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25. A. Ellegård, *Darwin and the General Reader* (Gothenburg Univ., Gothenburg, Sweden, 1958), p. 337.
26. H. W. Paul, in (*18*), p. 409.
27. W. Montgomery, in (*18*), p. 91; see also (*42*).
28. I. Bulhof, in (*18*), p. 284.
29. E. Pfeifer, in (*18*), p. 204.
30. T. Glick, in (*18*), p. 310.
31. A. Vucinich and J. A. Rogers, in (*18*), pp. 227–268.
32. R. E. Stebbins, in (*18*), pp. 117–163.
33. Francis Galton was presented with the same problem when he undertook the first sociological study of scientists in Great Britain. His solution was to restrict his sample to the members of the Royal Society who had distinguished themselves in some way other than just being elected to the Society; for instance, by earning a medal, presiding over a learned society or section of the British Association for the Advancement of Science, or being elected to the council of the Society. Of the 500 or so members in 1872, only 189 qualified. To this number, Galton added Herbert Spencer, John S. Henslow, and Robert H. Greg [F. Galton, *English Men of Science: Their Nature and Nurture* (Macmillan, London, 1874)].
34. W. H. Brock and R. Macleod, *Br. J. Hist. Sci.* **11**, 41 (1976). The declaration had been signed by 717 scientists when it was finally published in 1865. Sixty-five of the 673 members of the Royal Society signed. Of these, 48 were considered to be sufficiently important scientists to be labeled as such in the *Dictionary of National Biography*. Of these, only three were especially prominent scientists: Sir David Brewster (1781–1868), James Prescott Joule (1818–1889), and Adam Sedgwick (1785–1873). Of special relevance to our study is Brock and Macleod's conclusion that age seemed to be immaterial in determining who signed and who did not sign the declaration (p. 52).
35. D. L. Hull, *Syst. Zool.* **21**, 132 (1972); P. J. Bowler, *Ann. Sci.* **35**, 55 (1978).
36. R. W. Burkhardt, Jr., *Isis* **67**, 494 (1976).
37. A. Leeds, in (*18*), p. 439.
38. As Darwin himself said in the *Athenaeum*, 1854, 617 (1863): "Whether the naturalist believes in the view given by Lamarck, or Geoffroy St.-Hilaire, by the author of the 'Vestiges,' by Mr. Wallace and myself, or in any other such view, signifies extremely little in comparison with the admission that species have descended from other species and have not been created immutable; for he who admits this as a great truth has a wide field opened to him for further inquiry."
39. In this article we show that our intuitions about the role of age in acceptance of the evolution of species and the extent of this acceptance by 1869 are faulty. Hence, we would be foolish to accept at face value the widespread belief that evolution was much more widely accepted than natural selection. For example, in 1913, soon after the fortunes of natural selection were supposed to have reached their lowest ebb, E. R. Lankester [*Science from an Easy Chair* (Books for Libraries Press, Freeport, N.Y., 1913), p. 391] can be found saying: "I recently read an essay in which the writer is good enough to say that, owing to the work of Darwin, the fact that the differences which we see between organisms have been reached by a gradual evolution, is not now disputed. That, at any rate seems to be a solid achievement. But he went on to declare that when we inquire by what method this evolution was brought about biologists can return no answer. That appears to me to be a most extraordinary perversion of the truth. The reason why the gradual evolution of the various kinds of organisms is not now disputed is that Darwin showed the method by which that evolution can and must be brought about. . . . The assertion that the theory of natural selection as left by Darwin 'is now generally held to be inadequate' is fallacious. Darwin's conclusions on this matter are generally held to be essentially true."
40. F. Galton (*33*); in addition to the usual Victorian lives and letters, Ellegård (*25*) and Brock and Macleod (*34*) were especially useful.
41. H. Theil, *Principles of Econometrics* (Wiley, New York, 1971), pp. 628–636.
42. W. Montgomery [in (*18*), p. 115] did a similar study of 34 German scientists in 1860. Although his sample was half as large as ours, his results accord reasonably well with ours. He found the mean age in 1860 of the 20 German scientists who came to accept some form of evolution to be 36.8 and the mean age of the 14 who continued to hold out to be just under 50. In Montgomery's study, only 59 percent of the scientists studied were converted.
43. The research for this article was supported in part by NSF grant Soc 75 03535. We thank A. McHutcheon for help in using the logit technique.

NEWS AND COMMENT

Accident and Hostile Citizens Beset Animal Disease Laboratory

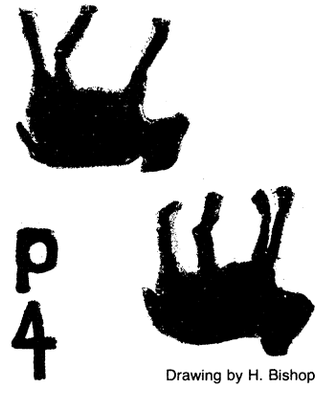
The customarily placid waters around Plum Island, site of the Department of Agriculture's high-security Animal Disease Center, have been ruffled by squalls from two different directions. One is the outbreak of foot-and-mouth disease which occurred in mid-September when the virus escaped from the laboratory and infected cattle being held on the island (*Science*, 20 October). The other is apprehension among the communities on neighboring Long Island about the laboratory's plan to start work with Rift Valley fever, an exotic African disease that has recently become a health menace in Egypt. The still unexplained outbreak of foot-and-mouth has not helped allay the citizenry's concern about Rift Valley fever, particularly since Long Island abounds with the mosquitoes that seem to help spread the disease.

The Rift Valley project has become an election issue. Suffolk County executive John Klein is seeking to have the Department of Agriculture keep state authorities better informed of what goes on at Plum Island. Some 25 citizens' organizations, according to one local critic, oppose the Rift Valley project. The public health authorities of Suffolk County, however, are satisfied that the safety precautions being taken are adequate to contain the disease.

The escape of foot-and-mouth disease virus, the first in the Plum Island laboratory's 24-year history, implies either a failure of equipment or a breach of practice. (The virus did not escape from the island, so the overall safety system cannot be said to have failed.) The virus's route of escape has not been pinpointed but a report now being prepared by the Animal Disease Center suggests that a filter may have failed in the room where infected carcasses were incinerated, or that new construction activity, which penetrated walls and uncovered drain lines, may somehow have been involved.

The incident could not have come at a worse time in the center's efforts to assure Long Island residents of the safety of the Rift Valley fever project. A thought occasionally voiced is that the foot-and-mouth outbreak might have been deliberately engineered. Little credence is given this possibility, although the Inspector General's office of the Department of Agriculture is mounting a separate investigation of the outbreak, doubtless for routine reasons.

Among the laboratory employees on Plum Island a possible source of unhappiness caused by the Rift Valley proj-



Drawing by H. Bishop

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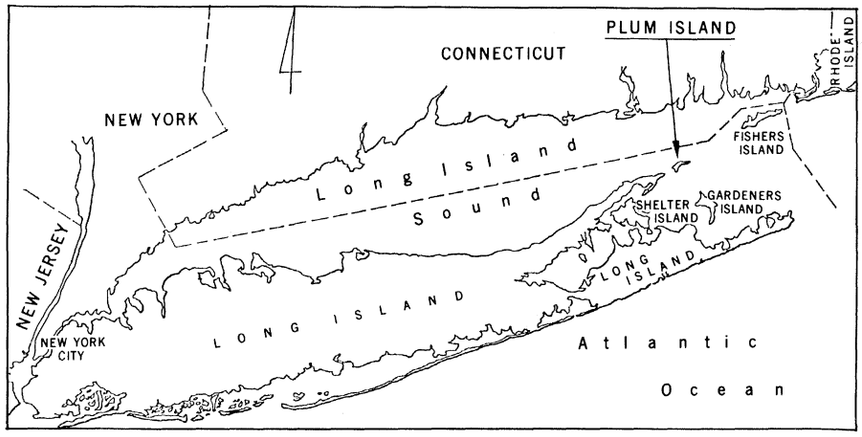

Map by E. Warner

ect is the decision to vaccinate those involved. The vaccine has not been approved by the Food and Drug Administration—the disease is unknown in the United States—so that people were asked to volunteer. A member of the employees' union, the American Federation of Government Employees, says that at least a dozen of the Plum Island workers didn't want to be vaccinated but feared they would be transferred to Iowa or elsewhere if they refused. The laboratory's deputy director, John Graves, says it was clearly understood that transfer would be to another job in the Plum Island center and that there was no compulsion.

The Rift Valley fever project is being undertaken because of a sudden spread of the disease from southern Africa, its usual habitat, to Egypt. In 1977 an outbreak to the northeast of Cairo killed more than 50 people and infected many others. Normally a disease of cattle and sheep, Rift Valley fever is sometimes caught by people in close contact with animals. Mosquitoes also seem to be involved in its spread. In case the disease should be spread by air travel to the United States, the Animal Disease Center wishes to test the efficacy of a vaccine in sheep and to develop diagnostic capabilites.

The security features of the Plum Island center are modeled after those developed at the Fort Detrick biological warfare laboratories. Plum Island officials describe their facilities as P4, the highest rating in classification developed by the National Institutes of Health for gene splicing experiments. NIH officials, however, who may not like to think that much could escape from P4, deny that Plum Island attains this status. NIH safety expert Emmett Barkeley even doubts if all the experiments there qualify for P3. The issue is that all P4 experiments must be performed in airtight sealed cabinets known as glove boxes. Plum Island researchers say they often use an equivalent system—one cannot put a cow in a glove box—and that the lesser hazards of working with animal diseases make glove boxes unnecessary. The Plum Island facilities are doubtless as secure in their own way as is P4—the water barrier and vaccination are two features not required by NIH—but defining P4 is the NIH's prerogative.

The Center for Disease Control does not mention Rift Valley fever in the current edition of its classification of disease organisms. But a new edition being prepared is understood to recommend that the virus be handled only in conditions of P4, as defined by the NIH.

Delayed by the foot-and-mouth outbreak, the Rift Valley fever project at Plum Island will now start in January. Originally scheduled to last through June, the experiment will finish in April to assuage citizens' fears that the disease might be spread by mosquitoes. On Long Island, mosquito larvae start to appear as early as March in warm years.

The political dimensions of the Rift Valley project have been less familiar than the practical aspects to the Plum Island scientists. Officials have acknowledged the desire of state authorities to know more about what goes on at Plum Island. "They have been operating in total anonymity for 25 years" complains county executive Klein. Center director Jerry Callis has spoken at town meetings to explain the project and the steps being taken to contain the disease. Although opposition has been quite active, Plum Island officials hope that the tide has turned in their favor. —NICHOLAS WADE

Senator Chides Gene Debate Doubters

Congress has failed for the last two sessions to get its act together on recombinant DNA but has not yet washed its hands of the problematic molecules, as some researchers had hoped it would. Senator Adlai Stevenson, chairman of the space and science subcommittee, has announced that he will introduce legislation in January, ensuring that yet a third session of Congress will have genes on its agenda.

A year ago, when Congress was inclined to legislate stringent controls on the research, Stevenson issued an influential statement cautioning the Senate not to rush out with an ill-considered law. "In retrospect, perhaps my remarks were taken too seriously," Stevenson said in a Senate statement last month. He believes legislation is necessary in order to secure both uniformity and compliance.

Stevenson added the following comment on the course of the recombinant DNA debate: "Since 1974, a great many scientists have come to doubt their own wisdom or that of their colleagues in questioning the safety of recombinant DNA research and making it a public issue. This attitude is both regrettable and largely unfounded. Scientists should derive a great deal of satisfaction from the recent course of events. Congress has not passed restrictive legislation of the sort once contemplated. States and communities have acted responsibly."

Stevenson's committee is not empowered to initiate legislation. His bill, which has yet to be drafted, will have to pass through Senator Edward Kennedy's health subcommittee, which may have other ideas, including its present position that no legislation is necessary. A new force in next session's debate may be the pharmaceutical industry. Having kept a lowish profile hitherto, the industry may wish to have the status of its activities clarified now that commercial applications of the technique are coming so quickly near to fruition. Eli Lilly and Company, for instance, said recently that it sees an "imminent necessity" for conducting scale-up experiments larger than the 10-liter volumes permitted by the NIH guidelines.—N.W.

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