may have doubts as to the identity of his samples.

Goldman suggested that investigators should "report such incidents promptly to their colleagues and forcefully to their suppliers." We have now done both.

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Nonhuman Primates

A simian virus reference center has been developed at this laboratory to provide assistance for individuals working in biomedical research with nonhuman primates. With grants from NIH and the World Health Organization [*WHO Chronicle* **23**, 112 (1969)] we propose to develop a working repository for simian viruses, provide reagents such as certified reference seed virus strains and specific antiserums, furnish diagnostic services and serum survey data on viruses of both human and simian origin, act as an information exchange with other primate centers, and train students in virological laboratory procedures associated with primate investigations.

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Desalination of Cold Seawater

In "Dry lands and desalted water" (23 Jan., p. 339) Young suggests that a maximum cost of about 20 cents per 1000 gallons for desalinated water represents the limit below which irrigation agriculture using this water source can begin to be economical for certain crops. The cost of water from presently operating desalination plants is discouragingly higher. A recent study (*1*) of water production costs of the 59 largest of these plants, operating around the world, reveals that 57 percent of them cannot produce water below $3 per 1000 gallons and only 5 percent show costs below $1. Although Young points to the hoped-for cost reductions expected through engineering advances and the development of atomic reactor powered dual-purpose plants, it will be some time before these improvements can lower the cost of desalinated

water. Moreover, it is unlikely that these developments, when available, will be of help to the older existing plants.

In recent publications (*2*, *3*) J. L. Worzel and I have suggested an approach to the utilization of the marine environment, where deep ocean water (20°C colder than surface water), pumped to shore installations through large pipes, becomes a valuable resource in sea thermal power generation, atmospheric water recovery, and mariculture. We also pointed out (*3*) that desalination plants located on shores accessible to deep cold seawater could realize immediate benefits.

The water yield and performance ratio (desalinated water per unit weight of steam) in the typical multiflash distillation plant are increased by increasing the difference between the minimum and maximum water temperatures. This flashing range, which is limited on the high side by problems of scale and corrosion and on the low side by the local surface seawater temperatures [tropical and subtropical surface waters are commonly between 24° and 27°C (75° to 80°F)], averages around 55°C (100°F). By using deep water of about 5°C (41°F), available at many sites within a few miles of the shore, the flashing range can be increased by more than 30 percent with a commensurate increase in yield and performance ratio. Additional advantages would accrue in the form of reduced corrosion, reduced requirements for phosphate or acid additives used to remove scale, and reduction of the thermal and brine pollution effects of the outflow water.

To an oceanographer considering the enormous engineering effort that has gone into the design of today's desalination plants, it is remarkable that none has been built with an intake pipe extending offshore to take advantage of colder water. It will be even more remarkable if desalination plants being designed today for tomorrow's increased needs still do not utilize this feature of the marine environment where it is available.

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References and Notes

1. *First United Nations Desalination Plant Operation Survey* (United Nations Dept. of Economic and Social Affairs, New York, 1969).
2. R. D. Gerard and J. L. Worzel, *Science* **157**, 1300 (1967).
3. R. D. Gerard and J. L. Worzel, *1968 Proc. Fourth Amer. Water Resources Conf.* (American Water Resources Association, Urbana, Ill., 1969), p. 218.