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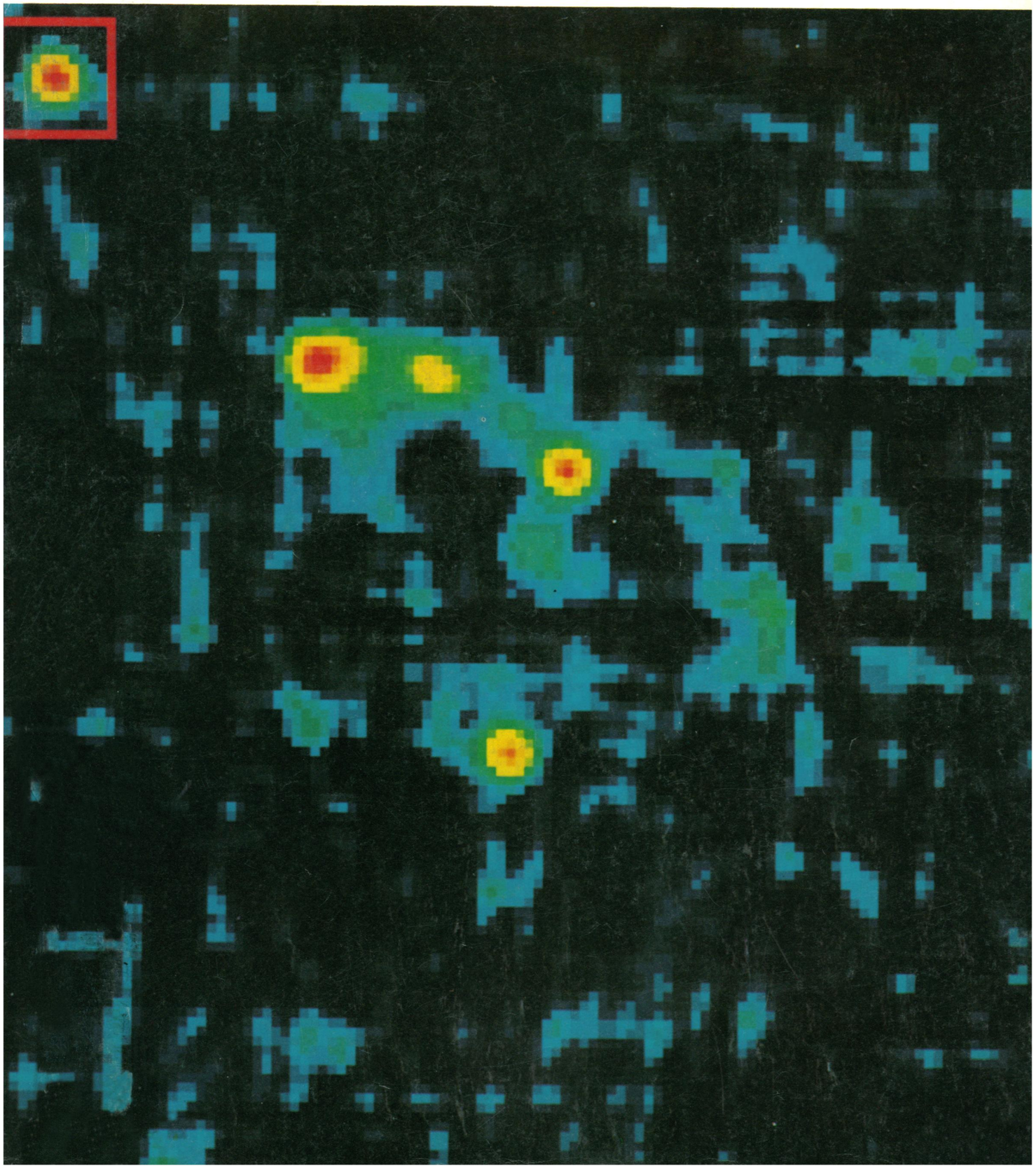

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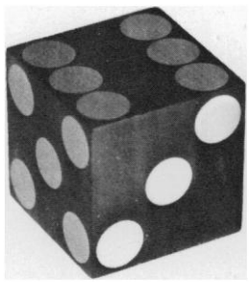

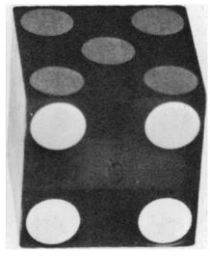

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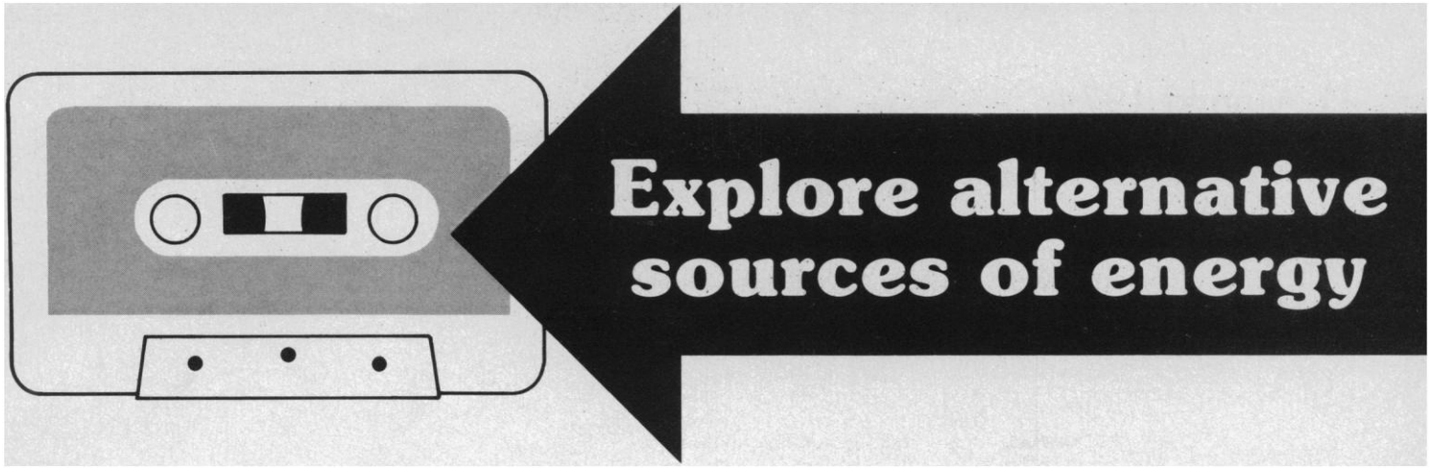

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COVER

Double quasar 0957+561 mapped at 6-centimeters wavelength by the Very Large Array radio interferometer. The point-source response is shown in the red box. Two unresolved sources, oriented north-south near map center, are separated by 6.1 arc seconds. These coincide with the optical images, which have been interpreted as double images of a single quasar caused by gravitational refraction by an intervening massive body. The additional radio sources in the field cause some difficulties for this hypothesis. See page 894. [D. H. Roberts *et al.*, Massachusetts Institute of Technology, Cambridge, in cooperation with the National Radio Astronomy Observatory, Socorro, New Mexico]

LETTERS

Scientific Ties and Human Rights

American scientists have been accused of "obstructing cooperation" with scientists of the Soviet Union and of "endeavoring to reduce [scientific] ties or stop them altogether." These charges appeared in a long article entitled "Scientific ties serve progress" which appeared in *Pravda* on 23 April 1979, over the signatures of five members of the Academy of Sciences of the U.S.S.R., two of them vice presidents. This article followed two previous pronouncements in a similar vein, presumably emanating from official circles. They appear to have been instigated in response to a mounting tide of opposition among U.S. scientists and engineers to the actions of the Soviet authorities against so-called dissidents, many scientists among them, who have had the courage to support the cause of human rights. Increasing numbers of Americans have withdrawn from participation in exchanges and other collaborative efforts with the U.S.S.R.

According to the *Pravda* article, "there are attempts to pressure American scientists to organize collections of signatures on all kinds of petitions and appeals." We are among the 2400 signers of "petitions" and "appeals" circulated by the informal group Scientists for Orlov and Shcharansky (SOS) which commit us to withhold or drastically limit our personal cooperation in U.S.-Soviet scientific affairs. Four-hundred French and 100 Australian scientists have taken similar positions. The Soviet spokesmen have misconstrued the basis for our actions and have gravely underestimated the depth and extent of the disaffection of American scientists engendered by the oppressive actions of the Soviet authorities. The SOS petitions are a mere sampling of the attitudes and convictions prevalent among American scientists and engineers. The numbers of signatories could be increased greatly by a comprehensive solicitation, without "pressure" from our government or from any other quarter.

The authors of the *Pravda* article profess an abiding commitment to international cooperation in science for the welfare of all mankind. We applaud their stand and are genuinely pleased to share common ground with our Russian colleagues. We too are steadfast believers in the traditions of science as an endeavor that transcends national boundaries and political differences. Even before the first official agreement on scientific cooperation between our respective academies of sciences was consummated in 1959, we eagerly welcomed the prospect of cooperation with our colleagues in the Soviet Union. Many of us were among the first U.S. citizens to cross the chasms of the Cold War.

In stark contrast to the professions of our Russian colleagues, the Soviet government has pursued policies that thwart cooperation and communication between our scientific communities. Anti-Semitism, as documented recently by eminent members of the American Mathematical Society, continues to poison the atmosphere of cooperation. The Soviet authorities have systematically imposed political restrictions on the selection of Russian scientists who are allowed to participate in international meetings and exchanges. It is common knowledge that the coveted privilege to attend scientific meetings abroad is under the control of the KGB. Russian scientists whose contributions have earned them worldwide recognition all too often are disqualified on political grounds. In their stead, persons with mediocre scientific credentials typically comprise a substantial fraction of the Soviet delegation. Our invitations to distinguished Russian scientists to deliver lectures or receive prestigious awards have repeatedly been interdicted by the Soviet authorities. Secret police escorts have become customary adjuncts to Soviet scientific delegations abroad. These practices have corrupted the very concept of scientific cooperation.

In spite of the policies enforced by the Soviet authorities, most of us were willing to enter into cooperative endeavors with our Russian colleagues, many of whom we hold in the highest regard. It was our abiding hope that through personal contacts the oppressive policies would somehow be ameliorated. This hope was dashed by the convictions and harsh sentences of Yuri Orlov and Anatoli Shcharansky in 1978 for the "crime" of advocating basic, inalienable human rights. Their names were thus added to the list, already long, of dissidents imprisoned or committed to psychiatric hospitals.

In a recent broadcast (19 May), noted Soviet radio commentator Valentin Zorin has castigated us for threatening disruption of scientific ties without "having a way of learning the true circumstances of the [Orlov and Shcharansky] cases." Indeed, the records of the court proceedings are not at our disposal. Does Zorin have access to them? If so, he should disclose them in fulfillment of the responsibilities of his profession. The secrecy surrounding the trials is disturbingly reminiscent of the infamous trials

of the Stalin era, trials that the Soviet government itself eventually exposed as shams.

Formal agreements on scientific cooperation are doomed to failure if leading scientists choose not to participate. If the Soviet government is genuinely eager to cultivate scientific ties and to engage the cooperation of scientists in the world at large, it must foster a climate free of political, ethnic, and racial prejudice and persecution.

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Research Subjects: Rights and Regulations

It is stated in the article "Proposals for ethics boards stir debate" (News and Comment, 20 July, p. 285) that "In July, HEW [Department of Health, Education, and Welfare] will *require* compensation to subjects for injuries suffered in HEW grant research"; and further, "individual institutions and their IRB's [Institutional Review Boards] are to foot the bill." Let me say flatly that no consideration is being given to issuing *final* regulations requiring compensation to individuals injured in the course of HEW-supported research.

HEW has been considering the *feasibility* of requiring that compensation be provided for subjects injured in the course of HEW-supported research. However, no issuance of proposed rules (NPRM) is contemplated in the near future; and not until the publication of a NPRM and consideration of public comment on the notice, will HEW consider issuing final regulations. Further, every alternative mechanism that has been considered by HEW would provide federal funds for the operation of any compensation program. *No* institution or IRB would be required to "foot the bill."

At this time, the compensation proposals made by the HEW Secretary's Task Force on the Compensation of Injured Research Subjects (*1*) are being re-

viewed to determine if the HEW Ethics Advisory Board (EAB) would be an appropriate forum for the study of the compensation issue and development of a feasible mechanism for implementing the program. In light of this possible assignment, the EAB tentatively scheduled, on the agenda for its September meeting (*2*), a discussion of the compensation issues. Interested parties would be welcome at this public meeting of the EAB.

CHARLES R. MCCARTHY
Office for Protection from Research Risks, National Institutes of Health, Bethesda, Maryland 20205

References and Notes

1. *HEW Secretary's Task Force on the Compensation of Injured Research Subjects*, Publication No. OS-77-003, (National Institutes of Health, Bethesda, Md., January 1977); *ibid*, Publication No. OS-77-004, Appendix A; *ibid*, Publication No. OS-77-005, Appendix B. Available from the National Institutes of Health, OD/OPRR, Room 3A18, Westwood Building, 5333 Westbard Avenue, Bethesda, Md. 20205.
2. To be held at 9:00 a.m. on 14 and 15 September in Room 800, Hubert Humphrey Building, 200 Independence Avenue, SW, Washington, D.C.

Camaraderie, Not Animosity

The pages of *Science* have recently contained statements by knowledgeable scientists that attempt to dissociate science as an enterprise from its applications (News and Comment, 20 July, p. 281). The fear is that the public may become upset with science because of the Skylab reentry, the DC-10 engine mounts, the Three Mile Island incident, and other areas in which the fallibility of science is so obvious. National Academy of Sciences President Philip Handler says he resents the "smearing" of science with the tar of engineering failures and that science and technology should not be used as though they were one word. Amitai Etzioni says that scientists are not identified with these problems—rather it is engineers and corporate executives who are blamed.

Such disclaimers are meaningless to the lay public as well as to most scientists, whether they are more closely identified with the basic or the applied poles of our profession. There is no dividing line between pure and applied science; one merges smoothly into the other. We depend on each other, and we must help and defend rather than alienate each other. Basic understanding is the stuff of application, but history reveals that technological advance may just as often precede advances in basic science.

Perhaps this attempted false separation is borne of a realization that financial support is today more often given in the applied areas than in the basic. Perhaps it is also viewed as a way to enhance the aura of the basic at the expense of the applied. The goal of our enterprise and its pervasive impact that has created modern Western civilization is one of making the lives of humans better, that is, applying science; this is the reason why industries, governments, and ordinary people support our enterprise at all. Otherwise, we would be supported about to the extent that a local symphony orchestra is, and our current standing in public confidence as second only to that of physicians (who also serve people through the application of science) would surely plummet.

Basic scientists made no such efforts of dissociation during the manned space flight program that so thrilled the lay public and which seemed to be so frequently billed by the media as a great scientific advance. "Scientists" then did a wonderful job of designing spacecraft to take men to the moon. But it was "engineers" who designed the DC-10. We must be done with these sorts of inaccurate and mutually offensive and destructive attitudes.

Perhaps, as a chemical engineer, I am overly sensitive to such antagonistic attitudes, for chemical engineering so beautifully blends basic chemistry with engineering. The academic degrees held by a first-class faculty are typically one-third to one-half in pure chemistry rather than in engineering chemistry. It is this blend, the interaction, the interfaces, that are important. We can best meet the more overriding goal of service if we seek such collaborations all along the spectrum rather than point accusing fingers. Both the problems of our society and our concern for our professional well-being demand more—much more—of this constructive interaction.

HENRY A. MCGEE, JR.
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Erratum: In the Research News article "New testing methods could boost air safety" (6 July, p. 29), Tony Mucciardi of Adaptronics, Inc., was incorrectly referred to as Tom Mucciardi.

Erratum: In the article by W. V. Ligon, Jr., entitled "Molecular analysis by mass spectrometry" (13 July, p. 151), the sentence beginning on line 10, column 3, p. 157, read "The total sample weighed more than 100 micrograms." The sentence should have read "The total sample weighed less than 100 micrograms."

Erratum: In the article entitled "Submarine thermal springs on the Galápagos Rift" by J. B. Corliss *et al.* (16 Mar., p. 1073), the sentence on p. 1078 beginning in column 1, line 34, reads "Data for iron give a range of values equivalent to iron to manganese ratios of from three to several hundred." It should read ". . . manganese to iron ratios of from three to several hundred."

31 August 1979, Volume 205, Number 4409 **SCIENCE**

National Science Foundation

During its 29-year existence the National Science Foundation has experienced moments of euphoric support and times of carping criticism. It now faces a period of uncertainty from which it could emerge either strengthened or weakened. Those who believe in the long-term benefits to society of programs carried on by NSF should follow closely and contribute to the in-depth review of NSF now under way. The review is being conducted by the subcommittee on science, research, and technology, chaired by Representative George E. Brown, Jr. (D-Calif.). The year-long effort will include an examination of the basic statutes under which NSF operates and could probably lead to legislation changing in some ways the scope and thrust of NSF. Chairman Brown, who approaches the task in an open-minded fashion, intends that the examination should be reflective, thorough, and broad-ranging. Part of the subcommittee's review will be based on a series of public hearings in which advice will be sought from individuals, organizations, and communities. Other sources of counsel will include a commissioned study and ad hoc advisory groups.

Why is NSF being placed under scrutiny at this time? One reason cited is that 10 years have elapsed since the last searching look. Congress has responsibilities for oversight and legislation which should be discharged. Some of us adhere to the late Sam Rayburn's dictum, "If it ain't broke, don't fix it." However, the temptation to improve a going concern is strong, particularly when, as in the case of NSF, circumstances in which it operates have changed. During the past 10 years the United States has lost much of its technological supremacy and ability to compete in foreign trade. Innovation has become one of the "buzz words" in Washington and it is natural that a possible role for NSF in fostering it has been identified. The past 10 years have also seen a great revolution in instrumentation. The new equipment is very powerful but it is very expensive. An inevitable move is on toward instrumentation centers. The past 10 years have also witnessed an important change in university science departments. Enrollments have leveled off or declined. Few new faculty positions are available. If graduates are to be placed, most of them must go to business and industry.

Representative Brown and the subcommittee reviewing NSF have identified at least 30 questions or issues for examination. They have not yet focused sharply on the matters that will receive maximum attention. However, given the spirit of immediacy that characterizes politics and the quick-fix attitude of Washington, the tendency will be to move NSF further toward applied research. One of the questions for discussion posed by the subcommittee is, "To what extent should NSF support research intended to provide solutions for society's problems?" Another comment and questions are, "We often characterize basic research as an investment in the future, and strongly imply future productivity, industrial innovation, etc. How should NSF's concern with innovation and/or productivity be expressed, if at all? What role or connection should NSF have with research in industry? Can or should NSF promote good research in industry or the linkage between university research and industry?"

A short answer to the last set of questions is that relations between academia and industry could be improved, but the participation and funds of NSF are not required. The government merely needs to change its potent policies with respect to inventions arising under grants.

In its studies and deliberations, the subcommittee will be reminded of the enduring values of basic research. The words have been spoken before. Nevertheless, they are true. Congress should reflect on how much it spends on immediate efforts that often amount to plowing the waves. In contrast, it should note how little is invested for the future.

This is an important period in the life of NSF. It needs the voices of those who understand the importance of fundamental research. It also needs some fresh ideas on how best to justify its continuing efforts.

—PHILIP H. ABELSON

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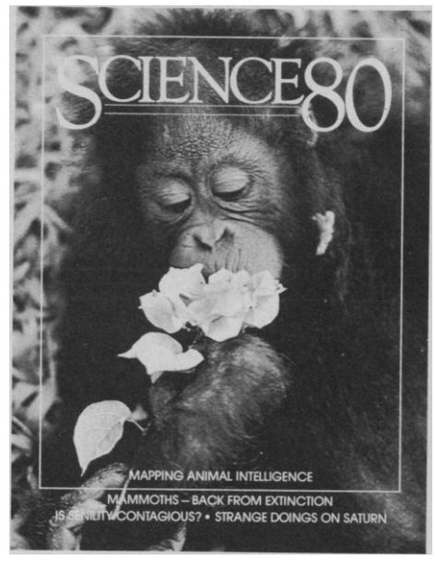

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