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SCIENCE

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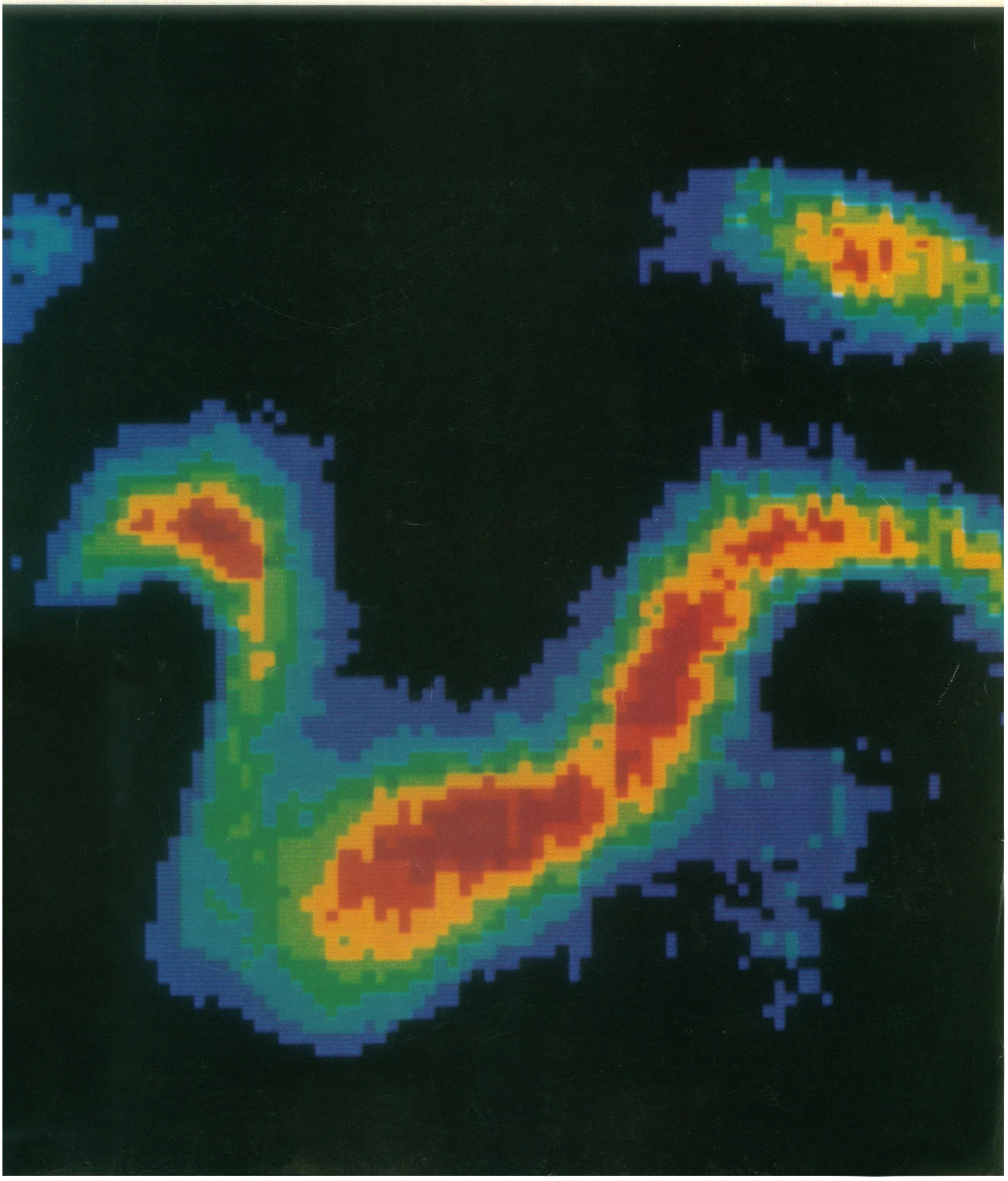

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SCIENCE

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COVER

Digital picture of the chemical species distribution in a turbulent hydrogen-air jet flame is formed by imaging of laser-induced fluorescence. A planar cross section of the species OH is shown, with the jet center line at the top of the 3 by 3 centimeter visualized region. Such information is important for the understanding of questions concerning turbulent flame structure. See page 382. [George Kychakoff *et al.*, Department of Mechanical Engineering, Stanford University, Stanford, California 94305]

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New England Biolabs produces more than 90 restriction endonucleases—eight new ones since our last catalog.

Dpn I
#176

```
        CH3
        |
5'...GA▼TC...3'
3'...CT▲AG...5'
          |
          CH3
```

200 units /1,000 units

Dra I
#129

Dra I is an isoschizomer of *Aha* III

```
5'...TTT▼AAA...3'
3'...AAA▲TTT...5'
```

2,000 units /10,000 units

HinP I
#124

HinP I is an isoschizomer of *Hha* I but cleaves to leave a 5′ extension

```
5'...G▼CGC...3'
3'...CGC▲G...5'
```

500 units /2,500 units

Nla III
#125

```
5'...CATG▼...3'
3'...▲GTAC...5'
```

10 units /50 units

Nla IV
#126

```
5'...GGN▼NCC...3'
3'...CCN▲NGG...5'
```

20 units /100 units

Nsi I
#127

Nsi I is an isoschizomer of *Ava* III

```
5'...ATGCA▼T...3'
3'...T▲ACGTA...5'
```

250 units /1,250 units

SnaB I
#130

```
5'...TAC▼GTA...3'
3'...ATG▲CAT...5'
```

100 units /500 units

Xho II
#128

```
5'...Pu▼GATC Py...3'
3'...Py CTAG▲Pu...5'
```

25 units /125 units

DNA Methylases

for modification of restriction endonuclease cleavage specificity.

Alu I Methylase
#220

```
        CH3
        |
5'...AGCT...3'
3'...TCGA...5'
        |
        CH3
```

100 units /500 units

Cla I Methylase
#218

```
          CH3
          |
5'...ATCGAT...3'
3'...TAGCTA...5'
        |
        CH3
```

150 units /750 units

Taq I Methylase
#219

```
          CH3
          |
5'...TCGA...3'
3'...AGCT...5'
      |
      CH3
```

300 units /1,500 units

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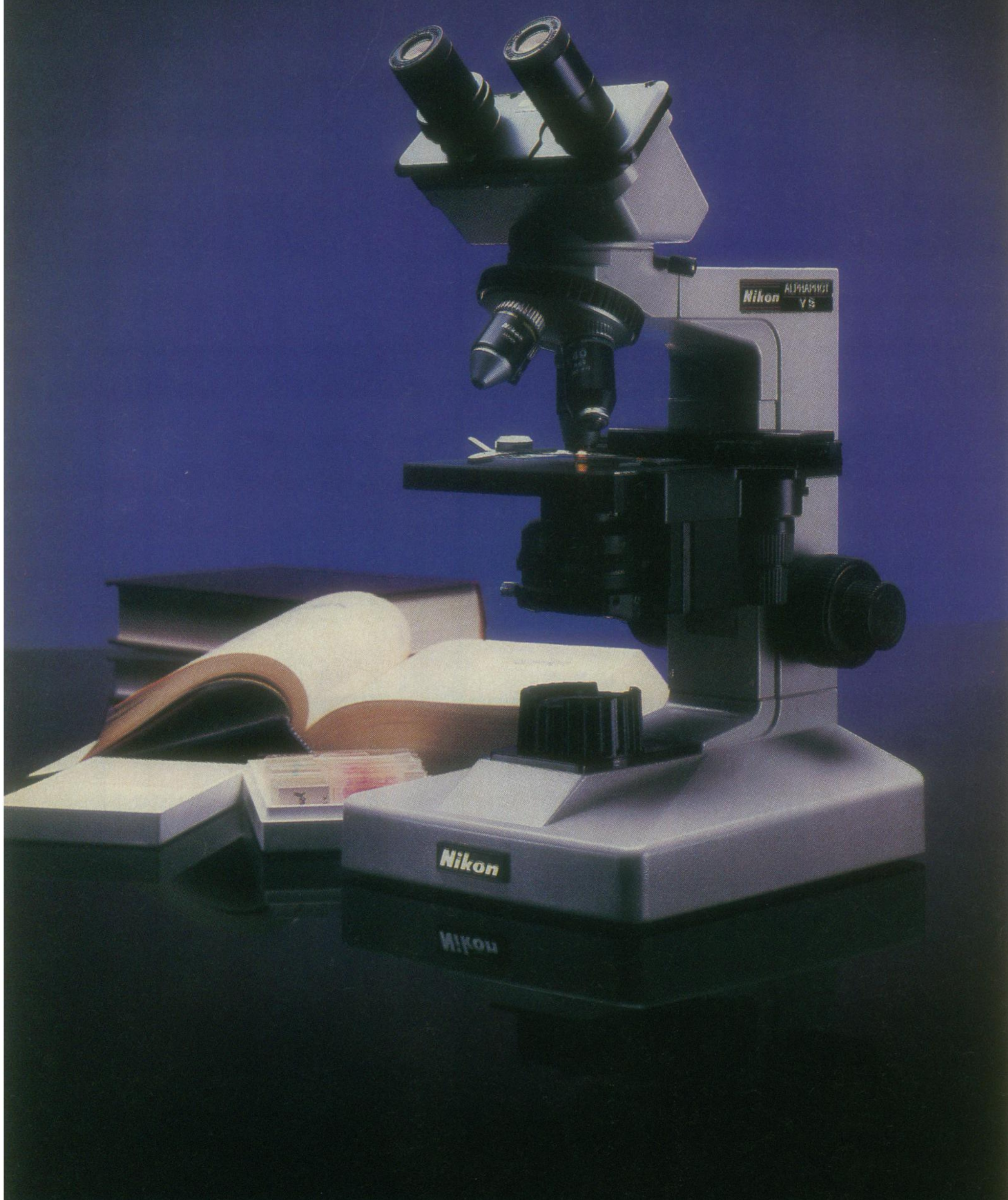

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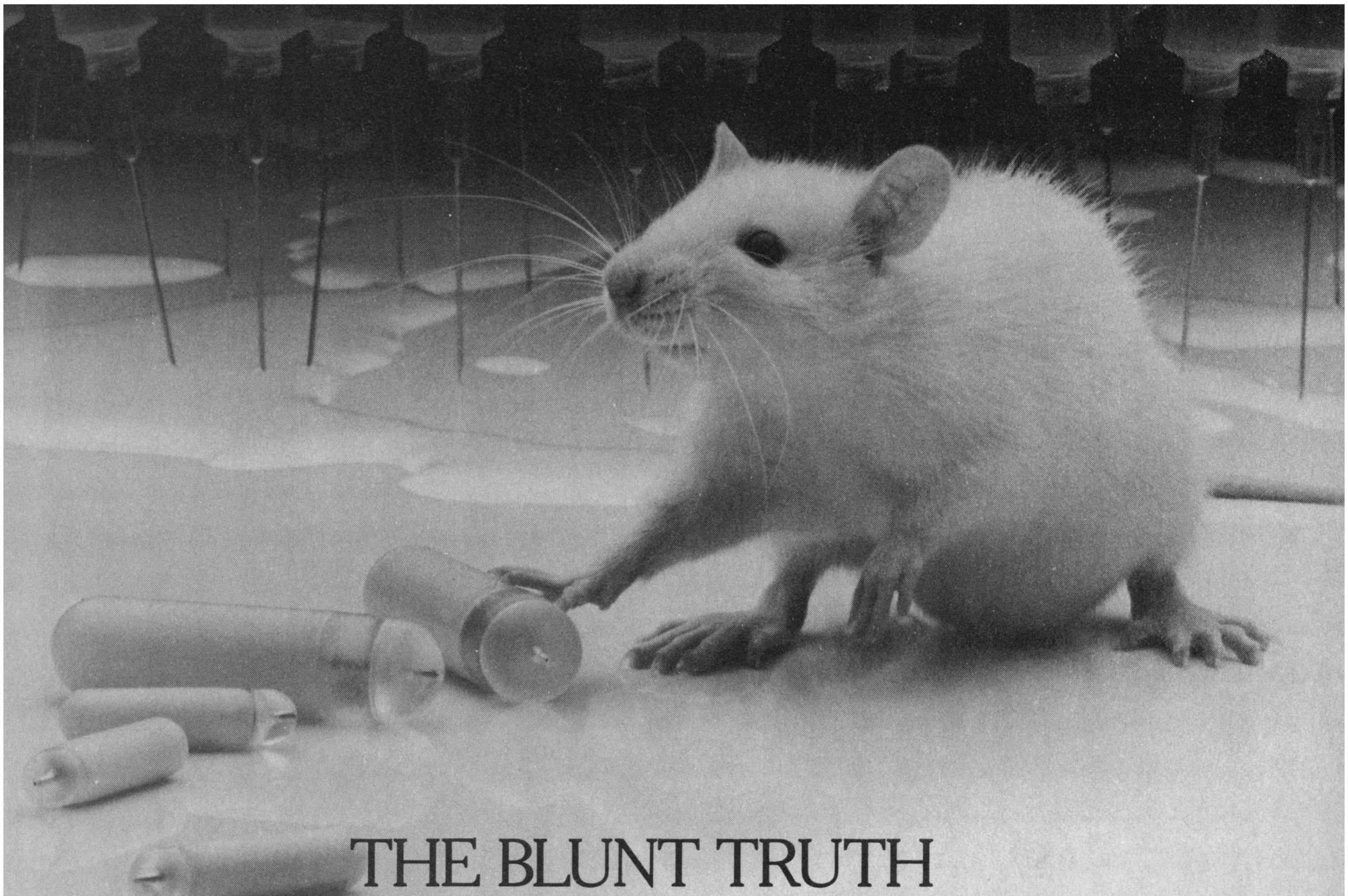

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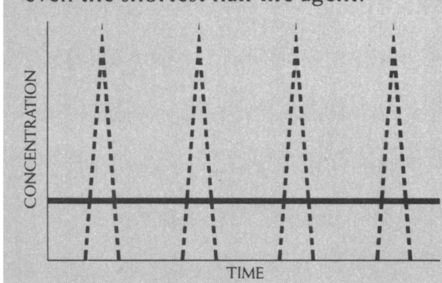

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The sensitive measure of complement activation

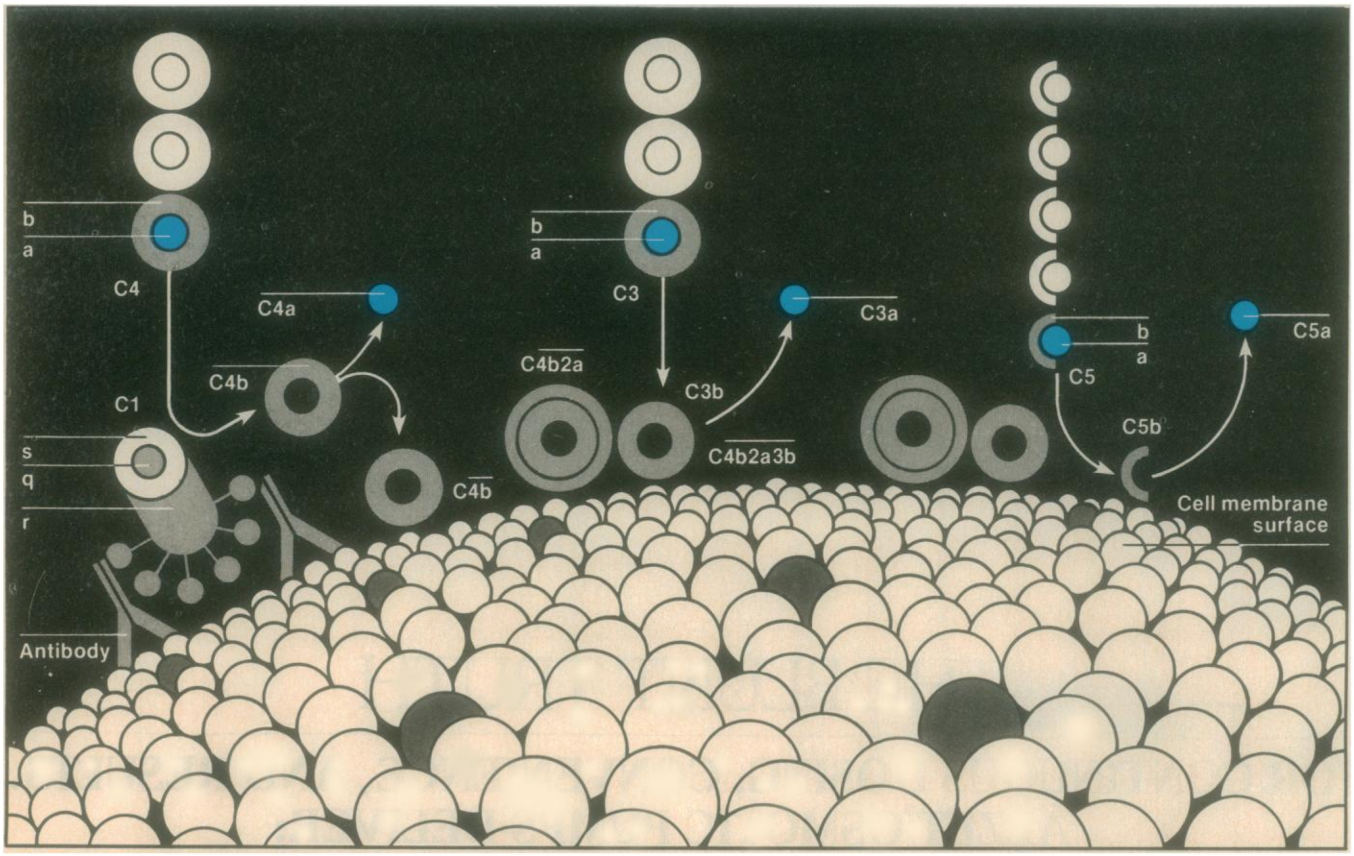

Illustration C3, C4, C5 activation in the classical complement cascade: Activated C1 (C1s), which binds to antigenic sites on the cell surface, cleaves C4 by limited protealysis to yield C4a which is released to the fluid phase and C4b which binds to the surface of the cell. C4b2a cleaves C3 to yield C3a and C3b. The latter binds to the cell surface. Complexes of C4b2a and C3b form a C5 convertase (C4b2a3b) that cleaves C5 to yield C5a, and C5b which binds to the cell surface.

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(1) Hugli, T E, and Chenoweth, D E, "Biologically Active Peptides of Complement: Techniques and Significance of C3a and C5a Measurement," *Laboratory and Research Methods in Biology and Medicine,* (ed. R M Nakamura, W R Dita, E S Tucker III: Alan R. Liss, Inc, 1980), pp.443-460.

(2) Gorski, J P, "Quantitation of Human Complement Fragment C4ai in Physiological Fluids by Competitive Inhibition Radioimmunoassay," *J. Immunol. Methods,* (**47**,1981), pp. 61-73.

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SCIENCE

Engineering and the National Science Foundation

For some years the National Science Board has been working with the directors of the National Science Foundation—in particular, Richard Atkinson, John Slaughter, and Edward Knapp—to modernize the NSF mission in support of academic engineering. With strong encouragement from the National Academy of Engineering and professional societies, and with the support of the Office of Science and Technology Policy, gratifying progress has been made. The Engineering Directorate has been established, a new mission for NSF in engineering established by NSB, and new program directions established by the NSF director.

All this has been accomplished within the framework of the NSF Act, which, as Frank Press points out in his editorial (13 April, p. 115), does not require amendment to permit this. Nevertheless, the consensus of the NSB is that the amendments proposed by the House Committee on Science and Technology are reasonable and constructive. Engineering would no longer be defined as a scientific discipline. At the same time NSF's role would be support for programs " . . . fundamental to the engineering process and programs to strengthen engineering research potential and engineering education. . . ."

This proposed new phrasing should help put to rest two concerns that have bothered both scientists and engineers. Engineering is seen as more than science. We should not say to engineers, "You can receive support only if your work competes as science." Such pressures in the past have hurt U.S. engineering, have hurt the economy, and have not helped science. The phrasing also emphasizes the academic and research orientation of NSF support and makes clear that NSF will not do the engineering work of other agencies or engage in commercially oriented problem-solving.

For these reasons, I do not share Press' concern about the "likely outcomes" of adoption of the proposed amendments. His main concerns are that (i) NSF's fundamental mission will be diluted and (ii) the engineering budget will grow at the expense of science. On the first point, the fundamentals of engineering are being defined and their educational linkages strengthened. On the second, there is a way for science to lose but also a way for both science and engineering to gain.

If we insist that engineering is only another discipline of science, like physics or anthropology, all the pressures to modernize American engineering in the interests of national security and economic competitiveness will be played out in a fixed-pie scenario—one discipline against another. Or, if this process frustrates those concerned with upgrading our national engineering capability to the point that they abandon NSF as a significant participant in the effort, it will lead to a National Technology Foundation or some other new federal structure to do the job. Much of the political support enjoyed by fundamental science today might well be bled off into the support for the budget of such an agency, which would focus the majority of its work on near-term benefits. Growth in the budget for science could be a major casualty. So too would be much of the fruitful interchange between science and engineering, which is best promoted with a single agency incorporating both.

Engineers should help NSF refine the research and education strategy that best fulfills the NSF mission in engineering and should support the study of engineering research priorities now under way at the NAE. Industry needs to understand how well its interests are served by a supportive but nonintrusive NSF program and help NSF get the additional resources it deserves. Scientists should welcome the development of new NSF initiatives that build an ever stronger case for the economic importance of basic science through an effective engineering capability that can deliver added benefits to the American people.—LEWIS M. BRANSCOMB, *Chairman, National Science Board, Washington, D.C. 20550.*