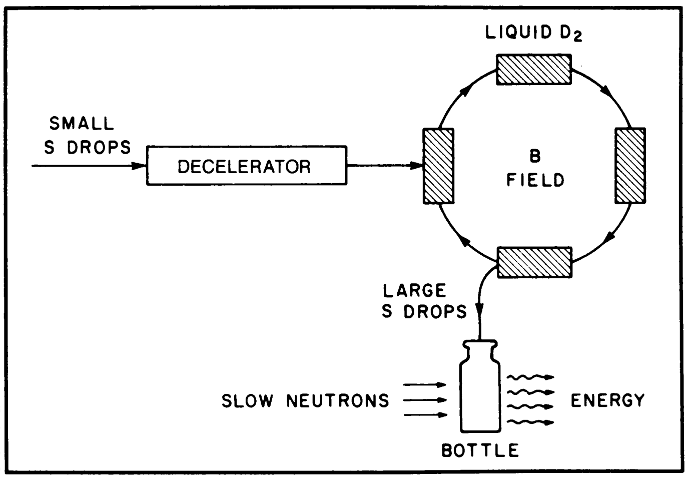
at all.

A somewhat more sophisticated approach would send in heavy ions at just the right energy so they would interact with any strange matter in the target material. The lump of strange matter would absorb the incoming nucleus, eventually getting rid of its excess energy by releasing a distinctive burst of X-rays and gamma rays.

"This signature would be totally unconventional," says Jaffe. However, because of the technical difficulties involved, no one has yet attempted this particular experiment.



In this schematic diagram of a proposed apparatus for rapidly growing small drops of strange matter (S-drops) into larger drops, the S-drops are first circulated through liquid deuterium (D_2) in a magnetic field (B), then stored in a "bottle." When stored S-drops capture slow neutrons, they release energy.

Another way to study strange matter is to make it at particle accelerators. Gordon L. Shaw of the University of California, Irvine, and his colleagues suggest a novel scheme for generating small drops of strange matter by smashing together heavy ions traveling at high speeds. The resulting small drops of strange matter, though somewhat unstable, could last long enough to grow larger and more stable by absorbing neutrons. Eventually, they would become stable enough to be isolated, slowed down and stored. Because the addition of neutrons releases a great deal of energy, the growth of stable strange matter to even larger sizes shows promise as a potential energy source, Shaw says.

One problem with making the scheme work is ensuring that the hot, low-density quark-gluon plasma created in the collision of high-speed heavy ions (SN: 10/8/88, p.229) cools in the right way to produce high-density, low-temperature drops of strange matter. No one has yet proposed a detailed mechanism for accomplishing this feat — akin to extracting an ice cube from boiling water.

"Despite these reservations, the proposal does not seem to be an expensive addition to experiments that are already in progress," Alcock comments in the Feb. 2 Nature. "As the payoff in physics would be so large if strange matter were detected, the ideas should be further explored. And the engineering ideas raise long-term prospects for energy generation."

Does strange matter exist? No one knows yet.

"The issue is far from settled," Alcock says. "Even though the experiments may be somewhat farfetched, if things work out, the possible consequences for our understanding of fundamental physics are very great."

In particular, theorists are struggling to understand how matter is put together. "We have this elegant theory of quantum chromodynamics, which is supposed to describe the binding of the fundamental constituents of all matter, but we don't know how to make it work," Jaffe says. "We can't even do something as basic as building protons out of quarks. Understanding the very special role of strange quarks is becoming the focus of the whole puzzle."

Physicists are also considering the possibility that strange matter, rather than being absolutely stable, is actually quasistable, meaning that strange matter, once created, would decay into other forms in seconds or less. A group of researchers is now planning to test the idea by putting a detector — a type of mass spectrometer — a short distance downstream from a heavy-ion collision experiment. The instrument would be close enough to the production zone to capture strange matter, even if it decayed within microseconds.

A positive result, says Jaffe, "would give us not only a lot of insight into quantum chromodynamics but also a tool for understanding heavy-ion reactions." Collisions between heavy ions usually produce complicated patterns that are hard to interpret.

The quest for strange matter is fraught with difficulty and frustration. "Not finding strange matter in a given experiment is interesting but doesn't really prove anything," Alcock says. "Finding one piece of strange matter, under any circumstances, would tell you something fundamental about physics." □

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"discrimination." But the economic bottom line is that without such screening, those of us who are healthy (and in particular, who are sufficiently "discriminating" to keep away from high-risk situations) will end up paying out-of-sight premiums for the high-risk life style of homosexuals and drug users.

John Bryant
South Pasadena, Fla.

Why did your author so studiously avoid the ultimate outrage of genetic screening: the potential for denial of life to an unborn human because he or she had the misfortune to be diagnosed in their mother's womb as having, for instance, the wrong color eyes?

Alfred R. Beronio
Martinsville, N.J.

'Fluoride is not the answer'

As a longtime researcher of the biologic effects of fluoride, I feel compelled to comment on your recent article touting a "new" fluoride treatment for osteoporosis ("Fluoride-Calcium Combo Builds Better Bones," SN: 1/21/89, p.36).

This long-held delusion that fluoride will be a safe, effective and marketable treatment for osteoporosis is what concerns me. There have been many attempts to achieve this golden result but all have failed: Fluoride is simply too toxic and its benefits are too little. Its toxicity at these high doses is not limited to gastric irritation but also shows up as pain and stiffness of joints and ligamentous structures. The slightly denser bone that eventually develops in the spine after several years of fluoride medication is disordered and lacks tensile strength. As the article indicates, the researchers reported that the treatment failed to decrease the incidence of hip fractures, which are the major debilitating effect of osteoporosis.

Wax-encapsulated tablets are not new. The fact that high-dose fluoride can result in a slight increase in bone density as measured by X-ray also is not new. The fact that it doesn't decrease the risk of hip fracture is well established. The treatment is not available to the public. In a recent special report published by Postgraduate Medicine, Louis V. Avioli, Shoenberg Professor of Medicine at Washington University School of Medicine, St. Louis, pointed out that research already exists to show that the fracture rate of a fluoride-treated group of patients actually increased in relation to that of the control group during the first year, osteoarticular side effects occurred in 47 percent of the fluoride-treated patients, hip fractures were not prevented, and fluoride was simply not worth further exploration as a therapy for postmenopausal osteoporosis.

The major defect of postmenopausal osteoporosis results from the lack of estrogen *and* progesterone. I have treated this condition for more than six years in over 100 patients with balanced estrogen-progesterone hormone supplementation and have demonstrated 15 to 50 percent increase in bone density as measured by dual photon bone mineral density tests. Clinically, the nontraumatic fracture rate fell to zero. Clearly, fluoride is not the answer; proper nutrition and hormone supplementation is.

John R. Lee
Mill Valley, Calif.