nearly 40 percent of present U.S. energy demands."

Estimates of future solar energy production are numerous and often contradictory (SN: 4/22/78, p. 243). What makes the OTA report unique is that it also grapples with major conflicts that must be ironed out before solar can spread. For example, solar equipment can use onsite storage for backup during the night or cloudy days — but it is usually cheaper to rely on conventional gas or electric backup. The report therefore digs into how more and more people going solar will affect utility rates. Another example: It is usually more efficient for an onsite electric-generating device to sell excess electricity to an electric utility, even at reduced rates, than to store it in batteries. The report not only points out that such sales are now prohibited in most areas, but it goes on to grapple with the web of problems that will arise when onsite producers start pumping power into a utility's grid.

Not just a nuts and bolts evaluation, the report also ranges into the means of making solar stick. "The primary barrier to the widespread use of onsite solar energy is not technology but economics," said Peterson during the Senate hearing. He noted that tax credits and research support are often given to utility-owned facilities. Federal policies, moreover, maintain low oil and gas prices, and thus discriminate against onsite solar equipment. Solar is growing. But to make a significant contribution to U.S. energy supplies before the year 2000, Peterson said that federal energy administrators should:

- Stimulate markets for onsite solar energy by allowing energy prices to rise to the cost of energy from new production facilities.
- Give tax credits, loan subsidies or other incentives for both consumers and manufacturers of solar devices.
- Resolve legal and regulatory barriers, particularly in utility law and in the area of "sun rights."
- Encourage international cooperation in solar research and demonstrations, especially in countries where solar energy may be commercially attractive before it enters U.S. markets.
- Ensure that adequate standards and testing facilities are available for solar energy equipment.

The OTA report noted that onsite solar "runs against the trend toward centralization which has characterized the energy industry over the past four decades." Whether or not the report will become a well-thumbed text for the "small is beautiful" crowd remains to be seen. Yet one positive response has already come from Senator Frank Church (D-Idaho), chairman of the Energy R&D subcommittee, who said that the report should become "required reading" for college-level energy courses. □

Fingerprints revealed in the laboratory

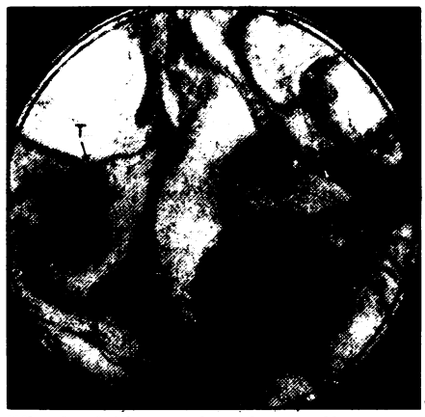
Elementary, my dear Watson. Those prints weren't made by fingers, but by foreskin cells grown in laboratory culture.

Patterns of arches, loops and whorls resembling features of human finger ridges can appear in a laboratory-produced layer of skin cells, Howard Green and Judith Thomas report in the June 23 SCIENCE. The patterns reflect intrinsic skin cell properties that may help to explain how human fingerprints develop during embryonic growth.

Green suggests that the movement of embryonic skin cells winds the digital ridges into their characteristic swirls. Because the ridges are curved when they are first seen in embryos, researchers previously assumed the ridges emerge already in their definitive pattern.

Ridges of skin cells can form by different processes. In the embryo the ridges peak over epidermal folds, where the proliferation of skin cells is greater than in the surrounding area. Laboratory ridges arise when two masses of cells growing on a plate collide. But the forces generating curvatures of the ridges in culture should also be acting on embryonic fingers, the Massachusetts Institute of Technology researchers say.

Complex ridge patterns are characteristic only of the palms and soles of primates.



Green and Thomas/Science

Whorls of ridges make cultures of human skin cells resemble fingerprints.

Yet in laboratory culture, the patterns are produced by skin cells from different locations and by related cells. All the cells observed to make whorl patterns in culture, or in primates, are keratinocytes. The investigators suggest that the pads underlying primate palms and soles permit skin cells freer movement than elsewhere on the body, a freedom also found in cells in culture.

If movement is crucial, cells burdened with the mass of an extra chromosome should be hindered in pattern formation, Green suggests. Other investigators have reported fingerprints of diminished complexity among people with extra, genetically inactive X and Y chromosomes. The slight difference in male and female fingerprint complexity may result from the extra bulk of the second X chromosome (compared to the smaller Y).

Besides uncovering factors that contribute to the molding of individual dermatoglyphs, Green hopes studies of skin cells in culture will provide clues to greater mysteries of control of cell movement and of local influences on development. □

The born-again spleen

Beyond the expression, "Venting your spleen on someone," the spleen is a lesser-known body part indeed. But it does some important things for the human body. It is a large organ of the lymphatic system located near the stomach that functions as a blood reservoir, blood and lymph filter and as a source of antibodies. It is the chief organ involved in the destruction of worn-out blood cells.

Now an intriguing ability of the spleen has been discovered — the ability to regenerate after it has been virtually destroyed, and at a site different from its original one. True, the liver and small intestine can also regenerate if mostly destroyed, but only at their home sites in the body.

Specifically, Howard A. Pearson and his pediatrics-surgery team at Yale University School of Medicine report in the June 22 NEW ENGLAND JOURNAL OF MEDICINE that 13 out of 22 children who had emergency splenectomies because of trauma to their spleens gave evidence of forming new spleens one to eight years later, despite the prevailing opinion that spleen rejuvenation is rare. And the new spleens seemed to form, not at their original locations, but by sending a few spleen cells remaining after surgery to the small intestine. The cells then used blood circulation from the small intestine to get established and to replicate themselves, eventually forming a new spleen. □

Press goes to Peking

A 14-member delegation of government scientists, headed by Frank Press, President Carter's science advisor, will fly to the People's Republic of China for four days of talks from July 6 to 10. Stress will be on areas of interest to the Chinese, such as agriculture, energy and medical research. This is the first time that China has agreed to government-to-government talks on science and technology. The heads of the National Aeronautics and Space Administration, the National Science Foundation, and the National Institutes of Health will also go. □