SCIENCE

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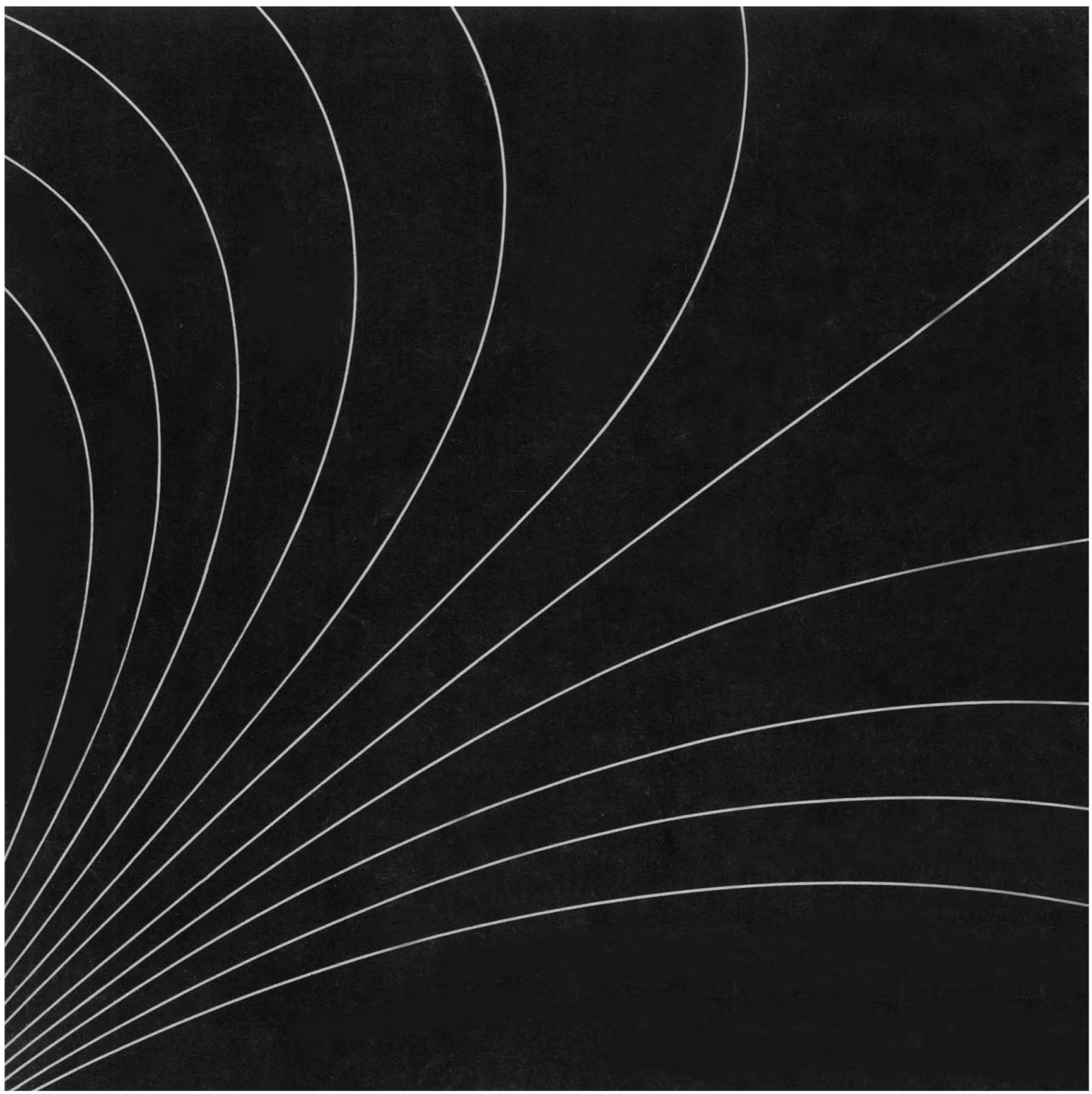
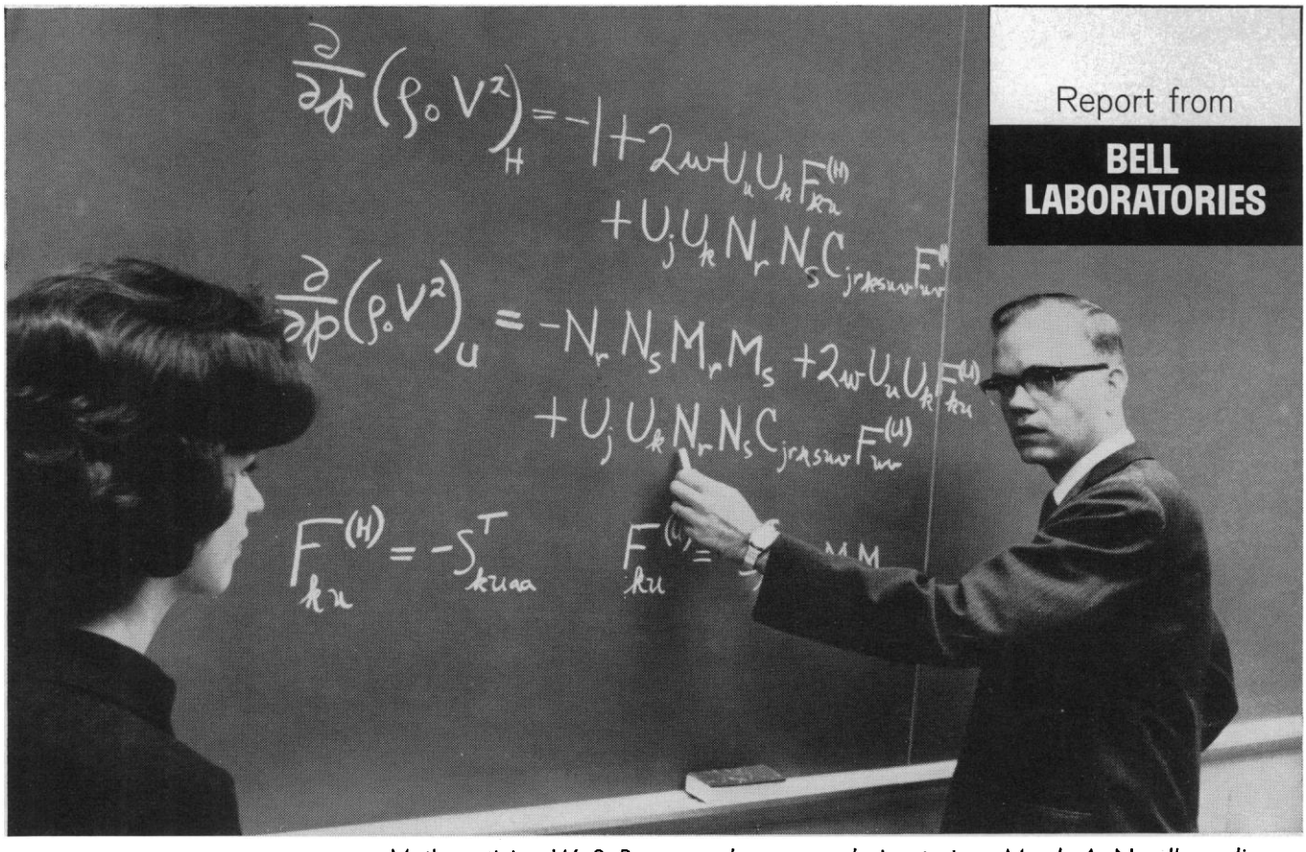
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



INTEGRAL CURVES



Mathematician W. S. Brown and program design trainee Mrs. L. A. Needham discuss an application of ALPAK programming to wave propagation in crystals under pressure.

ALGEBRA ON A DIGITAL COMPUTER

PHI(3,0)

NUMERATØR

	A4	A3	A2	A1	Q
-288	0	0	0	3	3
1152	0	0	0	3	4
-1896	0	0	0	3	5
1656	0	0	0	3	6
-816	0	0	0	3	7
-2	1	0	0	5	1
1	1	0	0	5	2

A portion of the printout from an ALPAK computation: each row represents a polynomial term consisting of a coefficient and five exponents; the variable names appear as column headings. The first term is thus $-288A_1^3Q^3$. ALPAK can handle polynomials and rational functions in several variables, as well as truncated power series and systems of linear equations with rational-function coefficients.

Much laborious manipulation of routine algebraic expressions can be eliminated by a computer programming system devised at Bell Laboratories. Called ALPAK (ALgebra PAcKage), the new system makes it possible to perform algebraic calculations on a digital computer at ten thousand times human speed.

Digital computers work with numbers, not algebraic symbols. But algebraic expressions include numbers as coefficients and exponents. For example, the term

$$3x^2y^4z^5$$

can be written in the form

3 2 4 5

where 3 is the coefficient and 2, 4, and 5 are, respectively, the exponents of x, y, and z. This numerical representation permits a computer to perform algebraic addition, subtraction, multiplication, division, substitution, and differentiation. The exponents and coefficients are reassociated with the variables at the output.

Unlike the human algebraist, the digital computer does not become weary and make mistakes. It can quickly carry to completion computations that hitherto seemed prohibitively long. For example, at the left is a printout of the result from a computation related to a telephone traffic problem. The problem involved 9 linear equations in 9 unknowns, with a total of over 800 terms. The computer running time was six minutes: the time required for a human mathematician to work the problem and check the answer would be approximately one year.

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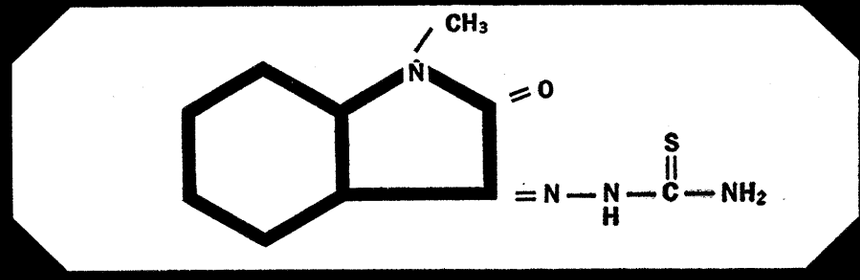

SIGNIFICANT ADVANCE IN SMALLPOX CONTROL

The first instance of successful prophylaxis of a virus disease by a synthetic chemical agent was reported recently by Bauer et. al. (1) (2).

MIBT N Methyl Isatin Beta Thiosemicarbazone was shown to be very effective protection for smallpox contacts regardless of vaccination status. In contacts who had primary vaccination, MIBT was more effective than revaccination in suppressing contact cases. It was also effective when contact was not detected in time for revaccination to offer protection.

Treatment of contacts began one day after admission as patients. They were observed for 16 days. During this time, only three mild cases of smallpox occurred among 1101 treated patients. Among a control group of 1126 untreated contacts, 78 cases of smallpox and 12 deaths occurred.

MIBT gave better results than were obtained with antivaccinal gamma globulin. And it can be made readily available and administered orally, thus simplifying administration to large groups.

Thompson, et. al. described antiviral activity of Isatin Beta Thiosemicarbazone in mice infected with vaccina virus (4). Easterbrook reported inhibition of infectious virus with IBT (1962) which resulted in immediate cessation of virus maturation and production. He suggested that IBT interfered with the process of maturation (5).

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25 grams	gm. 1.95	5 grams	gm. 1.90
5 grams	gm. 2.00	1 gram	gm. 2.25
1 gram	gm. 2.35		

References: (1) D. J. Bauer, L. St. Vincent, C. H. Kempe, A. W. Downie, Lancet, II, 494, (1963). (2) Lancet, II, 501, (1963). (3) C. H. Kempe, C. Bowles, G. Meiklejohn, T. O. Berge, L. St. Vincent, B. V. Sundara, Babu, S. Govindarajan, N. R. Ratnakannan, A .W. Downie, V. R. Murthy, Bull. Wld. Hlth. Org. (1961) 25, 41. (4) R. L. Thompson, S. A. Minton, J. E. Officer, G. H. Hitchings, J. Immunol (1953) 70, 225. (5) K. B. Easterbrook, Virology, 17, 245, (1962).

THE LITERATURE REFERENCES SHOULD NOT BE INTERPRETED AS EITHER AN ENDORSEMENT OR DISAPPROVAL OF THE BIOCHEMICAL BY THE CITED INVESTIGATOR.

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

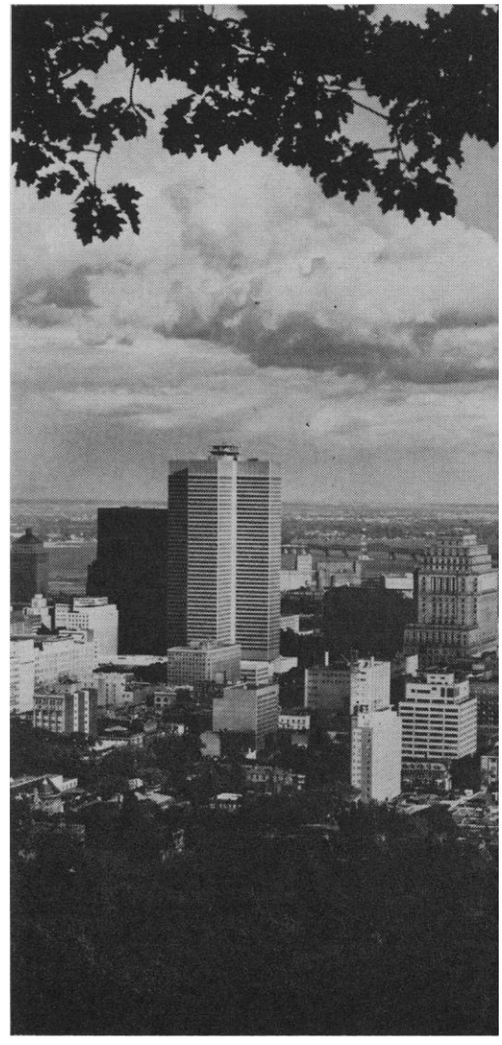
COVER

Integral curves of a first-order differential equation. The simplest problem in differential equations requires the determination of a family of curves from a knowledge of their tangents. These curves appear to be parallel in small regions but may diverge from one another in large regions. See page 451.

MONTREAL • 131st AAAS

Order Your General Program

It provides complete, detailed information about all the sessions and symposia scheduled, the Annual Exposition of Science and Industry, and the Science Theatre.



Program Highlights

Moving Frontiers of Science V. C. Wynne-Edwards on self-regulating systems in animal populations; J. M. Harrison on nonrenewable world resources; Philip Morrison on a topic on the border between nuclear physics and astronomy; and Clement L. Markert on role of genes in embryonic development.

Interdisciplinary Symposia Possible meteoric or lunar influences on meteorological phenomena; basic concepts of biochemical differentiation; medical geology and geography; history of the popularization of science.

Special Sessions AAAS Presidential Address by Alan T. Waterman; the Joint Address of Sigma Xi and Phi Beta Kappa by René Dubos; the George Sarton Memorial Address by Lloyd G. Stevenson; and the National Geographic Society Illustrated Lecture.

International Conference on Primate Behavior Three AAAS sections and the combined ESA and ASZ Section on Animal Behavior and Sociobiology are sponsors. Five sessions, open to the public, will include 37 speakers from four continents.

AAAS Committees Sessions of the AAAS Committee on Meetings, including two sessions on the sociology of science arranged and chaired by Robert K. Merton; the Committee on Science in the Promotion of Human Welfare; the Commission on Science Education.

Sections and Societies The 20 AAAS Sections and some 76 participating societies are scheduling specialized symposia; some have sessions for contributed papers.

AAAS Science Theatre The latest foreign and domestic films.

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MEETING • 26–31 DECEMBER

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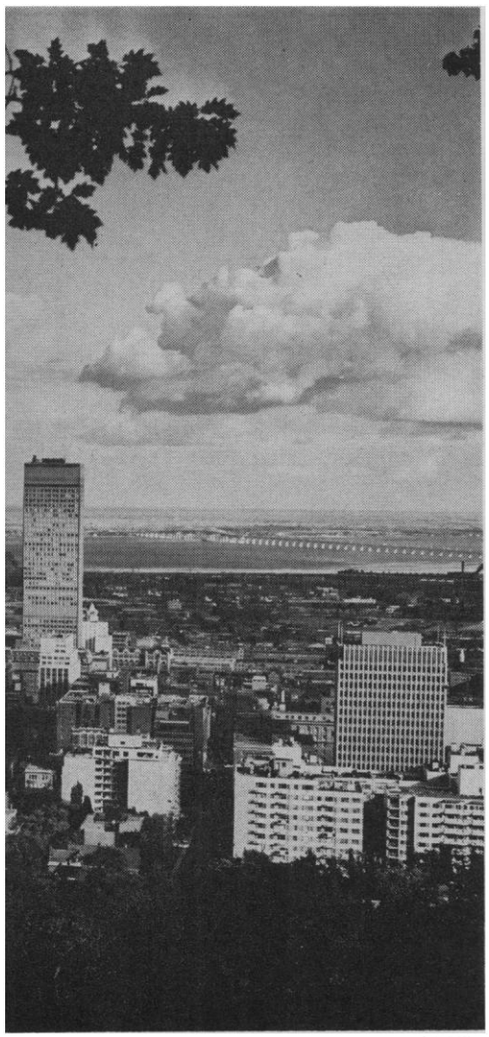

Montreal Municipal Tourist Office

Make sure you have the accommodations you prefer. A list of headquarters hotels of participating societies appears on page 299, 17 July, SCIENCE. The AAAS headquarters is the Queen Elizabeth.

The hotels for the AAAS Montreal meeting have established special, low rates and have reserved large blocks of rooms for the meeting.

Use the coupon below to make your hotel reservation in Montreal. **Send your application to the AAAS Housing Bureau in Montreal, not to any hotel.** Give a definite date and estimated hour of arrival, and also probable date of departure. The Housing Bureau will make the assignment and send you a confirmation promptly.

A rollaway bed can be added to any room at $3.00 per night. Mail your application now to secure your first choice of accommodations.

Hotels with asterisks have unlimited free parking for guests. The Windsor has overnight free parking for guests, but not between the hours of 9 A.M. and 4 P.M.

HOTEL RATES

For a list of the headquarters of each participating society and section, see page 299, 17 July, SCIENCE.

Hotel	Single	Double	Twin	Suite
*Queen Elizabeth	$ 8.50, 10.00	$15.00	$15.00	$30.00–$50.00
*Sheraton-Mount Royal	8.50, 10.00	15.00	15.00	25.00– 45.00
Windsor	8.50	15.00	15.00	25.00– 45.00
*Laurentien (Sheraton)	7.50	12.00	12.00	21.00– 30.00
Ritz Carlton	10.00	15.00	15.00	35.00
Berkeley	7.00	10.00	10.00	17.50

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(Individual requesting reservation) (Please print or type)

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31 July 1964, Volume 145, Number 3631

SCIENCE

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National Humanities Foundation

The world of learning is always kept off balance by the achievements of individual scholars, the special needs of time or place that direct resources and interest toward one field rather than another, or the special opportunities that arise as a result of some fortunate circumstance. Scholarship never moves forward uniformly over its entire frontier. Nor should it. Perfect balance—if we knew what that means—could be achieved only by letting the slowest set the pace. Yet always there is recognition that the imbalance should not become too great or last too long, and in recent years many scientists, whose fields have been prospering greatly, have recognized that special effort should be devoted to nurturing the humanities and arts. Four years ago the President's Science Advisory Committee wrote:

"We repudiate emphatically any notion that science research and scientific education are the only kinds of learning that matter in America. The responsibility of this Committee is limited to scientific matters, but obviously a high civilization must not limit its efforts to science alone. Even in the interests of science itself it is essential to give full value and support to the other great branches of man's artistic, literary, and scholarly activity."

In 1963 the Commission on the Humanities was created by the American Council of Learned Societies, the Council of Graduate Schools in the United States, and the United Chapters of Phi Beta Kappa. The commission has now reported that it recommends a National Humanities Foundation patterned after the National Science Foundation and intended to do for the humanities and the arts what the NSF has done for the sciences: support research, offer fellowships, provide opportunities for the improvement of teaching, improve facilities, and, in general, give to scholars those types of aid that will best enable them to advance their fields of research and study.

It will not be easy to persuade Congress to establish a National Humanities Foundation. It took 5 years of effort to bring the National Science Foundation into being, and it does not appear that a National Humanities Foundation will be any easier to establish. Humanists themselves will in some cases have to become convinced; congressmen will have to be persuaded; support must be generated from a variety of sources. All of this is a considerable undertaking, and it is not certain that the final outcome will look much like the goal now envisioned. Some critics have doubts or oppose the plan. Others contend that, as a result of the NSF experience, it should be possible to devise a better pattern of organization and to plan a better program of activities.

However these disagreements are resolved, a lively discussion of alternative goals and plans will be helpful. Scientists can well take part in this discussion, for the recommendations of the Commission on the Humanities—and scientists helped to write those recommendations—are of concern to all scholars, including scientists. That greater support for the humanities and arts would be desirable is hard to question. That the nation can afford it is clear. It would aid the humanities to have scientists understand and support their needs, just as it aids science to have its needs appreciated and supported by scholars in other fields. And "even in the interests of science itself it is essential to give full value and support to the other great branches of man's artistic, literary, and scholarly activity."—DAEL WOLFLE

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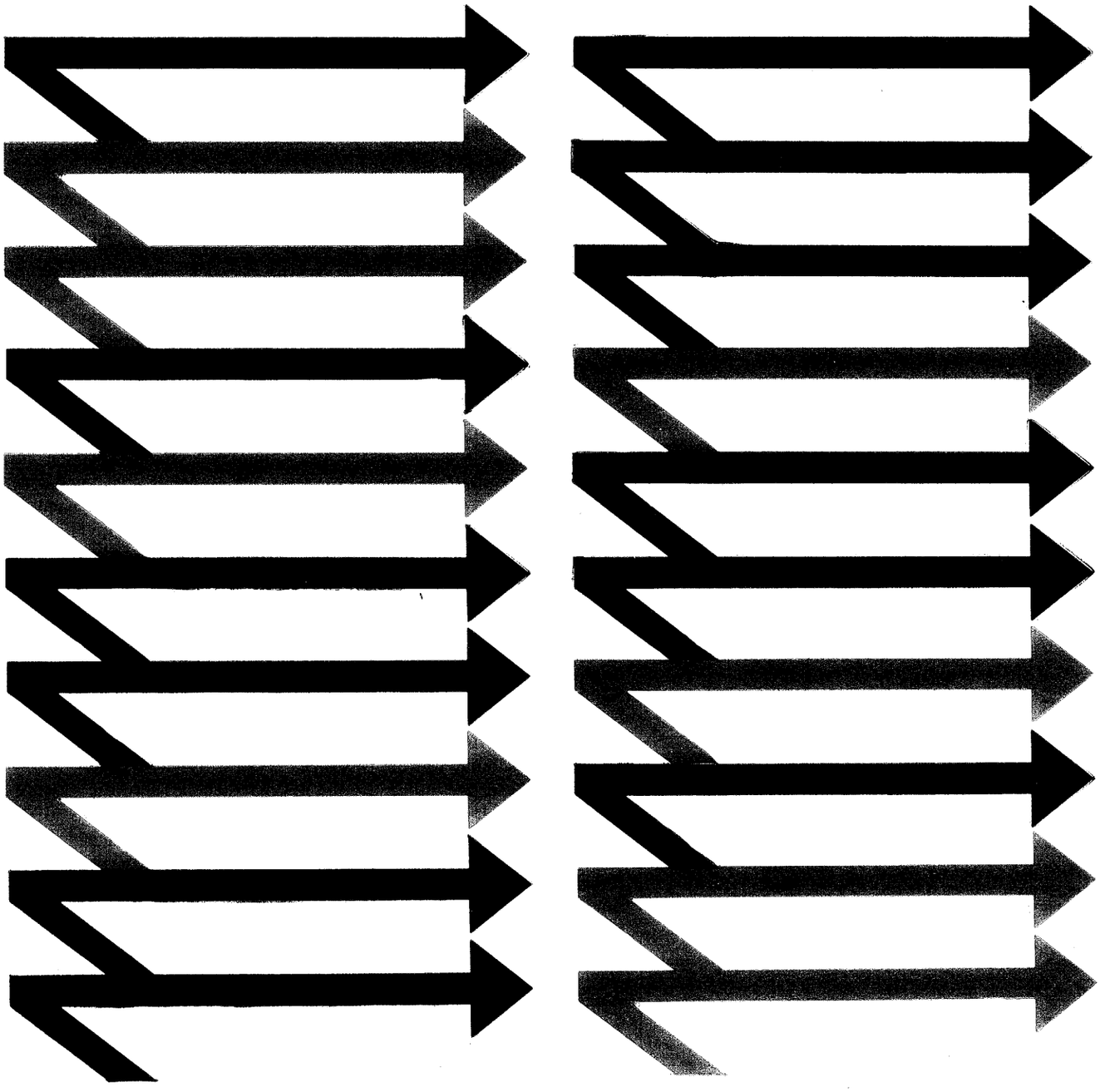

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