation instruments.

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Dutton, F.D., "Education (Q)", Science, Vol. 155, Feb. 17, 1967, pp 903-906 - on a symposium emphasizing the pervading interrelationships between the biological sciences, agriculture and renewable natural resources.

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Elton, L.R.B., "Self-Tests in Physics", Univ. of Surrey, Guilford - on a self-testing book for physics students.

Flowthow, R.C., "Technical Re-Education for the Space Age" - on the importance of education in today's world of technology.

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Fowler, J.M., "Commission on College Physics", Physics Today, March, 1967, pp 64-71 - a review of the CCP activities.

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- Freeman, M., "Your Child's Physics Books", Physics Today, Dec. 1966, pp 67-81 - although more than 2000 new titles for children are published each year, good reading in physics is not plentiful. (discussion of suitable books).
- Friskopp, K.G.; Sandstrom, A.E., "The Education of Physicists in Sweden", American Journal of Physics, pp 168-173, Vol. 29, 1961 - a survey of the school system and the background expected of students advancing to university studies in maths, physics and chemistry.
- Gardner, J.W., "What About Technical and Trade Schools?", Sun Life Assurance Co. of Canada - on the growing need for technical and trade schools. (booklet)
- Goldfarb, A.M., "On the Education of Physicists in Austria and Israel", American Journal of Physics, Vol. 29, 1961, pp 161-167 - the basics of the educational system in Austria and Israel are described, each followed by a discussion of the training of a potential physicist or physics teacher in that country.
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- Grobman, A., "Biology is Changing Too", Saturday Review, Sept. 21, 1963, pp 67-75 - a new biology curriculum developed by research scientists and high school teachers is becoming available to schools.
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- Hulsizer, R.I., "The New MIT Course", Physics Today, March, 1967, pp 55-57 - this new course is evolving and flexible; the current course content and texts are discussed.
- Hunt, G.C., "Technical Education in Britain", Jan. 21, 1966, (5 pages) - a talk on the system of technical education in Britain.
- Hurd, P.D. (ed.), "The Biological Sciences Curriculum Study", New School Science AAAS, pp 24-38 - on the urgent need for a reform in the biology curricula.
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- Johnson, H.W., "Education for Management and Technology in the 1970's", Science Vol. 160, May 10, 1968, pp 620-627 - the universities and business must foster entrepreneurship and its interaction with technology. (references)
- Jones, G.O., "Physics in the New London BSc Degree", Physics Education, Vol. 4, May 1969, pp 143-150 - an outline, giving curricula details and timetables of changes at the University of London.
- Jones, G., "Sixth Formers' Attitudes to Technology", New Scientist, Jan. 31, 1963, pp 239-242 - the distribution of talent between science and technology. In Britain, the ablest science pupils show a marked preference for pure science rather than technology.
- Jones, T.F., "Doing Your Own Thing", IEEE Student Journal, Sept. 1969, pp 2-4 - a university president, himself an electrical engineer, tells how to beat the system in which no curriculum fits all EE students.
- Keohane, K.W., "Toward an Integrated Teaching of the Sciences", The Science Teacher, Oct. 1968, pp 39-43 - the Nuffield Foundation begins work on a science course significant to the average student.
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Massey, N.B., "Curriculum for the Senior Division", Ontario Dept. of Education, Dec. 23, 1968 - a course designed so that students in their later school years may explore topics linked with space and astronomy as a part of their general education (third draft).

Massey, N.B., "The Real and the Counterfeit" or "Teaching Science from W to M", April 17, 1969 - author suggests we live in two worlds, the real world, W, with all its indefinites and uncertainties and awkwardness, and also the model world, M, with all its clarity and certainty.

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Massey, N.B., "Science Summer Course in Toronto", April 11, 1968 - teachers of elementary and secondary schools who attend the course in elementary science, have all come for various reasons.

Massey, N.B., "Summary of Speech in Ottawa, Planned for January 19, 1966" - this follows a visit of secondary school inspectors to an elementary school science lesson and a simultaneous visit of elementary school personnel to a secondary science classroom.

Mathewson, J.H., "Science for the Citizen: An Educational Problem", Science, Vol. 138 Dec. 28, 1962, pp 1375-1379 - academic scientists have a responsibility for educating the nonscientist in the nature of science.

McCarthy, M.C., "Education for a Restless Society-4", New Scientist, Oct. 10, 1968, pp 88-89 - specialization is one of the central weaknesses of science education in British schools and universities.

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- Munn, J., "Scientists Find Texts Shocking", Globe and Mail, April 11, 1964, - Physicists are getting together to do something about high school science courses. (on the origin of the Ottawa Chapter of the CAP)
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- Norris, S., "Views on Science Education in Foundation-Supported Literature" - this study examines, through a content analysis, foundation financed program recommendations and policy statements pertaining to science education.
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- Parsegian, V.L., "Baccalureate Science", Physics Today, March, 1967, pp 57-60 - "...to develop understanding of the nature, trends and significance of science to the common interest..."
- Penfield, W., "Oriental Renaissance in Education and Medicine", Science Vol. 141, Sept. 20, 1963, pp 1153-1161 - a Canadian physician sees a sudden renaissance of Western learning on the Chinese mainland.

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- "in how many lessons do we actually arouse curiosity in the children we teach?"
- Pippard, "The Educated Scientist" - on the importance of science education and the need for improvement.
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- Riley, W.R., "Resource Letter BSPF-1 - a Bibliography of Selected Physics Films", American Journal of Physics, Vol. 36, June 1968, pp 475-489.
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- Rogers, E.M., "Examinations: Powerful Agents for Good or Ill in Teaching", American Journal of Physics Vol. 37, Oct. 1969, pp 954-962 - on examinations - and a few pointers on what should be and should not be done.
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- Ross, M.G., "A Decade of Upheaval", Education Canada, Vol. 10, June 1970, pp 18-22
- the role of intelligent men and women is to know, to understand, to care and to act - not to stand by as spectators.
- Scott, M., "The Use of Books in the Teaching of School Physics", Physics Education, Vol. 4, March 1969, pp 72-74 - on the increasing use of small sets of books related to a particular topic instead of using the same book for the whole class. Also the use of libraries and a better variety of books for reference.
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- on the fact that the capacity of pre-college pupils has been underestimated and science courses should be made open to more people than just those who are specializing. (editorial)
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- Victor, L.J., "Systems: An Organizing Principle for Science Curricula", Science and Children, Jan./Feb. 1969, pp 17-20 - on a new science curriculum whereby the children should be guided in their investigation of concrete systems to see the common features of these systems and the common technique and strategies they employ in their investigations.
- Warren, J.W., "School Physics", Electronics & Power, Feb. 1968, pp 72-73 - the teaching of physics greatly affects the understanding of those pupils who become technologists and is often a determining influence in their choice of career.
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- Weinberg, A.M., "The Federal Laboratories and Science Education", Science, Vol. 136, April 16, 1962, pp 27-30 - by playing a greater role in education, "Bio Science" can diminish the manpower shortage it has created.
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- Whitson, W.L., "Education for the Space Age" - on the importance and necessity of education in our space age.
- Willard, J.E., "Capitalizing on Manpower Resources Through Education", pp 291-295 - the pipeline that feeds our manpower pool of able scientists, as well as able citizens in all other areas, starts in the elementary schools.

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- Williamson, M.A., "The Art of Precise Writing", Research/Development, Jan. 1970 - engineers and scientists are reputedly poor writers. One means to sharpen writing ability and reading comprehension is to master precise writing.
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- Zacharias, J.R., "Team Approach to Education", American Journal of Physics, Vol. 29, 1961, pp 847-849 - on the preparation of a new physics course for American secondary schools.
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- "A Computer-Assisted Instruction Course in Introductory Physics".
- "A Demand for Reform", Scientific Research, June 9, 1969, pp 5-8 - a discussion on whether scientists are "overtrained" or not. (letters to the editor)
- "A Report on the Activities of the Science Education Study Committee of the Canadian Association of Physicists (Ottawa Section), Oct./Dec. 1964 (8 names)
- "Acknowledging Science as Part of a Liberal Education", Science Forum 8, April 1969, pp 18 - some Canadian universities are seeing the need to include science in the education of non-scientists.
- "The Analysis of Test Items" - an analysis of the test items in the Naval Academy's introductory physics course.
- "Areas of Investigation Relating to a Bicycle" - on the parts of a bicycle and observations and questions on the bike and how it works.
- "Austrian and Dutch Education under Examination", Nature, Vol. 227, 1970, pp 1184 - on the problems of the universities re growth, costs and the need to shorten the course length in order to keep the problem manageable.
- "Bringing Down the Tablets", Nature, Vol. 224, Dec. 20, 1969, pp 1142-1143 - a report of the Haslegrave Committee on the question of how to reorganize technical education.

- "Central Direction Urged for Scientific Research", Ottawa Journal, March 5, 1966
- on the need for interesting the general student in science as well as the brighter student.
- "Certificate of Attendance" - a certificate of attendance for a physics refresher course as an introduction to PSSC physics. (CAP SES Committee)
- "Commission on College Physics", Newsletter #17, Oct/68
- Commission on Science Education, AAAS, Vol. 3, No. 3, June 1967 - on an evaluation of science curricula.
- "Co-operative Physics Courses Between High School and Junior Colleges".
- "Earth Science Courses Suggested", Ottawa Journal, April 16, 1970 - Science Council of Canada has recommended geology and other earth sciences be taught in high schools.
- "The 8mm Mathematics Loop Films", The National Film Board of Canada - about the films and a list of those available.
- "Evaluation and the Modern Science Student", Feb. 19, 1969 - two speeches on "what" and "how" to evaluate the science courses.
- "The General Course in Integrated Science", Dec. 7, 1965 - on a new system of science teaching for those students who are not science-orientated majors. (second draft)
- "IEEE Educational Activities - An Ad Hoc Committee Report", IEEE Spectrum, Nov. 1967, pp 101-104 - IEEE's new organization - the Educational Activities Board is important in improving the effectiveness of its educational activities.
- "Is School Physics Becoming Too Soft?", New Scientist, May 7, 1970, pp 267
- a criticism on the teaching of physics, claiming the physics courses are too soft.
- "It Takes More Than Curricula", Canadian Electronics Engineering, Nov. 1966, pp 31-41 - a panel discussion recently examined engineering curricula only to find it had opened a Pandora's box in the process.
- "More Sad Statistics", New Scientist - on the decrease of adequate staffing for science and math courses, on the drop in the number of entrants to Colleges of Education who have "A" level passes in math and science and on what happens to these people with "A" levels in science and maths. (seventh report of the universities Central Council on Admission - UK)
- "NRC/AID Conference on the Production of Physicists", Physics Today, June, 1955, pp 6-12 - on the need for more people with specialized knowledge in the sciences and that more emphasis is needed in the study of physics and maths.
- "Nations and Professionals", Science and Technology, Dec. 1967, pp 38-41 - too often, the real comers in a country get the boyish enthusiasm ground out because the educational system has no way of exploiting it. Interview with Lord Bowden.

- "October-National Science Youth Month", Science News, September 4, 1965, pp 156-159 - Science Service has organized the Tenth Annual National Science Youth month in cooperation with more than 50 national agencies to nurture science talent in youth.
- "Outline for the Advanced Level Course" - on the scientist and his achievements, current scientific thought and practice, the scientific enterprise and a major project in relationship with the students. (fourth draft)
- "Outline of the General Level Course" - on the nature of science, contemporary science and science and society as relevant to a student.
- "Physical Science for Nonscientists", Physics Today, March 1967, pp 60-64 - this course is aimed at the prospective elementary school teacher.
- "Physics Education Evaluation Project" - a study to measure students' perception of certain concepts related to physics and physics courses. (UBC PEEP project)
- "Physics in Education", Physics Today, Feb. 1957, pp 27-31 - report of a conference held in New York to advance recommendations designed to produce more physicists. A number of resolutions are listed.
- "Playing at Technology", New Scientist, Dec. 7, 1967, pp 608-610 - three new scientific kits for school children and students, with a minimum age of about 11.
- "The Proposed Courses in General Science" - on a new course for general science. (first draft)
- "The Role of Physics in Engineering Education", Physics Today, Dec. 1955, pp 12-21 - a report of a Committee of the American Institute of Physics on the role of physics in engineering education.
- "Science and the Intellectual Tradition", Nature, Vol. 199, July 13, 1963, pp 105-107 - Dr. Toulmin's ideas on science and education.
- "Science, Education and Catastrophe", May 1954 - H.G. Wells remarked that the fate of the world depends upon a race between education and catastrophe. The article further develops this remark.
- "Science Education in Various Parts of the World", World Confederation of Organizations of the Teaching Profession - report of a questionnaire study on materials, methods, new techniques and preparation of science teachers overseas. Study was done by the Committee on Science Teaching. (initiated in Stockholm 1962)
- "Science Film Service" - facilities for High Speed Microphotography, Time Lapse and Underwater Photography.
- "Science Group to Put Stress on Education" - the National Science Foundation announced a major reorganization of its activities in support of science education.
- "Science Teachers' Workshop" - a science workshop for teachers to discuss teaching techniques, curriculum changes, experimental courses, new text-books and new equipment in physics, chemistry and biology in the 4 and 5 year programs.

"Space and Man", Ontario Department of Education, 1969 - Guidelines are provided so that teachers and students are able to plan for studies centered on space.

Summary of replies to the questionnaire on the PSSC course issued by the SES Committee of the Ottawa and Area Section of CAP.

"The Teaching of Physics in Schools", Physics Today, Jan. 1961, pp 30-38 - a comprehensive report of an international group of physics teachers on physics curricula.

"Technology Versus Education", Wireless World, April 1970 (one page) - on the muddle caused by the overlap of technology and education.

"Thinking about Education", Nature, Vol. 227, 1970, pp 988 - on the need to assess the value of a university education for all.

"Training Industrial Physicists", Nature, Vol. 220, Dec. 28, 1968, pp 1279-1280 - a report on a seminar on the education of physicists in the industrial field.

The Use of Computers in Physics Courses.

"Young Talent on Display", Science, News, Vol. 93, May 1968, pp 474 - a rich display of young scientific talent is on at the International Science Fair.

g) General Education

- Armstrong, R., "McGeorge Bundy Confronts the Teachers", The New York Times Magazine, April 20, 1969, pp 25-124 (10 pages) - on Bundy's fight to decentralize the New York School System.
- Atlee, B., "There are Just Two Things Wrong with Our Schools - What They Teach and How They Teach It", Maclean's, Nov. 2, 1964, pp 20-47 (4 pages) - a criticism of our present system of education and the curricula.
- Bratton, F.G., "The Legacy of the Liberal Spirit", Beacon Press, Boston, pp 269-214 - Dewey's defence of the traditional "classic" method of education.
- Bruner, J.S., "Culture, Politics, and Pedagogy", Saturday Review, May 18, 1968 pp 69-90 (6 pages) - advance in education continues amid the swirl of controversy.
- Buchwald, A., "Introduction of New Math Puts Parents in the Soup", Syndicated Newspaper Column 1965 - the new math system is putting a stop to parents helping children because the parents themselves can't do the math.
- Cameron, J.R., "Public Education and the Retreat from Culture", Journal of Educational Thought, Vol 3, 1969, pp 41-48 - a criticism of public education, saying that it doesn't give a complete education. Author asks the question, "To what extent does public education produce the cultured man, possessed of a cosmopolitan range of knowledge and interests?"
- Clegg, A., "Education: Mind Stocking or Fire Kindling?", Ont. Dent. of Education, Oct. 1966 - the two views of education are discussed. a) that knowledge should be used to stock the mind and turn out well informed citizens b) that education should be used to stimulate the mind and set it alight.
- Colborn, R., "If Whatever you Teach is Probably Wrong: What Can You Teach Most Usefully?", International Science and Technology, July, 1967, pp 23 - by the time many students get out of school what he knows is wrong or irrelevant. A new system of education is needed especially between the years 14-21, when the child becomes an adult. Author gives seven suggestions on improvement.
- Cowan, P., "Integration Plan Offered to Colleges" - a new system under which private institutions can voluntarily integrate themselves into the regional secondary system.
- Creery, T., "Exports, Literacy Key to Growth", Ottawa Citizen - Oil and literacy were key elements in the growth rates of 9 of the 20 underdeveloped countries which advanced fastest economically in the sixties.
- Crick, F., "On Running a Summer School", Nature, Vol. 220, Dec. 28, 1968, pp 1275-1276 - would be organizers of summer schools are offered some advice on how to increase the efficiency of communication between participants.
- Curtis, B.E., "Education: Four Propositions", Jan. 26, 1969 - four propositions to be considered on how to help improve the present befallen state of our education system.

- Davies, R., "Educating For the Future", The Atlantic Monthly, pp 140-144 - on the development of education in Canada and today's dissatisfaction with the education system.
- Dempsey, R., "Reducing Educational Pressures", Science, Sept. 8, 1967, pp 1117, - on the pressure students face in the educational system.
- Douglas, B., "Outaouais School Board Record Budget Up by \$2,000,000", Ottawa Citizen, Dec. 16, 1969, pp 5 - a higher budget than last year, more than \$2 million higher, was set by Outaouais Regional School Board for 1969/70.
- Drucker, P.F., "Education: The High Cost of Low Production", Think, July/Aug. 1968, pp 21-24 - what our schools need is a fresh appraisal of what we know - and what we don't know - about teaching and learning.
- Dutton, I.R., "Education is Back in Fashion", Canadian Electronics Engineering, Feb. 1966, pp 28 - people are realizing that education is essential to keep up the economy and to keep pace with the rate of technological change.
- Ferster, M., "New Mathematics in School", Science News, Jan. 19, 1963, pp 42-43 - to keep pace with our complex technological society, mathematicians and educators are cooperating to revise the teaching of school maths.
- Frye, N., (ed), "Design for Learning", Univ. of Toronto Press, 1962 - a report on a survey on English, foreign languages, mathematics, science and social science in the elementary and secondary schools and the Univ. of Toronto. (extract from the book)
- Frye, N., "Education-Protection Against Futility", May 21, 1964 - education, a necessity of life, is especially needed to protect us against what the world calls "failure".
- Furlong, W.B., "A New Factory Product: Instant Education", New York Times Magazine, Dec. 1, 1968, pp 54-160 (11 pages) - a large industrial centre has begun to train illiterates - to read, write and give them a basic education, at the same time these men work in the centre. A marked improvement has been made in the work rate.
- Goodlad, J.I., "Changing Curriculum of America's Schools", Saturday Review, Nov. 16, 1963, pp 65-88 (5 pages) - on the task of selecting what to teach in schools.
- Goodman, P., "Freedom and Learning: The Need for Choice", Saturday Review, May 18, 1968, pp 73-75 - a criticism of society's belief that schooling is an essential part of today. Also, some suggestions for a new type of learning system.
- Grantham, R., "Reforms Needed in Education", Ottawa Citizen - on the need for more progress in education.
- Gruninger, W., "The Crisis in Education", The Argus, Oct. 1964, pp 367-396 - on the crisis in education, a criticism of the system as it is.

- Harmon, L.R., "The Supply of Brains", International Science and Technology, Feb. 1966 - "are we scraping the bottom of the barrel? Far from it. We don't even know how deep the barrel is" - on the unrealized number of bright people in the U.S. and the author's plan to educate them and turn them into useful workers and professionals.
- Heller, M. P., "Protecting Freedom to Learn", The Argus, May 1965, pp 170-174, - with emphasis on protection of academic freedom, the paper focuses upon the role of the administrator accepting this change.
- Hockey, D., "Education-1968---?", May 1968 - the author's suggestion for education in the last half of the century is to have the aim - "to help individuals in their search for a personal purpose in life". He explains how this aim may be realized and achieved.
- Holt, J., "The Fourth R--the Rat Race", New York Times Magazine, pp 46-62 (6 pages) - on the terrific pressure being put on the students today.
- Hunter, I., "Layton Blasts Schools", Ottawa Journal - Canadian poet, Irving Layton criticized teachers, saying that they did not help close the gap between writers and society. Also, "Poet and School Inspector Cross Swords, Shake Hands."
- Hutchins, R., "The Future of American Education", Manas, April 16, 1969 - on some of the changes needed to reform the shortcomings and failures of the American higher education.
- Ibbotson, L., "Are We Wasting Brain-Power?", Wireless World, July, 1969, pp 302 - a criticism of our system of "labelling" and channeling of students into particular fields.
- Illich, I., "The School System as a Hindrance to Education", Globe and Mail, Tuesday, Oct. 7, 1969, pp 7 - a criticism of society's idea that schooling is a necessary means of becoming a useful member of society.
- Ivey, D.G., "The Nonscience of Education", The Crucible, Winter, 1967/68, pp 30-32 - "this is a courageous and creative defiance of pseudo-scientific thinking on education."
- Jencks, C., "A Reappraisal of the Most Controversial Educational Document of our Time", The New York Times Magazine, Aug. 10, 1969, pp 12-43, (8 pages) - an appraisal of James Coleman's report on "Equality of Educational Opportunity" which is on the black and white student situation in schools.
- Jennings, F.G., "Textbooks and Trapped Idealists", Saturday Review, Jan. 18, 1964, pp 57-78 (5 pages) - a criticism on today's textbooks. They are not good enough and should and can be better.
- Kelly, D.T., "Some Problems of Project Work", Physics Education, pp 40-42 - on the aims, advantages and disadvantages of "projects" in schools.

- Koerner, J.D., "Education and Government", UUA Now, Vol. 150 (autumn) 1968, pp 16-24 - the government directly and indirectly plays a large part in the education system of the U.S. (this issue is devoted to youth and education)
- Lavery, K.R. "The Knowledge Industry", Canada 2000, 1969, pp 120 - on the emergence of a new target for education - that of higher education and training for the 20-24 year old segment of the population.
- LeShan, E.J., "Reprise: How Much Pressure?", New York Times Magazine, Jan. 9, 1966, pp 63 - on the pressure students are under in our education system.
- Lee, D.M., "Psychology-Starting Point for Educational Reform", Discovery, Dec. 1965, pp 20-23 - more than 50 years of concentrated activity has taken place within the field of formal psychology. How much relevance has this to the process of education?
- Lempereur, G.J., "Outline of a Proposed Newspaper for the Young, Age Group 10 to 14", Jan. 12, 1967 - a newspaper for the age group 10-14 is described and explained.
- Lunn, J., "Color Maths - an Old System Gets a New Tryout", Canadian Weekly, pp 17 - across Canada schools are testing a new way of teaching arithmetic used 150 years ago.
- MacRae, D., "New School System Seen for Quebec", Ottawa Citizen - a new education system in Quebec, including promotion by age instead of by marks.
- Marshall, M.S., "Prefabricated Packages", Main Currents, Nov/Dec 1966 - a criticism of prefabricated packages of information which do not allow the student to think and inquire for himself. (excerpt)
- Mason, S.J., "Oral Examination Procedure", IEEE Student Journal, Sept. 1968, pp 21 - author's contribution to student disquiet by outlining a series of simple rules that add zest to degree-winning!
- Massey, N.B., "The Larger World", March 15, 1967 - a speech given to the Conservation Council of Canada on "out-door" education.
- McDowell, S., "Where Everything is Changing" - on the great change in Quebec textbooks which has taken place.
- McLeod, J., "Community and Education Colleges Urged by CIB", Ottawa Journal, Jan. 14, 1966, pp 3 - Collegiate Institute Board is planning and leading for a space age education for city high schoolers.
- McNarry, L.R., "Something to Think About", Feb. 1957 - on what education is and what it does for today's children.
- McNarry, L. R., "Studies" - on the importance of study to every person as an individual to enable him to help himself and to understand and help the society.
- Mitchener, R., "Education" - on the apparent need for federal-provincial cooperation with the educational system.

- Navarra, J.G., "A Word About Inquiry", Classroom Science Bulletin, Jersey City State College, Oct. 1966 - the students no longer learn science by themselves, the teacher does all the work and the student is spoon fed.
- Needham, R.J., "Please Don't Kill the Teacher", Globe and Mail, Jan. 23, 1970 - on the fact that "this is the first generation in history which wasn't needed." Children are being forced to go to school whether they like it or not.
- Noble, G.A., "The New Freedom in Curriculum Planning - Myth or Reality?", Canadian School Journal, Jan/Feb. 1968, pp 20-21 - on whether we really do have a freedom of our curriculum or not.
- Oliver, J.R., "Counter in Surgeny: Techniques for Examinees", IEEE Student Journal Sept. 1968, pp 30-31 - on how to pass oral examinations.
- Orlans, H., "Federal Expenditures and the Quality of Education", Science, Vol. 142, Dec. 27, 1963- pp 1625-1629 - some changes in the present pattern of expenditures would improve both higher education and research.
- Parent, A.M., "The Parent Commission Recommends...", University Affairs, Vol. 6, No. 2, Dec. 1964 - a report on the structure and levels of education in Canada and overseas.
- Parkinson, G.N., "How to Take a History Course - Without Yawning", IEEE Student Journal, Sept. 1968, pp 2-6 - if there are still some engineering students who do not relate to history, the three rules outlined by Parkinson and other humorous attacks on serious matters will persuade them that they are missing a good thing.
- Penfield, W., "Learning in the Afternoon" - on the learning ability of adults at different stages of life and from different backgrounds and professions.
- Penfield, W., "Penfield Explains Why the Infant's Mind is the Bilingual Kind" - Penfield explains in simple language the mechanics of bilingualism in the brain.
- Pidgeon, D., "A Modern Look at Examinations", Physics Education, Vol. 2, 1967, pp 237-242 - the reasons for the reluctance of teachers and external examiners to accept the modern outlook on examining despite proven unreliability of traditional exams. An outline is given of the procedure followed in constructing a modern examination.
- Pines, M., 'Readin' and Writin': Imperfect Past, Indefinite Future", Think, March/April, 1969, pp 21-25 - "here lies the verb To Be, interred by modern grammar gone but not forgotten". On the "new English" -- what educators feel about the change and how students and parents are reacting.
- Rich, D., "Former Students Learned Facts, Not How to Think, Pearson or Question" - parents of students would like to see specific classes to teach their children how to think.
- Robinson, N., "Innovation, Is It Just Label Switching?", The B.C. Teacher, Nov. 1968, pp 57-60 - one of the dominant themes in education today is the need for educational change. And change is seen as the key to quality education.

- St. John, J.B., "Education, the Individual and Society", Dimensions in Education, May, 1968, pp 2-3 - there is a great interaction between society and education. On the importance of education for our society and how it affects us as individuals and as a society.
- Seeley, J.R., "We Are Not Telling the Pupils the Truth About Life", The Educational Courier, Vol. 33, March/April, 1963, pp 21-83 (8 pages) - on the need to design an entire school experience to orientate the children for the real world.
- Starr, J.W., "The Reliability of Examinations", Education in Science, Feb. 1969, pp 23-25 - on the fallibility of examination marks as measures of intellectual achievement.
- Strasser, B.B., "Scope and Sequence", Science and Children, Jan/Feb. 1969, pp 13-14 - on the need for a new and better way of teaching newer and better material.
- Syrkin, M., "Don't Flunk the Middle-Class Teacher", The New York Times Magazine, Dec. 15, 1968, pp 32-93 (13 pages) - for the first time the public school system is being accused not of stupidity or of incompetence - the traditional criticism - but of "cultural genocide" directed against Negro pupils.
- Thompson, R.P., "Two Engineering Students View SF State", IEEE Student Journal Sept. 1969, pp 18-21 - "will the conscientious student, trying to get an education, be able to reach his class tomorrow? I know my professors will be there, and so will I. It will take more than a few radicals to stop the majority of students from receiving their education"
- Walsh, J., "Curriculum Reform", Science, Vol. 144, May 8, 1964, pp 642-646 - courses and teaching methods are changing at all levels, not just in high school, where it all began.
- Wees, W.R., "The Wastage in Education" - some of the changes that a dedicated leadership is making or is advocating in the education of children.
- Wells, H.G., "H. G. Wells on Education", Nature, Vol. 211, Sept. 3, 1966, pp 1061 - 1063 - a speech by Wells, reflects the flavour of the British Association of Educational Science in the 1930's. Some of it applies to the 1960's.
- Whitehead, A.N., "The Aims of Education", 1916 - a criticism of the education system. A suggestion for improvement is simply, the intelligent use and understanding of language, i.e. a greater emphasis is needed on the teaching of English.
- Williams, Iolo W., "The Edgeworths and Practical Education", The School Science Review, Vol. 50, Nov. 1968, pp 423-432 - on Richard Edgeworth, his book "Practical Education: and his opinions on education. (Published in 1820)
- Wolfe, D., "For Better Schools", Science, May 8, 1964 - some suggestions and ideas on what needs to be done to improve education. (editorial)

Zwicker, B., "Educator's Vision for an Onrushing Future", Globe and Mail, July 7, 1966 - the responsibility of schools is to kindle a fire-love of learning.

"A Fable--the Animal School" - a satire on the idea that everybody must learn from all fields of education and must not specialize in what he is good at.

"Adults Seeking More Education" - on a school for adults who want to improve their education, under the Agricultural and Rural Development Act.

"Aims of Education" - eight short questions on the purpose of education for the child as an individual and as a part of our society.

"Allow More Dropouts-Teachers" - more students should be allowed to drop out of Ontario Schools - two vice-principals tell why.

"Are Better Schools Better?", Science, Vol. 156, May 12, 1967, pp 731-735 - letters by different people on the variances and differences in schools - curriculum, students, faculty, intellectual performance and so on.

"Are School Trustees Measuring Up to Their Responsibilities - the Way Ahead", The School Board, Dec. 1959, pp 11-18 - on assisting school boards in solving their many problems, both financial and educational.

"Beyond the Classroom", Nature, Vol. 217, Feb. 24, 1968, pp 698-699 - according to Dr. Sizer, schools are failing, but he offers remedies to prevent an absolute collapse in the educational system.

Canadian Home and School, Vol. 18, June 1959 - on education, schools and parents.

Canadian Home and School, Vol. 19, Oct. 1959 - on education, schools and parents.

Canadian Home and School, Vol. 20, Oct. 1960 - on education, schools and parents.

Carleton Education Bulletin, Nov. 1969 - on various activities planned or being carried out in different schools in Carleton County.

City of Ottawa Public School Board, Nov. 3, 1968 - a radio address by the chairman of the finance committee, on how the School Board uses the money and on what.

The City of Ottawa, Public School Board, Finance Committee, Estimates, 1969 - the estimates of the City of Ottawa Public School Board Finance Committee, 1969.

"Committee on Aims and Objectives of Education in Schools of Ontario" - announcement of the committee to study aims and objectives of education in schools of Ontario.

"Conference of Learned Societies", Universite Laval, Quebec, 1963 - a pamphlet on the conference held at Laval University.

"Cumberland News", Cumberland and District Home and School Assoc., March 15, 1965, - on the Home and School's planned activities for the people. A report on the origins of the CAP local chapter and the SES committee.

Curriculum Bulletin, Ont. Dept. of Education, Sept. 1968 - this issue is dedicated to changes in education in many different schools throughout Ontario.

"Education for Success in Business", The Royal Bank of Canada, Monthly Letter, Vol. 40, No. 5, July 1959 - education is an absolute essential in order to succeed in business.

"Education Meeting Swamped" - many people came to the Minister's Conference on Education. The conference was on the 55 regional school boards.

"Education Onus is on Parents, says Inspector" - "parents are responsible for the development of the proper attitudes toward education in their children."

"Education Outside the Classroom", Curriculum Bulletin, Ont. Dept. of Ed. April 1969 - different schools, different grades try outdoor classes.

"The Education Scene in the U.S. and Abroad", New York Times, Jan. 16, 1964, - a special education survey.

"The Education Scene in the U.S. and Abroad", New York Times, Jan. 12, 1966 - a special education survey.

"The Educational Systems of Europe" - public instruction in nine countries, surveyed in week-long sessions, shorter seminars, visits to schools and special institutions, round table conferences on differing educational philosophies, practices and reforms.

"The Expansion of Primary and Secondary Education in the U.S.S.R. 1927-1956" - tables indicating increase of primary and secondary schools, the increased number of students and teachers and the qualifications of the latter over the last few decades.

"The Failing Student", The Royal Bank of Canada Monthly Letter, Nov. 1964 - on why the student fails and what happens to him.

"Freedom!": 1969 - a student cry to other students on the lack of freedom and oppressiveness of schools. (street handout) (also in French)

"Growth All Round", Nature, Vol. 222, April 12, 1969, pp 110 - on the increase of the rate of growth in British education.

"High School Standing and Subsequent Success in College Programs", Algonquin College Counselling Service, March, 1970 - a survey on the relationship between academic achievement in high school and subsequent performance in Algonquin College.

"How to Keep the Brains Home/the Other Ranks on The Navy Brass", Maclean's, Feb. 8, 1964 - on the exodus of bright people from **Canada** and why.

"Industrial Education", Scientific American, Aug. 10, 1878, pp 90 - concern expressed that compulsory education may inhibit the teaching of useful knowledge.

"Keep Learning-After High School" - different schools for trades, after a high school education in Quebec.

- "LCC Beats the Ban on Nursery Schools" (UK) - on the restrictions placed on nursery schools and what LCC is doing to overcome them.
- "Modernizing our Schools: Organization for Economic Co-operation and Development", Curriculum Improvement and Educational Development, pp 15-24 - new curricula are needed for the improvement of education.
- The Montreal Star, Dec. 12, 1964, pp 11 - many articles on different aspects and fields of education as discussed in the Parent Report.
- "Name Justice to Study Education", Ottawa Journal, April 8, 1965 - Mr. Justice Emmett Hall was named to head a study on aims and objectives of Ontario education.
- "Principals Plan to Protest Lengthening of School Year" - many principals united in protest against the lengthening of the school year.
- "Prospectus for Youth", The Royal Bank of Canada Monthly Letter, April 1966 - on the need for youth to have determination and willpower to push themselves through universities and stand up to the world on the other side of their degree.
- "Provinces, Ottawa to Attend Conference on Education in Fall" - a conference on education will be attended by education ministers, leaders of business and industry and representatives from all levels of Government. Topics of conference are including manpower, and research into both manpower and education.
- "Quebec Textbooks Shorn of Religious References", Ottawa Journal, Nov. 26, 1965, pp 37 - a Quebec province squabble sparked off by removal of religious references from first and second grade French Roman Catholic textbooks.
- "Scholarships and Bursaries", Sun Life Ins. Co. of Canada - information on scholarships and bursaries available to students.
- "Some Suggestions re Parent-Teacher Interviews" - some suggestions to help teacher and parent make the most of the interview and to cover more ground re the child.
- "Special Education Supplement", The New York Times Book Review, Sept. 20, 1970, pp 7ff - devoted to reviews and discussions of books and the current issues on the American scene.
- "Teaching and Learning", New Scientist, Dec. 18, 1969, pp 587 - a criticism on the use of entrance examinations to university and the poor teaching in schools.
- "Technical Training Upgraded", Montreal Star - on the education department of Quebec embarking on the establishment of pre-university and post-secondary technical training courses.
- "Towards a Broader Curriculum", Nature, Vol. 215, Sept. 23, 1967, pp 1329-1339 - a conference on educational problems concerned with the transition from school to university. It was agreed that a broader curriculum in 6th form was needed. The article tells why this was agreed upon.

- "Towards a Policy for Education", Nature, Vol. 201, Feb. 29, 1964, pp 874-875
- on a debate on education and the new ideas put forward concerning education and the change in education.
- "2,000 Miles Around Northern Ontario", Summer 1970 - on a 30 day camping program for students 15-19 years old under the auspices of "The Experiment in International Living".
- "210 Recommendations in Latest Parent Report", Montreal Star, Dec. 12, 1964, pp 10
- recommendations of part two of the second report of the Quebec Royal Commission on Education.
- "UUA Now, Autumn 1, 1968", 51 pages - this issue is devoted to youth and education and includes nine different articles.
- "Uniting Parents and Teachers for Progress", Ontario Home and School, March 1965
- on people, places and opinions of the Home and School Associations in Ontario. Convention report.
- "What You Should Know About School Boards", Sun Life Ins. Co. of Canada - some facts about the school boards.
- "When the Young Teach and the Old Learn", Time, August 17, 1970, pp 33-38 - an essay article on the difficulties between parents and the young. (includes tips on coping with parents!)
- "Who Wants to be a Student?", Nature, Vol. 222, April 12, 1969, pp 105-106 - on the difficulty of being a student in our present system of education.
- "Why Stay in School?", Sun Life Ins. Co. of Canada - some reasons why education is so important.
- "The World of Educational Research", Canadian Council for Research in Education, June 1968 - a conference on educational research to exchange ideas on how to ensure improvement in education.

h) New Methods, Approaches

- Ashby, E., "Can Education Be Machine Made?", New Scientist, Feb. 2, 1967, pp 285-287 - the intrusion of technology is responsible for the 4th and the farthest-reaching revolution in education. It has large benefits but also has its dangers.
- Atkinson, R.C.; Wilson H.A., "Computer-Assisted Instruction", Science, Vol. 162, Oct. 4, 1968, pp 970-976 - the use of computers as instructional devices has become reality. Authors describe the increase of use of computers and why. (references)
- Brahan, J.W. "Automation and Education - A Review", N.R.C., June 1967 - a review on some of the initial approaches in the field of programmed instruction and on some of the research projects in computer assisted instruction.
- Brahan, J.W.; Brown, W.C., "Development of a Computer-Aided Teaching System", N.P.C. Radio and Electrical Engineering Div. Nov. 1967 - an investigation at the NRC of computer-aided teaching systems and the use of computers in education.
- Brudner, H.J., "Computer-Managed Instruction", Science, Vol. 162, Nov. 29, 1968, pp 970-976 - the use of computers as a teacher's aid may entirely revolutionize the field of education. (references)
- Bryan, G.L., "Computers and Education", Computers and Automation, March 1969, pp 16-19 - the future of computers in education is assured. The open questions are, "How soon?", "How Much?" and "How?" (references)
- Collis, J.P., "Photography in Education", The Photographic Journal, Feb. 1966, pp 33-38 - on the use of photography in education - well illustrated books, charts, maps, etc. It helps the teacher clarify the lesson and it is a creative force.
- Freese, A.S., "Horizons - T.V. for Preschoolers" Think, Sept./Oct. 1968, pp 27-29 - on how a group of Negro mothers taught their preschool children with an imitation T.V. Since then, many preschoolers are using T.V. for education. Even just watching T.V. has advanced the reading and writing level of children.
- Giles, R.E., "Starting Young With Computers", New Scientist, Jan. 5, 1967, pp 36-37 - two things are required to make full use of computers - a new language and the habit of approaching problems in a new way. The first can be taught, and children learn faster than adults; the second is largely a matter of subconscious attitudes acquired naturally during childhood.
- Gotzsche, A.L., "Metric Madness", Guardian Weekly, August 15, 1970, pp 15 - on the unnaturalness of measuring units and the confusion of the layman.
- Graham, J.W., "Computers and Education: A Revolution in Teaching", The Globe and Mail, Jan. 18, 1967 - the role of the computer in education today and tomorrow is examined by Prof. Graham.
- Grantham, R., "School Calls Experts, Everyone Hears Answer", Ottawa Citizen, May 15, 1968, pp 4 - a telephone information service installed by Northern Electric and Bell Telephone enables students to phone different people in order to find out information for class work or to settle their curiosity. Everyone in the class hears the answer.

- Hills, P.J., "Leverhulme Research Project", Univ. of Surrey, Institute for Educational Technology - the photoelectric effect, an investigation into different ways of presenting a self-teaching physics experiment.
- Horne, J., "The Function of the Film in Higher Education", The Photographic Journal, Aug. 1965, pp 219-221 - on the use of films in education and the different fields in which they can be used.
- Houghton, V.P., "Educational Technology in Canada", Educational Technology, Nov. 1969, pp 13-15 - "... the introduction of a technological learning environment involves a fundamental change in the role of the teacher."
- Johnides, T., "Mr. Wizard Revisited", Physics Today, March 1970, pp 43-45 - the man who introduced science to countless children via television has concluded that he can teach them more effectively with instructional films in the classroom.
- Knowles, A.F., Willoughby, N.B., "York University Cones with Increasing Demands", Broadcasting and Communications, Jan/Feb. 1968, pp 18, 19 & 28 - York University wants to develop and stimulate the use of audio-visual and television resources for the improvement of instruction.
- Kromhout, O.M.; Edwards, S; Schwarz, G., "A Computer-Guided, General-Education Physics Course", American Journal of Physics, Vol. 37, No. 10, Oct. 1969, pp 995-1007 - a physics course for University students, given by computer.
- Mittler, P., "Helping the Mentally Handicapped to Learn", New Society, May 20, 1970, pp 919-920 - children who were once seen as unteachable can in fact be taught.
- Morris, A.J.; Grace, D.J., "Conceptual Design of a Television System for Continuing Education", IEEE Transactions on Education, Vol. E-11, No. 3, Sept. 1968, pp 165-170 - the medium of television can be used as a major contribution in the need for education - university level and as an aid in university education.
- Nassau, R.H., "Programmed Instruction", Science Vol. 149, Sept. 3, 1965 - on programmed instruction: its advantages and role in the classroom and what happens to the teachers.
- Peterson, A.D.C., "Real Goals for Education", Science Journal (6 pages) - on the changes demanded by a technological society. Traditional values are a hinderance.
- Piaget, J., "Quantification, Conservation and Nativism", Science, Vol. 162, Nov. 29, 1968, pp 976-981 - Piaget discusses quantification evaluations of children aged two to three years.
- Rhea, J., "1968 Seen Critical for Computer Education", Aerospace Technology, Jan. 1, 1968, pp 20-22 - computer industry seeks to validate benefits to achieve \$1.5 billion market; IBM, RCA emerge as leaders in elementary education system market.
- Silberman, C.E., "Murder in the Classroom (a three part series)", Atlantic Monthly, (40 pages) - a searching examination of the classroom: teacher; student milieu - examples of schools that work and why they work are given.

Smith, K., "Computer in the Classroom". New Scientist, July 31, 1969, pp 230-231
- computer terminals could be as common as blackboards in the schools and universities of the 1980s, and may even render examinations redundant. U.S. companies and universities are already heavily committed in this field, and our efforts need to be greatly increased.

Sweeney, J.P., "Let us Introduce Ourselves", American Education Publications - advertising classroom periodicals for subscription.

Taylor, E.F., "Automated Tutoring and Its Discontents", American Journal of Physics, Vol. 36, NO. 6, June 1968, pp 496-503 - an educational experiment in which students use textbooks and computer tuition to do research. The results expose some of the technical and educational problems lying in the way of general use of such study aids.

Todd, (Lord Todd of Trumington) "A Time to Think", New Scientist, Sept. 3, 1970, pp 458 - 461 - educational change needs to keep pace with technological change. We cannot wait for a generation or so for new approaches to be worked out - we must find new ways of spreading scientific awareness.

Walker, B.S., "Machines for Teaching", Discovery, Dec. 1965, pp 33-37 - in the drive towards more efficient technical education the use of complex teaching machines, such as computer simulators, will increase. But what should be our attitude towards simpler teaching machines with a less well-defined role?

Willis, N.E., "Teacher or Technician?", Discovery, Dec. 1965, pp 25-30
- education shares with industry the need to automate. Does this mean that the teacher will be freed to use his talents more widely?

Winton, R.C., "Promoting Audio-Visual Aids", Nature, Vol. 220, Dec. 28, 1968, pp 1283 - audio-visual aids could be extremely valuable to both teachers and pupils. But first some prejudices and practical problems must be overcome.

"A Simple Analogue Computer for Schools" - this computer has been designed to meet the needs of the many educational establishments which have introduced the analogue computer to their syllabuses in recent years.

"Author! Author!" Maclean's, May 1967, pp 65-67 - everybody is a critic in Helm Bumphrey's class. They choose the books they want to read, then write to the authors and tell them a thing or two. The children are 6-7 years old.

"Building an Educational Television System for Your Schools" - a bulletin on the questions and answers pertaining to building an educational television system in schools.

"Classroom Electronics Still in Groping Stage", Electronic Design, Jan. 4, 1969, pp 64-66 - a systems approach is needed in a field where make-do has largely prevailed. On the electronics industry in the teaching and educational fields.

"Computer-Based Instruction and Information Retrieval Programmes", N.R.C. Radio and Electrical Engineering Div. - on why the application of modern electronic

technology to the fields of education and automated libraries has good possibilities.

"Education by T.V. Gets Poor Rating" - a Toronto Board of Education official saw no future in education by T.V., mainly because of the rigidity and stiltedness of the present educational system.

"Information on Filmstrips" - on the use of filmstrips in and out of the classroom for the education of children and adults alike.

"Students Treated Him as a Human" - Christopher Fraser became principal of a school in Toronto and tried out the Summerhill philosophy which gives the students great freedom. Eventually through successes and failures, Fraser felt the system was working. But his superiors ordered the old system to be brought back.

"Teaching Aids from ITT", New Scientist, May 15, 1969, pp 355 - International Telephone and Telegraph Corp. is extending its audio-visual services into the educational field.

"That's an Asymptote, Sammy", Eastman Kodak Co. - on the use of slides, especially for biology helps students take a greater interest in classwork and the teacher becomes less authoritative. (from an advertisement)

i) Learning, Creativity, Intelligence, I.Q., Reading, Problem Learning

Ahrendt, K.M., "Reading Ability and the Potential Dropout" - Ahrendt suggests that reading ability should be on the list of identifiers of the potential dropout. And the place to develop the reading ability is in the elementary school.

Berstein, T., "Complementarity and Philosophy", Nature, Vol. 222 1969, pp 1033-1035 - the complementarity characteristic of quantum physics is fundamental to ordinary languages. Failure to realize this has raised many problems for philosophers.

Dedijer, S., "The Brain Drain: An Age Old Problem", Bulletin of the Atomic Scientists, March 1970, pp 9-11 - the history of the university and the migration of students in search of learning.

Eliasberg, A.P., "Who Are the Early Readers?", New York Times Magazine, Feb. 19, 1967 (4 pages) - a survey on the children who learned to read without formal instruction before entering first grade: their characteristics, backgrounds, intelligence, family and the effect of being a good reader on their education

Elilshorn A., Telford A., "Game and Problem Structure in Relation to the Study of Human and Artificial Intelligence", Nature, Vol. 227, 1970, pp 1205-1210 - analysis of games as played by a computer is a convenient way of studying human intellectual capacities, including skills allied to social intelligence.

Elkind, D., "How Children Learn to Read", Science, Vol. 149, Sept. 17, 1965, pp 1325 - 1326 - the learning process in children are in part dependant on their development level. Also a reply by Gibson, E. J., to Elkind clearing up what Elkind misinterpreted in Gibson's report.

Hahn, N.F., "How to Teach a Delinquent", The Atlantic Monthly (1969) pp 66-72 - instead of denying the delinquent child a good education and thrusting him into the company of the older and more violent criminals: Warrendale School is on a program by which they educate the child, and at the same time lead him out of the patterns of delinquency. It is a difficult, trying yet rewarding task helping these children.

Hoffer, E., "Man, Play and Creativity", Think (196?), pp 3-10 - play, says Hoffer came before work and man will have a chance to attain his ultimate destiny if he returns to the playgrounds.

Holt, M., "Intelligence is not Enough", Sunday Times Magazine, U.K. (1969), pp 53 & 55 - Holt is particularly interested in thinking processes and tests his ideas by seeing how children solve mathematical problems.

Jensen, A.R., "Race and the Genetics of Intelligence: A Reply to Lewontin", Bulletin of the Atomic Scientists, May 1970, pp 17-23 - Lewontin has criticized Jensen's thesis that there exists a racial genetic influence on intelligence. Jensen replies.

Kestin, J., "Creativity in Teaching and Learning", American Scientist, Vol. 58, 1970, pp 251-257 - creativity and how to nurture it. There are no golden rules, but is related to a process he calls bio-sociation.

- Kubie, L.S., "Blocks to Creativity", International Science & Technology, June, 1965 pp 69-86 - a psychiatrist talks about the technical life, the problems of technical people, and those neurotic mechanisms which rob us of our creative potential.
- Lewontin, R.C., "Further Remarks on Race and the Genetics of Intelligence", Bulletin of the Atomic Scientists, May 1970, pp 23-25 - Lewontin continues the discussion and argues that Jensen's position is a closely reasoned ideological one having an elitist viewpoint.
- Lewontin, R.C., "Race and Intelligence", Bulletin of the Atomic Scientists, March 1970, pp 2-8 - Lewontin concludes that Jensen's thesis that intelligence may be radically dependent is wrong.
- McBroom, P., "Testing for the Spark", Science News, Vol. 93, May 18, 1968, pp 470-481 - identifying the truly creative mind is a task that finds existing testing techniques wanting.
- Mead, M., "Where Education Fits In", Think, Nov./Dec. 1962, pp 16-22 - the author analyzes teacher, classrooms and parents to show how we can kindle in more children the elusive spark of creativity.
- Nason, L. J., "Learning the Right Way", Ottawa Journal, Sept. 28, 1963 - a series of five reports on faulty learning habits, how to recognize them and how to overcome them.
- Nicholson, G., "Forget the I.Q. - Where's the Talent?", Sunday Times Magazine 1969, pp 49 & 51 - the genius in a particular, narrow field frequently recognized early as a child prodigy, has long upset theories of intelligence. In the music school in Surrey, children are not selected for I.Q. tests on intelligence but solely for their musical ability.
- Pidgeon, D., "The Expanding Mind", Sunday Times Magazine, 1969, pp 38, 39 & 41 - our grandparents thought their babies were born bright or dim - and that was that. One's intelligence was marked out for life at birth. Today as shown in this survey we have to adjust to a new view of intelligence that includes the notion that our minds expand if they are nurtured properly. Author looks at this evidence and what it could do for education.
- Pines, M., "Why Some 3-Year-Olds Get A's--and Some Get C's", New York Times Magazine, July 6, 1969, pp 4-17 - different intelligence levels and learning abilities, personalities and environment all affect the A-B-C rating of the preschooler.
- Pitt, M., "Learning and Noise", New Scientist - learning under noisy conditions leads to better retention than learning in quieter surroundings.
- Rabinowitch E., "Jensen vs Lewontin - a Comment", Bulletin of the Atomic Scientists, May 1970, pp 25-26 - Rabinowitch calls for an equalization of economic and educational opportunities.

- Rowan, H., "The Creative People: How to Spot Them", Think, Nov.-Dec. 1962, pp 7-15
- "the creative person is both more primitive and more cultivated, more destructive and more constructive, a lot madder and a lot saner, than the average person. These are some of the characteristics coming out among the findings of the research centered on creative people.
- Senders, V.L., "How to get to Work", IEEE Student Journal, Sept. 1968, pp 7-10
- it takes as much effort to flunk a test as to get a good mark. Students of all ages can trade passive techniques that don't work, for active habits that will enable them to gain and retain the information that counts.
- Thorndike, E.L., "Human Learning", M.I.T. Press, 1966, pp 190-200 - on the evolution of learning in recent times. "The active ideal being to have as many children as possible, learn as much as possible, with very little regard as to who learns what." (originally published in 1931)
- Tschernezky, W., "Dolphins and the Mind of Man", New Scientist, Aug. 22, 1968, pp 377-379 - the example of the dolphin suggest that the evolution of intelligence is independent of the pressures of the environment.
- "CEC in Canada", CEC National Education Association - the Council for Exceptional Children. A program by the CEC has been offered to give the children who are handicapped an opportunity to continue to an advanced level of education. Handicaps include - mental retardation - educable and trainable, speech defects, gifted, deaf and hard of hearing, visually handicapped, physically handicapped, emotionally and socially handicapped and neurologically impaired.
- "Child Reads Backwards? Suspect Dyslexia", Science News, Jan, 23, 1965, pp 61
- children with normal or above normal intelligence can have a reading disability which finds them reading backwards or confusing letters. Dyslexia children can be rehabilitated, particularly if recognized early.
- "Detection and Referral of Perceptually Handicapped Children by the Classroom Teacher". Canadian Association for Children with Learning Disabilities - a list of "symptoms" that will help the teacher recognize those students with perceptual handicaps and enable him to refer the child to skilled testing.
- "Reading Troubles Seen", Science News, Sept. 4, 1965, pp 147 - slow progress in learning to read and write may be caused by a number of factors including "word blindness", mental retardation, familial problems, and brain damage.
- "Special Education Film Project", National Film Board of Canada - on an extensive series of 8 mm films for children with learning disabilities, to be used especially for remedial work.

j) Swing from Science

Connor, R.D., "Flight from Science", Talk given in Winnipeg, 1968 - the facts and figures on the students' swing from science.

Dalyell, T., "The Swing From Science Halted?", New Scientist, March 27, 1969, pp 697 - the swing from sciences to arts, now appears to have swung back, having gone from 55.8% in 1959/60 to 56.0% in 1967/68.

Ellis, S.D., "Enrollment Trends", Physics Today, March 1967, pp 75-79 - statistics show that enrollments of physics majors, measured as fractions of registered students, are dropping.

Hawkes, N., "Swing to Arts Continues, says Dainton", Science Journal, Oct. 1969, pp 13 - an alarming decrease in the percent of students going into the sciences. Dainton blames the early education to which a child is subjected and hence, influenced.

Hibbs, C., "Technology and Youth", Nature, Aug. 9, 1969, - some reasons why there is a decline in the number of students in the sciences.

Jevons, F.R., "Teaching of Science", Allen & Unwin London 1969, pp 123-128 - a chapter on "the ominous swing" from science. The author's exploration of this unusual phenomenon.

McNarry, L.R., "CAP Plans to Find Out Why More Students Don't Enter Physics", Science Forum 11, Oct. 1969, pp 21-22 - a research by CAP to find out the underlying reasons why there is a decline of students going into physics.

Morin, M., "Trop Peu d'etudiants des CEGEP s'orientent Vers les Sciences Physiques et Mathematiques", Le Droit, Sept. 20, 1968 - very few students are studying the sciences and the numbers of those that are, are decreasing. (in French)

Rogers, D., "Hostility to Science in the University: A Science Students View", Science Forum, Vol. 16, 1970, pp 3-6 - Science faculty lack social awareness and hence they fail to recognize the students need for relevance.

Seaman, P.H., "Redundant Handmaiden?", New Scientist, May 21, 1970, pp 396 - on why there is a swing from science. Science provides a mechanistic view of man that the youth reject.

Strassenburg, A.A., "Will Physics Become Obsolete?", American Journal of Physics Vol. 36, No. 6, June, 1968, pp 520-525 - a broad reason is suggested for the disenchantment of young students with physics which suggests new responsibilities for science educators.

Swartz, K., "The Flight from Science - a Students View", Physics Teacher, April 1969, pp 195 - suggests the formation of a third culture more concerned with applying science to the problems of people. (editorial)

Walsh, J., "Dainton Report: British Youth Swings-away from Science", Science, Vol. 159, March 15, 1968, pp 1214-1215 - a decrease in the number of students taking sciences is becoming more noticeable.

- "...and a Chorus of Woe", New Scientist, Oct. 8, 1970, pp 61 - analysis of the "passes" in English schools indicate that; "A" level rose by 5%; social sciences rose by 8.6%; chemistry - no change 0%; physics fell by 2%; math fell by 5%; - overall passes at "A" rose by 12.5%; math science (excluding biology) fell at 2%.
- "Combating the Swing from Science", The Times, July 17, 1969 - two measures to combat the swing from science in schools in England.
- "Dainton's New Job", New Scientist, Oct. 15, 1969, pp 148 - Dr. F.S. Dainton was appointed chairman of the Advisory Committee on Scientific Policy. A brief biography is mentioned and also mentioned that he made his report on the flow of candidates in science and technology into higher education.
- "More Children for Science", Nature, Vol. 221, Feb. 15, 1969, pp 607-608 - a meeting discussed reasons for decline of students going to sciences and possible ways for reversing it.
- "The Output of Scientists", Guardian, July 26, 1969 - on the falling number of graduates in the physical sciences.
- "Physicists Want Study", Globe and Mail, Aug. 20, 1969 - plans to undertake a research to find out about the drop of students taking physics.
- "The Physics Dropout: What Turns Him Off?", Physics Today, Oct. 1969, pp 67 - a study of students who dropped out of physics.
- "Recommendations NRC-AIP Conference on the Production of Physicists", Physics Today June 1955 - on the shortage of physicists.
- "Science's Image", New Scientist, April 17, 1969, pp 142-145 - some opinions why the swing from science exists.
- "Signs That Swing From Science May be Ending", The Times, July 31, 1969 - either the swing from science is decreasing or the universities have succeeded in encouraging more science admissions.
- "Who Wants to be a Scientist?", Nature, Vol. 220, Nov. 2, 1968, pp 424-425 - Dainton reported that the swing from sciences does not represent a great loss of scientists and technologists but is a social phenomenon which should arouse concern.

N A T U R A L S C I E N C E

a) Brain, Mind and Behaviour, Learning and Memory

- Barondes, S., "The Recognition Molecules of the Brain", New Scientist, Feb. 6, 1969, pp 278-280 - discussions on how recognition molecules in the brain cells help determine the way the brain "wires itself up" during development and later in the process of learning.
- Bateson, P., "What is Learning?", New Scientist, June 25, 1970, pp 621-623 - our knowledge of learning is sketchy at best.
- Berger, F.M., "Control of the Mind", American Scientist, Vol. 55, Jan. 1967, pp 67-71 - the effect of drugs and other influences over the control of the human mind.
- Blank, M., "How Children Learn". Science and Technology, Jan. 1969, pp 62-70 - the human child learns at different levels. The brain evolving slowly builds a strong memory base founded on tangible elements that accrue from feel, sight and sound.
- Blomfield S.; Marr, D., "How the Cerebellum May be Used", Nature, Vol. 227, 1970, pp 1224-1228 - recent anatomical information suggests new input-output relations for the cerebellum.
- Camras, M., "Information Storage Density", IEEE Spectrum, July 1965, pp 98-105 - old and new methods of storing information are compared with theoretical limits based on compactness, speed and total bit capacity.
- Ceraso, J., "The Interference Theory of Forgetting", Scientific American, Oct. 1967 pp 117-124 - learning some things tends to make one forget others.
- Chedd, G., "Fear in a Pinch of Atoms". New Scientist, April 4, 1968, pp 30 - emotion transferred chemically from one rat to another has given the idea of a chemical basis for memory a much needed boost.
- Chedd, G., "Mind over Matter", New Scientist, Feb. 13, 1969, pp 343 - heart rate, blood pressure, gland function, etc. controlled by the autonomic nervous system can be altered by will.
- Chedd, G.; Stubbs, P.; Wick, G. (ed.) "To Sleep: Perchance to Learn", New Scientist, March 5, 1970, pp 446 - experiments in which people may learn during the "wasted" periods of sleep.
- Chedd, G., "Triggers of the Brain", New Scientist, Jan. 29, 1970, pp 200-201 - the brain controls the hormonal activities by secreting "releasing factors". These factors are under study as possibly useful to man.
- Collier, B., "Isolation", Science News, Vol. 95, "letters", June 21, 1969, pp 501 - on the effects of isolation for mental stimulation, rather than social contact.
- Dethier, V.G., "Microscopic Brains", Science, Vol. 143, March 13, 1964, pp 1138-1145 - the behaviour of insects and vertebrates may not differ qualitatively to the extent that has been supposed. (references)

Dingman, W; Sporn, M.G., "Molecular Theories of Memory", Science, Vol. 144, April 3 1964, pp 26-29 - any theory of memory in the nervous system must consider structure and function in the entire neuron.

Dobbing, J., "Food for Thinking", New Scientist, June 25, 1970, pp 636-637 - human brain growth spurt is perinatal - from 30 weeks gestation to 18 months after birth. Diet effects during this period can be of great importance.

Gale, A; Coles, M., "Brain Waves and Personality", New Scientist, July 3, 1969, pp 17-19 - the electrical activity of the brain in extraverts has a different pattern to that in introverts.

George, F., "Stimulating Human Thought", Science Journal, Jan. 1970, pp 56-60 - language programming promises a sophisticated and personal form of communications between man and machine.

Gould, D., "The Molecules of Memory", New Scientist, Jan. 12, 1967, pp 50 - a theory is offered to account for the biochemical and physiological factors known to be involved in memory and learning.

Griffith, J.S.; Mahler, H.R., "DNA Ticketing Theory to Memory", Nature, Vol. 223, Aug. 9, 1969, pp 580-582 - it is possible to have a biochemically plausible theory in which memory is stored in coded form in the DNA of nerve cells.

Grossman, S.P., "Exploring the Brain with Chemicals", Discovery, May 1966, pp 19-23 - the activity of the brain cells depends on complex chemical processes - processes which are just becoming possible to study.

Guilford, J.P., "Creativity and Learning", pp 307-326 - learning and creativity are much the same phenomena but to understand them we must maintain a comprehensive view of behaviour and of course, of the brain. (references prior to 1965)

Henshaw, P.S., "Information Per Se", Nature, Vol. 199, Sept. 16, 1963, pp 1050-1052 - on the storage of information and the three types of information - inherited, acquired and generated.

Herbert, M.; Kemp, Monica, "The Reliability of the Brain", Science Journal, Nov. 1969, pp 47-52 - the brain's reliability under stress, depends on an individual's personality. Extraverts tolerate a higher note of stimulation, before - the nervous system is overloaded, than an introvert.

Horn, G., "Experience and the Central Nervous System", New Scientist, June 25, 1970, pp 623-625 - it has now been demonstrated that learning can modify the brain; probably the nature of the neurones of the brain.

Kety, S.S., "A Biologist Examines the Mind and Behaviour", Science, Vol. 132, Dec. 23, 1960, pp 1861-1870 - many disciplines contribute to understanding human behaviour, each with peculiar virtues and limitations.

Lewis, J.J., "Drug Action and the Mind", Discovery May 1962, pp 24-29 - hallucinations, depression and elation can all be produced by drugs now in clinical use. How do they do this? Discoveries suggest drug mechanisms will soon be understood.

- Mark, H.J., "Elementary Thinking and the Classification of Behaviour", Science, Vol. 135, Jan. 12, 1962, pp 78-87 - a hierarchy of information processing abilities parallels development of the brain's reasoning power. (references)
- McCallum, C, "New Waves in the Brain", New Scientist, Dec. 7, 1967, pp 592-594 - the discovery of a measurable electric signal from the brain that can be linked to a subjective mental state.
- Newell, E.; Simon, H.A., "Computer Stimulation of Human Thinking", The Rand Corporation, April 1961, (23 pages) - computer stimulation promises to provide a tool for constructing and testing theories of complex behaviour.
- Oatley, K., "Brain Mechanisms and Motivation", Nature, Vol. 225, Feb. 28, 1970, pp 797-801 - mechanisms in the brain generate specific patterns of motivated behaviour re hunger, thirst, sex. The mechanisms contain models of relevant aspects of the internal and external environment which enable an animal to direct its behaviour appropriately and purposefully. (references)
- Pedler, K., "The Eye as a Computer", Science Journal, Feb. 1970, pp 49-54 - information derived from light signals is processed in the retina before passing in coded form to the brain.
- Pfeiffer, J.E., "How the Human Memory Functions", Think, April 1963, pp 7-10 - how does the brain store and recall all the bits of information which are collected?
- Pfeiffer, J.E., "Visceral Learning: A New Human Faculty?", Think, Sept./Oct. 1969 pp 9-12 - on the possibility of man being able to control his blood pressure, heart beat, kidney function, and even the rhythm of his brain waves.
- Rose, S., "The Future of the Brain Sciences", New Scientist, June 25, 1970, pp 618-621 - a review of our current knowledge of the brain.
- Rose, S., "Is Learning Transferable?", New Scientist, Dec. 1965, pp 781-782 - on experimental findings which suggest that memory is basically a biochemical phenomenon. Conditioning in hamsters can be transferred to rats.
- Rose, S., "Think Tank", Sunday Times Magazine (UK) - new theories on how the brain works, support the view that we have more "thinking power" than we actually achieve.
- Shockley, W., "Thinking About Thinking Improves Thinking", IEEE Student Journal, Sept. 1968, pp 11-16 - using creative thinking to help solve a problem by means of "the four basic-science thinking tools". (bibliography)
- Stubbs, P., "Disembodied Brains", New Scientist, Nov. 11, 1965, pp 398 - research on isolated (by removal from body) but still-living brains. Ethical question raised on nature of consciousness.
- Sutton, S., "Recent Eddies in Brain Currents", Bulletin of Atomic Scientists June 1968, pp 23-27 - on understanding the language codes of the brain.
- Uttley, A.M., "Models of Memory", New Scientist, June 25, 1970, pp 634-635 - on the design of model memories useful in the study of human memory.

- Walter, W.G., "The Brain", Discovery, Oct. 1962, pp 26-32 - on how the brain stores, sorts out and selects information.
- White, R.J., "The Isolated Brain", Industrial Research, April 1968, pp 65-69 - study of the living isolated brain gives an insight into strokes and infections and may result in new surgical methods and even "organic computers".
- Windle, W.F., "Brain Damage by Asphyxia at Birth", Scientific American, Vol. 221, No. 4 Oct. 1969, pp 77-84 - on the permanent damages of the brain due to asphyxiation at birth.
- Young, J.Z., "Memory and the Increase of Knowledge", Nature, Vol. 217, March 9, 1968 pp 905- 907 - Prof. Young discusses the increase of knowledge and its storage in the brain.
- "A Fighter for Mens Minds Now Studies their Brains", New York Times Magazine, Aug. 30, 1970, pp 12ff - an indepth interview with Arthur Koestler.
- "A Talk with Konrad Lorenz", The New York Times Magazine, July 5, 1970, pp 4ff - an extensive interview in which Lorentz examines his present stand on behaviour.
- "Culture Molds the Brain", Science News, Vol. 95, Jan. 18, 1969, pp 61 - changes take place in the brain after birth and before maturity. Childhood and environment play a part in the flexibility of the brain's function.
- "The Developing Brain", Nature, Vol. 221, March 1, 1969, pp 808 - British scientists are making advances in neurochemistry and some of their work is discussed.
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- "Hazards of Getting Science News to the Public", Science Forum, Vol. 16, 1970, pp 2 - a perfect solution is not possible but trust is essential. (editorial)
- "In Our Opinion", Science and Technology, Feb. 1968, pp 17 - three notes headed, "A New Department", "An Effect of Technology on People", "An Effect of People on Machines". (editorial)
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- "Toward a Future in Which Science Has Conscience", Globe and Mail, Jan. 2, 1970, pp 5 - science and scientists should help our society - after all, they control our welfare or demise.
- "Wanted: New Science Spokesmen", Science Journal, Sept. 1970, pp 3 - science is a central part of our culture and must be clearly interpreted to the public.
- "Welcome to the BSSRS!", New Scientist, April 17, 1969, pp 10 - on the BSSRS - its aims and ideas and why it came into existence.
- "What is it all For?", Nature, Vol. 227, 1970, pp 1004-1005- a report on the 1970 meeting of the British Association.
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b) Scientists

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- Barker, B., "A Plan to Keep Canada's Scientists at Home", Canadian Research and Development, Nov.-Dec. 1969, pp 26-28 - author discusses the emigration of Canadian scientists to the States.
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- Christiansen, W.N., "Science and Scientists in China Today", Scientific Research, Oct. 1967, pp 64-68 - on the scientists and the scientific state of China today.
- Cohen, B., "Below the Veneer of Union, some Bubbling Dissent", Science Forum 11, Oct. 1969, pp 19-20 - Canada's scientists and engineers are on a path to some kind of political union, but at this point the path's foundation seems uncertain. (SCITEC)
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- Gandy, R.O., "Bertrand Russell and Principal Mathematician", New Scientist, Feb. 12, 1970, pp 314-315 - on Russell's influence on the foundations of mathematics.
- Hawkes, N., "The Scientific Mercenaries", Science Journal, Sept. 1970, pp 23-26 - why scientists leave Britain - a conference on why they left and what would bring them back.
- Hinshelwood, C., "Science and Scientists", Nature, Sept. 4, 1965, Vol. 207, pp 1055-1060 - a speech on the role of scientists in science and the images of scientists.
- King, C., "Involving Scientists in Society", New Scientist, March 14, 1968, pp 594-595 - on the need for scientists to contribute to the conduct of the nation. (an explanation of why socially conscious students avoid science)
- Lonsdale, K., "Developing Nations and Scientific Responsibility", Bulletin of the Atomic Scientists, Nov. 1969, pp 27-28 - scientists want freedom of movement to choose their work, usually at centers of advanced research. How can this be reconciled with the need of underdeveloped countries to maintain and explain their corps of scientists?
- Maeots, K., "Science Council Director Defends Criticism Right", Ottawa Citizen, Dec. 16, 1969, pp 4 - the executive director of the Science Council has defended the organizations right to comment on the social sciences.
- Marine, G., "The Engineering Mentality", Playboy, September 1970, pp 120-269 (6 pages) - we are caught up in a frantic need to apply what we know "If it can be done, do it". We need to reconsider the human reaction rather than the machine reaction.
- Medvedev, Z.A., (translated by Vera Rich), "The Closed Circuit: A Record of Soviet Scientific Life", Nature, Vol. 227, 1970, pp 1197-1202 - an account of Medvedev's unsuccessful attempt to accept an invitation to speak at a meeting in England.
- Peierls, R.E., "The Scientist in Public Affairs: Between the Ivory Tower and the Arena" Bulletin of the Atomic Scientists, Nov. 1969, pp 28-30 - the scientists objectivity can usefully be carried over into the political arena.
- Phillips, J., "Women in Science", Science Journal, May 1966, pp 77-81 - scientists and technologists are in short supply yet women form only a small proportion of their numbers. Are more women capable of being trained in these subjects and if so, can they be encouraged to use their talents.

- Rabinowitch, "Responsibility of Scientists in our Age", Bulletin of the Atomic Scientist, Nov. 1969, pp 2,3,26 - the two main challenges of the scientific revolution are unprecedented in their difficulty.
- Sayles, D.C., "Professional Obsolescence and this Rapidly Expanding Technological Era", Nature, Sept. 4, 1965 - Vol. 207, pp 1028-1030 - on the technical obsolescence - or the difficulty in keeping up to date with new scientific data.
- Settle, T.W., "Scientists: Priests of Pseudo-Certainty or Prophets of Inquiry?", Science Forum 9, June 1969, pp 21-24 - on the controversy concerning scientists as the priests of a cult of scientific pseudo-certainty.
- Sherwood, M., "Caricatures of Science", New Scientist, Aug. 20, 1970, pp 382-384 - scientists as seen by cartoonists through the ages and their influence on the public image.
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- Smith, J.M., "Scientists and their Conscience", Vancouver Sun, Sept. 20, 1969 - extract of a BBC talk by Smith in which he argues that scientists do have a social as well as a scientific responsibility.
- Southwick, T.P., "Brain Drain: Fewer Scientists Enter U.S., More Seek to Leave", Science Vol.169, 1970, pp 565-566 - immigrant scientists have dropped sharply from 1968 (13,000) to 1969 (10,300). There is evidence of an outflow of U.S. Scientists because of the political climate.
- Star, J., "European Physicists Rush in Where Politicians Fear to Tread", Scientific Research, June 9, 1969, pp 38-41 - on the meeting in Florence of the European Physical Society.
- Todd, R., "George Wald: the Man, the Speech", The New York Times Magazine, Aug. 17, 1969, pp 28,86,87,99 - Wald's work, speeches, ideas and influence following his famous March 4, speech at M.I.T.
- Wagoner, C.D., "Steinmetz Revisited: The Man and the Myth", IEEE Spectrum, April, 1965, pp 83-95 - on the life and work of Charles Proteus Steinmetz.
- Wald, G., "Colloquium on God and the Modern World", UUA Now, July 28, 1969, pp 28-33 - a speech by Wald on the eternal things in the world.
- Willenbrock, F.K., "Report on the AS Popov Society Meeting", IEEE Spectrum, July 1965, pp 116-117 - on the 21st annual meeting of the Popov Society in Moscow, USSR, May 12-25, 1965.
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- "A Memorial to Oppenheimer", Physics Today, Vol. 20, No. 10, Oct. 1967, pp 34-53
- several articles on the life and work of Oppenheimer.
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- "The Atom: A Matter of Character", Time, June 14, 1954, pp 17-21 - on the Oppenheimer case and the people involved in it.
- "Audiotapes of AAS Annual Meeting Symposia and Panel Discussions", Science Vol. 164, April 11, 1969, pp 113-117 - audiotapes of AAS annual meeting symposia and panel discussions. Dallas Texas, Dec. 26-31, 1968.
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page 5.,
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"Freedom's Flight", Time, May 12, 1961 pp 64 - on Freedom 7's flight.

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"The Mercury-Atlas-6 Space Flight", Science, Vol. 136, June 29, 1962, pp 1093-1099 - John H. Glenn, Jr., describes his astronomical, meteorological and terrestrial observations. John A. O'Keefe comments on the scientific results of the flight.

"The Other Phenomenon", Flying Saucer Review, Vol. 14, No. 2, March/April, pp 1-2 - a brief recapitulation of the outline features which form the frame-work in which the subject, (dealt with in the "Flying Saucer Review "journals") has grown.

"Science in the Mountains: NRAO Astronomers to Leave for City", Science, Nov. 1965, pp 722-724 - on the debate going on over the moving the National Radio Astronomy Observatory (NRAO) and its scientists and scientific facilities to another place.

"Space Program: Results of Poll of AAAS Members", Science, Vol. 145 - questions and results of a questionnaire on the aims and priorities of the national space program. There is substantial disagreement.

Time, Jan. 3, 1969 - several articles on the Apollo 8 flight.

page 7.,
4 f) continued -

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- Venkatavaradan, V.S., "Geophysics - Antimatter and Tree Rings", Nature, Nov. 20, 1965, pp 772 - on the case of the Tunguska meteor.
- Workman, E.J., "The Problem of Weather Modification", Science, Oct. 19, 1962, Vol. 138, pp 407 - 412 - what went wrong with the rain-making program? Is there any hope?

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- Argyris, C., "On the Effectiveness of Research and Development Organizations", American Scientist, 56, 1968, pp 344-355 - in this article, the focus is on two qualities of research and development - those qualities which are common to all organizations and those which are unique to research and development organizations.
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- Cotgrove, D.S., Box, S., "Scientists and Employers", New Scientist, May 7, 1964, pp 362-364 - are the aims of science and those of industry so different that conflicts arise between the attitudes of industrial research workers and their managements?
- Cowan, G.A., "Scientific Applications of Nuclear Explosions", Science, June 2, 1961, Vol. 133, pp 1739-1744 - nuclear explosions are uniquely necessary for a number of interesting experiments in basic research.
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b) Youth (drugs, unrest)

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- Brewster, K., "The Dangers of Silence", Computers and Automation, July 1970, pp 44-47 - the university students may be misunderstood - particularly those who appear outwardly calm. We need to know more of their attitudes and outlooks.
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- Gay, P., "The Enlightenment", Horizon, Vol. 12, Nov. 1970, pp 40-45 - this is our tradition, our world view -- the liberal, rational, humanitarian way of thought that has persisted for several centuries. This is the tradition against which the young rebel. Is it no longer "relevant"?
- Griffith W., "The Isla Vista War - Campus Violence in a Class by Itself", The New York Times Magazine, Aug. 30, 1970, pp 10ff - the tense situation in the youth ghetto next to the University of California at Santa Barbara.
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- Ottawa Citizen - "U. of O. to Launch Big Marijuana Research Program" (K. Maoets) "Christian Reformed Ladies Meet the Drug Users" (K. Maoets) "Fantastic Rise in Pot Smoking at Carleton" (Bob Douglas) "Parents Seen as Inspiration for Drug Use" (Canadian Press)
- The Paper, Volume 3, Number 1, August 24, 1970 - largest student weekly newspaper in Canada.
- "Playboy Student Survey", Playboy, September 1970, pp 182-240 (5 pages) - opinion polls of 7300 students on issues of war, campus turmoil, U.S. Government, demonstrations, drugs, sex, politics, abortion, etc.
- "Tempers Boil as City Approves Hippie Haven", Ottawa Citizen, Feb. 8, 1969 - a proposed home for homeless youths causes much controversy.
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- "Your Kids When They Grow Up", Changing Times, the Kiplinger, Magazine, March 1965, pp 7-13 - on what the next generation will be like and the kind of world they will live in. An interview with the author of, "The Next Generation", Donald Michael.

c) Law

Alderman, T.; Brown, D.; Carmichael, D.; Miller Z.; Rasky, F. "The Cop", Canadian Magazine, Saturday Citizen, April 27, 1968, pp 2-13 - the policeman is really a human also. His likes and dislikes, his job and the public attitude towards the people who protect the public itself).

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- Foss, J.W.; Mayo, R.W., "Operation Survival", Bell Laboratories Record, Jan. 1969, pp 11-17 - Bell Telephone Laboratories are responsible for designing reliable communication systems that will survive almost any catastrophe - even nearby nuclear explosions. Here's how the transcontinental and other long-haul routes are protected.
- Goldin, H.H., "The Television Overlords", Atlantic, July 1969, pp 87-94 - on the inter-locking ownership of television - radio and newspapers in the U.S.A.
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- Tomalin, N., "Stop the Press, I Want to Get On", The Sunday Times (UK) - on a career in journalism.
- Wooster, H., "Communication with Extraterrestrial Intellinence", IEEE Snectrum, March 1966, pp 153-163 - different forms of communication with extraterrestrial "beings", panel consists of: Paul L. Garvin (a linguist), Lambros D. Callimahos (a cryptologist), John C. Lilly (works with dolphins), William O. Davis (a physicist), Francis J. Heyden (an astronomer).
- "The American Media Baronies, a Modest Atlantic Atlas", Atlantic Monthly, July, 1969, pp 83-86 - being a compilation of data and well-informed conjecture concerning some but not all media moguls, together with cartographical depictions of their domains, obtained with some difficulty by the editors.
- "Canadian Satellite Communications", Canadian Electronics Engineering, Dec. 1968, pp 50-53 - the nroposal for a satellite communications system was set un and how they are to be used is described. (particularly the role of RCA).
- "Satellites, Cable and Radio will allContribute to Canada's Communications Requirements", Canadian Electronics Engineering, Dec. 1968, pp 44-49 - IEEE panel discusses communications in Canada over the next five years.

page 3..
5 d) continued -

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Science and Technology, April, 1968, pp 105-118 - some views from a number of specialists on different branches of communications, particularly technical aspects of the use of satellites.

"What's Wrong with News? It isn't new Enough", Fortune, Oct. 1969, pp 110-161
- the news media is having difficulty in keeping up with the rate of new news. The ideological bent of the news reporters is far less important than their artistic bias.

e) Pollution

Brown, M., "Pollution Warnings Bolster Case for Nuclear Power", Vancouver Sun, Jan. 13, 1970 - although nuclear power is the largest factor (or will be) in the supply of energy, it also is a cause of pollution.

Fenner F., "Infection and Social Change", New Scientist, Sept. 10, 1970, pp 528-530 - the precariousness of mans' truce with the microbial world.

Gage, R., "Air Pollution No Problem Here -- Yet", Winnipeg Free Press, Jan. 17, 1970 - the article deals with the problem of air pollution and its effect on people.

Griffin, C.W., "The Air Around Us", The Report, Sept. 10, 1964 - on the air pollution in the U.S.

Hinds B., "Biologists Concerned by Artic Pollution", Halifax Chronicle, Jan. 23, 1970, pp 41 - oil pollution of the Arctic waters is affecting the wild life seriously.

MacKenzie, V.G., "The Role of the Scientist and the Citizen - a Case Study: Air Pollution", U.S. Dept. of Health, Education and Welfare, Public Health Service, Div. of Air Pollution -presented at the Scientists' Institute for Public Information Symposium of the annual meetings of AAAS in Montreal, Dec. 29, 1964. On the role of the scientist and the citizen in curbing air pollution.

Mueller, M., "DDT: Criticism, Curbs Are on the Unswim", Science, Vol. 164, 1969, pp 936, 937 - government concern re DDT is showing in increasing government control.

Teller, E., "Can a Progressive be a Conservationist?", New Scientist, Feb. 19, 1970, pp 346-349 - if controls of the same stringency as those applied to radioactive contamination were imposed on other pollutants, industry would be reduced to a negligible fraction of what it is today. Progress cannot and will not be stopped.

Thompson, M., "The Death of Rubbish", New Society, May 28, 1970, pp 917-918 - on our changing attitudes towards rubbish, its uses and its management.

"Carleton Students' Pollution Probe Goes Into Action", Ottawa Citizen, Dec. 10, 1969, pp 38 - a fight against pollution in the Ottawa Valley has been joined by "Pollution Probe" from Carleton University.

"Environment Report: The Reality and the Illusion", Science News, Vol. 98, 1970, pp 133 - the worlds population growth is exerting enormous pressures on the environment.

"Our Grasslands May Depend on SO₂ Pollution", New Scientist, July 2, 1970, pp 6 - intensive agriculture tends to deplete sulphur content of the soil.

"Pollution Commission", New Scientist, Feb. 26, 1970, pp 387 - the Royal Commission on Environmental Pollution has completed the reorganization of anti-pollution machinery and reforms.

"Pollution is Always With Us", Nature Volume 225, March 7, 1970 - on the constant presence of pollution around us and the continuous new pollutants which crop up. The need for restraint and level headedness in dealing with pollution.

"The Pollution Probe at Carleton University of Ottawa", Probe, Carleton University, Vol. 1, No. 2, 1970 - various aspects of the probe into the problem of pollution and the effects of pollution, plus some useful and simple ways in which to help prevent pollution.

"Pollution Scare Said Not Warranted", Ottawa Citizen, Dec. 4, 1969, pp 50 - pollution should be brought to public attention but it is distorted "by news media".

"Teach-In at Edinburgh", Nature, Vol. 225, March 14, 1970, pp 1004 - a teach-in at Edinburgh University for Scientists, economists, moral philosophers, politicians and representatives of industry to discuss pollution with the students and the public.

f) General Social Science & Society

- Byelousov, V.N., "Making Cities Fit to Live In", New Scientist, Nov. 30, 1967, pp 548-549 - Soviet Union solves town planning problems. Architects, engineers and sociologists are finding novel ways of improving urban life. These include Russian and American schemes for totally enclosed communities housed in artificial microclimates.
- Cohen, J., "The Scientific Revolution and Leisure", Nature, Vol. 198, June 15, 1963, pp 1028-1033 - on the development of science and the increase of leisure time.
- Crowe, B.L., "The Tragedy of the Commons Revisited", Science, Vol. 166, pp 1103-1107 Nov. 28, 1969 - major problems have neither technical nor political solutions; extensions in morality are not likely.
- Dion, R., "Fitness...a Challenge", The Educational ABCs of Industry - on the need for improved physical fitness to help people as individuals and as a society.
- Dubos, R., "The Human Environment", Science Journal, Vol. 5A, October 1969, pp 75-80 - from the moment of birth, the human mind, and body too, is strongly influenced by the surroundings. The modern urban environment holds hidden dangers with new kinds of pollution and the difficulty of adjusting to its rapid evolution.
- Freedman, D.G., "The Origins of Social Behaviour", Science Journal (4 pages) - studies with deprived and indulged puppies show how their behaviour depends both on their environment and on their genetic make-up. Follow-up studies with twins are being made to elucidate the origins of human behaviour. (references)
- Greenwood E., "Attributes of a Profession", Professional Public Service, Oct. 1965, pp 6-11 - on the role professions play in today's society.
- Harman, W.W., "The Humanities in an Age of Science", IRE Transactions on Education, Vol. E-4, Sept. 1961, pp 118-126 - the behavioral scientist and the scientific humanist differ on the physical and spiritual aspects of reality. (bibliography)
- Illitis, H.H.; Loucks, O.L.; Andrews, P., "Criteria for an Optimum Human Environment", Bulletin of Atomic Scientists, Jan. 1970, pp 2-6 - shall a single species of animal, man be permitted to dominate the earth so that life, as we know it, is threatened?
- King-Hele, D., "Ending the Century", New Scientist, Feb. 26, 1970, pp 414-416 - "author looks back over the writing of his book, "The End of the Twentieth Century?" and summarizes its main themes". On the fact that man does not know how to avoid self-destruction.
- Klausner, W.J., "An experiment in Leisure", Science Journal, June 1968, pp 81-85 - a study of the impact of a three month vacation on manual workers has shown that the experience was highly beneficial.
- Klineberg, O., "Unless Peace Comes - 5", New Scientist, May 2, 1968, pp 226-228 - we have in our hands, or within our grasp, the means for our total self-destruction.

- Krutch, J.W., "Dropouts, Do-gooders and the Two Cultures", Think, March/April 1969, pp 34 - 36 - on the two conflicting factions in American society - those who think there is a cure for the ills that beset us, and those who despair of any future at all.
- LeBlanc, J., "Social Sciences "Gaps" Stressed", Ottawa Citizen, Sept. 16, 1969, pp 28 - on the need to improve Canada's approach to the social sciences. (Senate Committee on Science Policy)
- Lessing, L., "Science Takes a Closer Look at Man", Fortune, Jan. 1970, pp 113-158 - the scrutiny is under way throughout the social sciences, and before long may influence how men and societies behave.
- Liebow, E., "No Man Can Live with the Terrible Knowledge that He is not Needed", New York Times Magazine, 1970, pp 28-133 - on the unemployed and the under-employed.
- Lipkin, J.P., "Communications - on the Meaning of Modernization", Journal of Educational Thought, April 1969, pp 54-57 - on the definition and meaning of the term "modernization".
- Maeots, Krista, Automation (1) - The Computer - Slave or Master?", Ottawa Citizen, Dec. 5, 1968, pp 17 - a new fear among many people that they may soon be left jobless by the galloping age of automation.
- Maeots, K., "Automation (2) - the Puppet Society?", Ottawa Citizen, Dec. 6, 1968, pp 17 - the age of automation is threatening to displace a wide range of people.
- Maeots, K., "Automation (3) - the Search for Meaning...", Ottawa Citizen, Dec. 7, 1968, pp 35 - western man struggles for spiritual survival in the social environment that he has created for himself - an environment in which he witnesses massproduction not only of material goods, but also fears, frustrations, meaninglessness and boredom.
- Maeots, K., "Automation (4) - Leisure - the Lurking Lion", Ottawa Citizen, Dec. 9, 1968, pp 17 - as the process of automation continues, man's greatest threat will be the increasing leisure time.
- Magnus, M., "Gorbals - the Doomed Goldfish Bowl", Sunday Times Magazine (UK) - on a poverty stricken district in England the people and what the council wants to do with it.
- Malkin, L., "Halfway to 1984", Horizon Magazine April 1970, pp 32-39 - Orwell's classic dystopia remains the bugaboo of our century: the ultimate in rationalism gone mad. This is a reassessment of the author and his work and a guess at how close we are to living down to his vision.
- Marqolis, R.J., "The Rural Poor - Broken Promises, Broken Lives", Think, Sept.-Oct. 1969, pp 27-32 - on the poverty of the rural American family and what can be done to help them.
- McNenley, P., "Warns Automation May Cause TV Culture", Toronto Star - Canadians must learn to use up leisure time resulting from automation or end up with "idle masses wallowing in beer and television culture."

- Robertson, F., "Scientists Deserve their Lesser Image", Globe and Mail, July 29, 1970 - "there is a babble of scientists contradicting.....(this) can only further convince the public, businessmen, governments that scientists all too often value publicity above integrity".
- Schiller, H.I., "Social Control and Individual Freedom", Bulletin of Atomic Scientists, May 1968, pp 15-21 - further control of nature for human improvement is threatened by a failure to carry forward the organization of man's social structure to correspond to the heightened levels of technological interdependence.
- Sullivan, W., "Scientists Concerned over Public Hostility", The New York Times, July 19, 1970, pp 7 - "...there is a growing feeling that efforts to explain science to the young, as well as to adults, have failed".
- Taylor, P., "Absenteeism", Science Journal, April 1970, pp 26-31 - cost of sickness absence to the UK economy is about £2,000,000,000 annually and is increasing. The increase is due, not to sickness, but changes in social attitudes towards health and employment.
- Taylor, W., "Our World, AD 2,000", New Scientist, July 17, 1969, pp 146-147 - even on the most optimistic view, three-quarters of the world's population will be living in poverty at the turn of the century.
- Thompson, R.: Brown, H.R., "Social Science and the Ideology of the Status Quo", Canadian Union of Students - on the economic pressure that have diverted social science from the pursuit of knowledge essential for the development of a more humane form of social organization. (references)
- Toffler, A., "Future Shock", Horizon, Vol. 12, No. 2, 1970, pp 82-89 - high-powered change may be the central fact of our time, yet we know very little about its effects. We may, author warns, be racing toward the most devastating outbreak of mass hysteria in history.
- Toynbee, A.J., "The Coming of the Worldwide City", Think, July-Aug. 1968, pp 8-12 - while man is still what nature made him, he must live in an artificial environment of his own making. But the magnitude and pace of this man-made milieu is straining his ability to adapt.
- Truman, D.B., "The Social Sciences and Public Policy - Maturity Brings Problems of Relevance and Training", Science, Vol. 160, May 3, 1968, pp 508-512 - the bearing of social sciences on public policy is a broad treacherous and prudently avoided area.
- Vanterpool, A., "Hindrances to Innovation in Canadian Industry - and How to Remove Them", Science Forum, Vol. 16, August 1970, pp 14-18 - incentives must come from the government in a form of national goals.
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- Williams, R.J., "Heredity, Human Understanding, and Civilization", American Scientist, 1969, pp 237-243 - human beings understanding human beings is a basis for building peace and a stable civilization. Among the factors needed to understand humans, is heredity. (references)
- Wolfe, D., "Which Goals to Emphasize", Science, Vol. 164, No. 3877, April 18, 1969 - Leonard Lecht of the National Planning Association analyzed the cost of achieving 16 national goals by 1975.
- "The Alienation of the Land", Time, August 17, 1970, pp 8-9 - Americans are buying heavily in the Canadian resort areas and Canadians are finding themselves squeezed out.
- "Behavioral and Social Sciences Survey Committee", Social Science Research Council, Oct. 27, 1969 - the purpose of the survey is to provide a basis for an informed and effective national policy for strengthening and developing these fields.
- "Big City", Canadian Association for Adult Education, March/April 1963 - on the big-city living in it, working in it, planning, and paying for it.
- "Canadian Conference on Social Welfare", June 15-19, 1970 - the idea: Social development. The theme is: Canada in transit, people, policies, priorities, planning, programs, pricing.
- "The Cities", UWA Now, March 5, 1969 - whole issue devoted to problems of the city.
- "City for Learning", Nature Vol. 221, Feb. 15, 1969, pp 600-602 - on a new kind of city, planned in Britain.
- "Communities - Life in the Space Age", Time, July 4, 1969 - a new community has grown up in Florida, due to the space complex at Cape Kennedy.
- "A Community Forum for the People of Ottawa and Region", Action 70, Jan. 7, 1970 - Action "70 was a community organization and developed conference to provide a forum for community members to establish and articulate their own priorities and goals. (a report on the conference)
- Harbinger, April/May 1970 - an underground newspaper, printed in Toronto.
- "The Heroic Conception of Man", Manas, Jan. 29, 1969 - Manas is a journal concerned with the study of principles which move world society on its present course.
- Rapport, Vol. 2, July 1969 - experiment in international living of Canada. (news journal of an international student exchange program involving some 40 countries of the world.)
- "Science Planning and the Social Sciences: What are the Needs?", Science Forum, Vol. 1, June 1968, pp 22-25 - part of the proceedings of the first public hearing of the Special Committee on Science Policy of the Senate of Canada, March 12, 1968. On the brief presented by Canada Council on its policy of support for the social sciences.

"The Sixties", The Canadian Magazine, Saturday, Citizen, Dec. 13, 1969,
- a history of events and changes in the 1960s.

Technology Student Algonquin College, Winter 1970 - on the lack of emphasis on the
humanities and the possible need to wear labels in order to communicate.

"What do we do with ourselves even if we succeed in saving our world?"

Thoughts, Think, Jan-Feb. March/April 1969 - pertinent thoughts from different people.

"Unemployment: The Long View", Canadian Association for Adult Education, Nov. 1961
- the facts and figures about unemployment in Canada.

"Winning Friends and Influencing People", Nature, Vol. 223, Aug. 9, 1969, pp 559
- on the social scientists relationship with the economy.

a) Population & Food (crisis)

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- Bethune, A.J., "Child Spacing: The Mathematical Probabilities", Science, Vol. 142, Dec. 27, 1963, pp 1629-1634 - the chances of spacing children by the rhythm method are analyzed theoretically and experimentally. Natural variations in fertility and sterility will have to be mastered if the rhythm method is to work.
- Bradley, Charles C., "Human Water Needs and Water Use in America", Science, Vol. 138, Oct. 26, 1962, pp 489-491 - a permanent water shortage affecting our standard of living will occur before the year 2,000.
- Chedd, G., "Mutations vs Malnutrition", New Scientist, March 5, 1970, pp 450-453 - new cereals created with atomic radiation aid could offer a fundamental solution to the critical protein shortage facing the inhabitants of developing countries.
- Dorn, H.F., "World Population Growth: An International Dilemma", Science, Vol. 135, Jan. 26, 1962, pp 283-290 - to control his numbers man will soon be forced to choose between high mortality and low fertility.
- Ehrlich, P.R.; Holm, R.W., "Patterns and Populations", Science, Vol. 137, Aug. 31, 1962, pp 652-657 - basic problems of population biology transcend artificial disciplinary boundaries. (references)
- Ehrlich, P.R., "Paying the Piper", New Scientist, Dec. 14, 1967, pp 652-657 - there is no longer any hope of feeding the world's population. Only drastic and immediate reduction of population and birthrate can avoid a series of famines.
- Eichenwald, H.F.; Fry, P.C., "Nutrition and Learning", Science, Vol. 163, Feb. 14, 1969, pp 644-648 - inadequate nutrition in infancy may result in permanent impairment of mental function. (references)
- Ewin, A., "World Overpopulation Zooms", Science News, Sept. 18, 1962, pp 162-163 - only the nuclear war problem looms as a greater threat to mankind's future than the problem of too many people. (references)
- Greenberg, D.S., "News and Comment - Population Explosion", Science, Vol. 138, Nov. 30, 1962, pp 960-961 - "Population Explosion", Bishop's proposal for study conflicts with some popular conceptions of church.
- Hauser, P.M., "Demographic Dimensions of World Politics", Science, Vol. 131, June 3, 1960, pp 1641-1647 - population explosion has implications for the conflict between the free world and the Communist bloc. (references)
- Hutchinson, J., "Land and Human Population", Nature, Sept. 3, 1966, pp 1053-1055 (supplement to this issue) - population control problems are both social and emotional. An increasing population means an increased amount of land. But an increasing population means more food is needed but the land for agriculture is being taken up by people.

King, C.G., "International Nutrition Programs", Science, Vol. 147, Jan. 1, 1965, pp 25-29 - improved food practices are essential to reasonable progress for a large part of the world's population.

Lilienthal, D.E., "300,000,000 Americans Would be Wrong", New York Times Magazine, Jan. 9, 1966, pp 25, 86, 89, 91, 92 - population growth will not affect America as seriously as it will many other countries, but the associated problems will be immense.

Masefield, J., "Food Irradiation - a Threat to Deep Freezing Processes?" - food preservation by treatment with ionising radiation may emerge as an important adjunct to existing food preserving techniques.

Spengler, J.J., "Population and World Economic Development", Science, Vol. 131, March 20, 1960, pp 1497 - 1502 - in a finite world, population growth, before it is finally halted, entails diverse costs. (references)

Stycos, J.M., "The Outlook for World Population", Science, Vol. 146, Dec. 11, 1964, pp 1435-1440 - population control has begun to receive serious attention from governments and other organizations. (list of reprints - international population program)

Tinker, J., "Man as Epidemic", New Scientist, Oct. 2, 1969, pp 18-19 - unless world numbers are limited by man, a population crash from famine, pestilence or war, can hardly be avoided.

Federalist World, Vol. 14-3, No. 89, May/June 1969 - India teeming with humanity, - new parliamentary associations - economics and politics are one problem - W.A.W.F. development fund projects launched - food and population problems overseas.

"Tempest in a Cornflakes Bowl", Science News, Vol. 98, 1970, pp 134 - nutrition for the rich is different from nutrition for the poor.

h) Politics, War

- Asbell, B., "Pat Moynihan: Too Much and Too Little", New York Times Magazine, Nov. 2, 1969, pp 44, 45, 47, 50, 54, 60, 61 - Moynihan, counselor to the President on urban affairs talks about the Nixon Government and the problem of welfare.
- Ekman; Cohen; Moos; Raine; Schlesinger; Stone, "Divergent Reactions to the Threat of War", Science, Vol. 139, Jan. 11, 1963, pp 88-94 - a peace and a shelter group were studied to examine their different responses to the Berlin crisis.
- Friedenberg, E.Z., "The Hidden Costs of Opportunity", The Atlantic Monthly, 1970 - more opportunity and more democracy equal less freedom.
- Greenberg, D.S., "News and Comment - Civil Defense", Science, Vol. 137, Aug. 31, 1962, pp 658-659 - civil defense: Kennedy's failure to fight for program raises questions of whether he has changed his mind.
- Hutchison, B., "Human Pursuit of Naked National Power", Ottawa Journal, April 8, 1965 - on the human pursuit of power and its international implications.
- Kahn, H., "How to Think About the Russians", Fortune, Nov. 1968, pp 125-248 (10 pages) - a new view of the Soviet Government - especially in the wake of the Czech. crisis.
- Mead, M., "Public Policy and Behavioral Science", Bulletin of Atomic Scientists, Dec. 1969, pp 8-10 - on the need for more behavioral scientists in congress and on capital hill.
- Melman, S., "A Strategy for American Security", The World Peace Broadcasting Foundation - A Talk given May 25, 1963, 10 pages - the military aspect is not the only aspect in security for U.S.A.; others are cultural, political, economical and scientific.(details of tape recordings on peace and war)
- Mumford, L., "Authoritarian and Democratic Technics", Technology and Culture, 1963, pp 1-8 - on the two systems of government - authoritarian and democratic.
- Rabinowitch, E., "A Time for Open Minds", Bulletin of Atomic Scientists, Sept. 1962, pp 2-9 - total destruction of all higher life on earth is bound to become a practical possibility within a few years if the arms race is continued unchecked.
- Wolfe, R.R., "Individual Participation in Governmental Decisions", Bulletin of the Atomic Scientists, Dec. 1968, pp 32 - on our societal government - is there a lack of representative democracy or is it present?
- Information Report, Canadian Peace Research Institute, Feb. 20, 1963, Vol. 1, No. 2 (4 pages) - fact finding to facilitate UN police and observer actions - a Canadian study of the economic consequences of disarmament - basic studies in conflict resolution.
- Information Report, Canadian Peace Research Institute, 1963, Vol. 1, No. 3 (4 pages) - a news report on what the CPRI are doing.

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"The New Scapegoat", Modern Data, July 1970, pp 45 - on the use of computers and the need to operate them on a sound business basis. (editorial)

"Note to Young Men Wishing to Spend their Active National Service in the Service of Cooperation" French Embassy in Canada, Oct. 1967 - purpose of this note is to inform young men subject to call-up, on the conditions under which the period of active national service may be spent in Canada as part of the Cultural Cooperation Program.

Time, April 4, 1955, pp 19-32 - politics and political leaders in the States, Britain, Europe and Asia.

"War-a Human Idiosyncrasy, Anthropologists Conclude", Science, News, Vol. 92, Dec. 16, 1967, pp 583-584 - men don't know why, nor do they often ask why they wage war all the time.

"War of the Races", New Scientist, Nov. 11, 1965, pp 391 - on the possibility of a race war starting in Africa and involving the world.

i) Psychology, Psychiatry

- Burt, C., "Intelligence and Heredity", New Scientist, May 1, 1969, pp 226-228 - there may be minor differences in the innate mental abilities of different races but so far it has proved impossible to devise an I.G. test that is entirely uninfluenced by the different cultural backgrounds of different nationalities.
- Coopersmith, S., "Studies in Self-Esteem", Scientific American, Vol. 218, Feb. 1968, pp 96-106 - the opinion an individual has of himself is clearly an important component of his behavior. How this component is shaped and how it influences personal conduct is investigated in a group of boys.
- Eisenberg, L., "Can Human Emotions be Changed?" Bulletin of the Atomic Scientists, Jan. 1966, pp 27-31 - human nature becomes human only in social context: the context shapes its form.
- Elkind, D., "Erik Erikson's Eight Ages of Man", New York Times Magazine, 1970, pp 25-119 (15 pages) - Erikson's descriptions of the stages of the life cycle have advanced psychoanalytic theory to the point where it can now describe the development of the healthy personality on its own terms and not merely as the opposite of a sick one.
- Elkind, D., "Giant in the Nursery - Jean Piaget", New York Times Magazine, May 26, 1968, pp 25-80 (12 pages) - Jean Piaget "A genius for empathy with children, together with true intellectual genius has made him the outstanding child psychologist in the world today."
- Eysenck, H., "A Critique of Jensen", New Scientist, May 1, 1969, pp 228-229 - Dr. Jensen's findings on the levels of negro and white IGs in the U.S. are the result of careful studies, and cannot be dismissed out of hand. But much more research is needed before anything sensible can be said on negro-white differences.
- Eysenck, H., "The Technology of Consent", New Scientist, June 26, 1969, pp 688-690 - the author foresees that the techniques of experimental psychology will be used increasingly in the future.
- Freedman, D.G.; Freedman, N.C. "Behavioural Differences Between Chinese - American and European - American Newborns", Nature, Vol. 224, Dec. 20, 1969, pp 1227 - an investigation of newborn behaviour in different ethnic groups.
- Guilford, J.P., "Intelligence Has Three Facets", Science, Vol. 160, May 10, 1968, pp 615-620 - there are numerous intellectual abilities, but they fall neatly into a rational system. (references)
- Hunter, I. M.L., "The Development of Problem-Solving Ability", Discovery, Aug. 1961, pp 344-349 - experiments already conducted on animals and children suggest that there is a common pattern in the development of problem-solving ability. (references)
- Hutt, C., "Curiosity in Young Children", Science Journal, Feb. 1970, pp 69-71 - children react to a novel toy first by examining it carefully and only later by playing with it. Boys tend to be more interested in exploring the toy than girls and also play with it more inventively.

- Irvine, S., "Culture and Mental Ability", New Scientist, May 1, 1969, pp 230-231
- recent psychological research in Africa suggests that the western concept of intelligence will have to be revised if we are to use "intelligence tests" to compare mental ability in different ethnic groups.
- James, B.M., "Models in Psychology", Electronics and Power, Nov. 1969, pp 286-391
- certain models have been evolved to explain in part, or in whole the complexities of human behaviour. An explanation for engineers.
- Klaw, S., "The Management Psychologists Have Landed", Fortune, April 1970, pp 106-116
- on increased use of having a firm psychologist who helps sort out the problems - emotional and otherwise, of the management, president, vice-president, etc. It is the psychologist who as often as not hold the company in a stable state.
- Kramer, R., "Phasing Out Mom and Dad", New York Times Magazine, Nov. 2, 1969, pp 95-105
- a new answer to the old problem of parental permissiveness vs parental authority.
- Kramer, R., "Tis the Season to Be Cranky", New York Times Magazine, Nov. 26, 1967, pp 109-112
- on a study of a child's feelings influenced by his perceptions, as it became closer to Christmas time the children become more excited and their drawings became better, bigger and more elaborate. After Christmas, the excitement gone, the drawings became plainer and smaller.
- Leonard, M.R., "When Fathers Drop Out", New York Times Magazine, April 20, 1969, pp 81-91
- on the special contribution "fathering" contributes to the child.
- Lewontin, R.C., "Race and Intelligence", Bulletin of the Atomic Scientists, March 1970
- on a doctrine that genetic factors outweigh environment in producing I.Q. differences between racial groups. The author disagrees with this doctrine.
- MacKay, D.M., "The Bankruptcy of Determinism", New Scientist, July 2, 1970, pp 24-26
- the processes of the human brain can never be completely understood because of the indeterminacy of the interactions with other brains.
- Marwick, C., "Towards a More Human Horse", New Scientist, Jan. 12, 1967, pp 76
- it has been found possible to develop in horses, what looks like a sense of responsibility in emergencies. The trick lies in a particular type of handling by human beings early in the foal's life.
- Moriarty, J., "The Psychology of Human Reproduction", Science News, Vol. 98, 1970 pp 148-149
- motivation may be either altruistic or narcissistic. The latter tends to be self-perpetuating and is unhealthy.
- Murray, H.A., "Prospect for Psychology", Science, Vol. 136, May 11, 1962, pp 483-488
- a vision for the future, as reconstructed after one encounter with the hallucinogenic drug, psilocybin.

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- Richards, M.P.M., "Behaviour and the Social Environment", New Scientist, June 25, 1970, pp 638 - Psychologists still tend to neglect the social context of human development.
- Skinner, B.F., "Behaviorism at Fifty", Science, Vol. 140, May 31, 1963, pp 951-958 - the rapid growth of a scientific analysis of behaviour calls for a restatement of the philosophy of psychology.
- Smoker, P., "Simulating the Human World", Science Journal, July 1970, pp 49-53 - on simulating world conditions with role playing and computers.
- Strongman, K., "Communicating with the Eyes", Science Journal, March 1970, pp 47-52 - when people exchange mutual glances they communicate emotional reactions which cannot be exchanged in words. Conversation is punctuated by movement of the eyes which helps to establish the "pecking order" of dominance between two or more people.
- Welford, "Research on Skills", Discovery, July, 1962, pp 27-33 - the study of human performance is beginning to play a key role in many fields from the whole relationship between man and machine to sports and the training of old people.
- "16 PF Test Profile" - a personality and ability testing sheet. The "standard" profile of engineers and scientists.

j) Religion

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