most likely to be encountered at the Center for Disease Control, and he would like to develop a catalog of other pathogenic organisms. Both groups hope that pyrolysis-GC will be used routinely if a large number of catalogs are available.

Other problems are specifically associated with the use of GC. Most GC columns, for example, are not capable of separating all the components produced by pyrolysis—although some high-resolution columns can separate as many as 200 products. Columns also undergo a gradual deterioration with extended use and frequently a rather sharp difference

Speaking of Science

An Illuminating New Use for Solar Energy

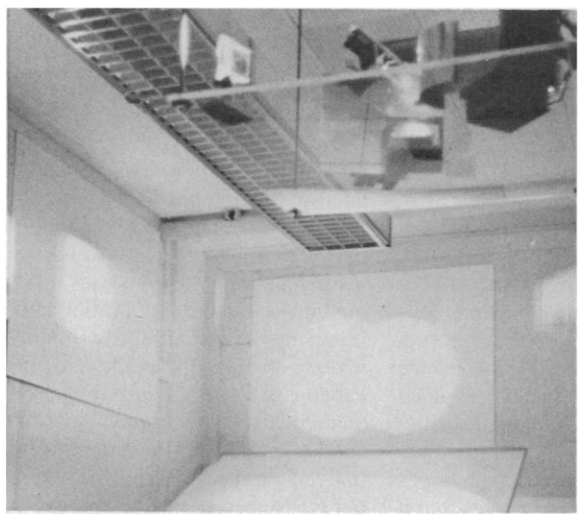
Solar-powered alternatives have been suggested as supplements or replacements for a host of traditional items—hot water heaters, furnaces, air-conditioners, electric home generators, and even central power stations. The rate at which this list has been lengthening should have been a warning that no piece of traditional technology was secure against the solar onslaught. But who would have suspected that inventors of solar-devices would propose a better way of illuminating a room than using a light bulb?

Two researchers working at a government laboratory in the southwest have conducted tests and made projections which suggest that indoor lighting is a sensible application of solar energy. In fact, they say it may be one of the more economic applications, because "the dollar value of sunlight used as light is about 10 times its dollar value when used as heat."

Put a sun-tracking mirror on the roof of a building, reflect the light onto a fixed spherical mirror, beam it into the building through a small glass porthole set in the roof, project it into the interior rooms of the building that lack windows, and the result is a solar lighting system.

In the few instances in which it has been tried, the effect is reportedly quite pleasing esthetically, and when clouds pass overhead they can be seen running across the image of the sun projected into the solar-lit room. Such a system could serve as a local weather indicator, providing a measure of psychological relief in office buildings, and could also have other benefits. If one system were used to illuminate many rooms on different floors, it could create new possibilities for interoffice communication as light beams destined for lower floors pass through the offices above.

One of the first installations of such a system for lighting purposes was at the Hyatt Regency Hotel in Chicago in 1974, where three beams were used to create a novel effect on the glassed roof of the hotel lobby. More recently, two physicists have set up a solar indoor lighting system in an office at the Sandia Laboratories in Albuquerque, New Mexico. The Sandia adaptation was motivated as much as anything by the desire of the researchers. Michel Duguay and Robert Edgar, to improve the conditions in their shut-in offices. Solar lighting has since become a full-time avocation for Duguay.



To light the Sandia office, a small flat mirror with an area of 0.3 square meters collects sunlight all day by following the sun under the direction of an electronic control circuit. A variety of mirrors and lenses split the beam inside the building and transmit the sunlight wherever it is needed. The accompanying photograph shows one corner of the sunlit office. The two circles are images of the sun projected onto a piece of white cardboard, and under the circles is a broad patch of light produced by a third beam hitting a piece of white diffusing plastic. The third beam provides illumination for a desk underneath the diffuser. Under clear skies in Albuquerque, the system provides 205 watts of sunlight, which is reported by the physicists who have tried it to be "better than the 250 watts of fluorescent lighting" that had been previously installed in the 3- by 5-meter room.

An additional advantage of using focusing optics, the Sandia researchers report, is that filters can be inserted in the concentrated beams to separate out the infrared portion of the spectrum, which produces heat but no light. Under ideal conditions, they report, about four times less heat is produced than with fluorescent lamps. The infrared need not be thrown away, however. Duguay is quite enthusiastic about using it for producing electricity in a photovoltaic cell.

Because incandescent bulbs are only 10 percent efficient at producing light from electricity and fluorescent bulbs are only 20 percent efficient, solar lighting has an advantage over the other applications of solar energy. Duguay estimates that the value of the sunlight from a 1-square-meter collector that tracks the sun in Albuquerque is $12 per year if it is used for heating or producing electricity in systems that are available today and $120 per year if it is used for lighting.

Solar lighting is not for every situation. It would seem to have limited applicability in homes, which have few interior rooms. And office buildings, which tend to have more windowless rooms, could alternatively be designed with skylights, interior courts, and light wells. Perhaps the idea is most applicable to existing buildings, but even then occupants would want electric lighting systems as well. For there is no doubt that when the sun goes down, a solar lighting system is sure to go out.—WILLIAM D. METZ