

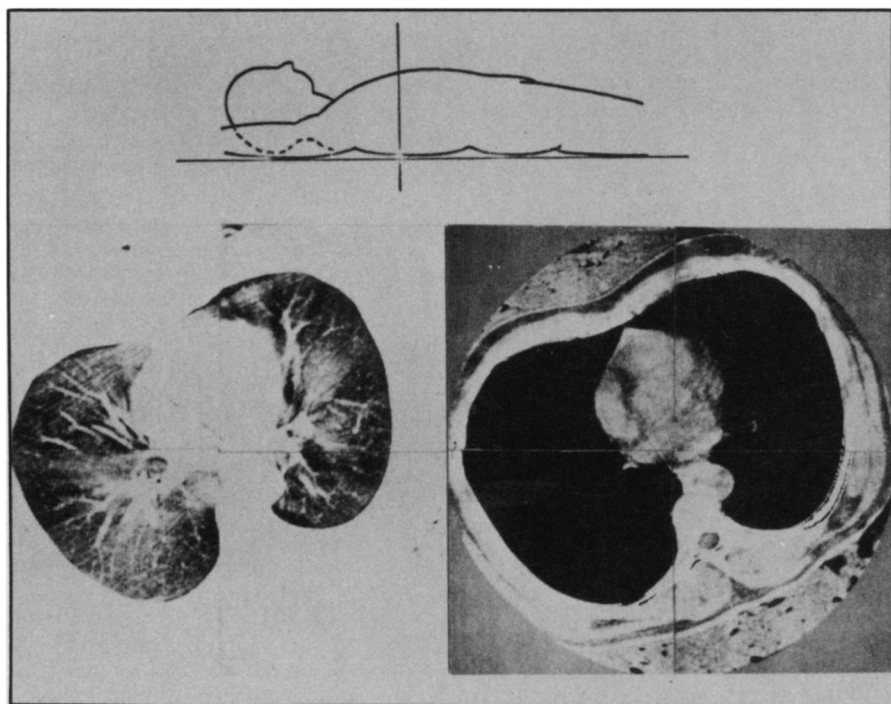
nitrogen fixation in soybeans is an inadequate supply of photosynthate in the root nodules. This leads them to an important conclusion: "Improved photosynthate production by cereals such as wheat and rice may be a prerequisite for the useful extension of any biological nitrogen-fixing system to these crops." This is one goal of current research.

In an interview with *SCIENCE NEWS*, Abelson discussed the related matters of energy and food that were covered in two special issues of *SCIENCE*. He disagrees with the pessimism of *NAS* President Philip Handler (*SN*: 11/2/74, p. 278), calling the concept of triage "inhuman" and saying population can indeed be brought under control in time. In his opinion, the

United States should continue to provide food aid to those countries suffering the most, without griping too much about the extra cost of producing the food because of rising Arab oil prices. Only a fraction of our energy consumption goes to agriculture, he says—the real problem is "those damn two-ton gas-guzzlers;" all our crops could be raised on a fraction of domestically produced petroleum.

The problem finally becomes one of time, whether developing nations can control population faster than the industrialized ones did. "For reasons Malthus could have hardly foreseen," Poleman concludes, "the misery and vice about which he brooded may yet be visited on much of the world." □

EMI scanner: Now for the body



EMI horizontal chest scan shows (l) lungs with blood vessels and (r) lungs and heart.

Three years ago, a British electronics research firm—EMI Limited of Hayes, Middlesex, England—introduced a brain scanner that has revolutionized neurological diagnosis.

The EMI brain scanner, as it is called, offers views of the brain which are not available or are only poorly available with conventional X-rays, nuclear scans, angiograms and pneumoencephalograms, thus helping neurologists better diagnose brain tumors, blood clots, lesions of the optic nerves and other brain abnormalities.

The brain scanner is safer than conventional diagnostic techniques because it requires minimal exposure to X-rays and radioactive dyes. It is quicker than conventional techniques because it takes only several hours on an outpatient basis compared to three or seven days in the hospi-

tal. And it is more economical, costing a patient about \$200, versus \$1,000. What's more, the brain scanner is painless, which several of the conventional techniques are not, since they require the injection of dyes, air or gas into the brain (*SN*: 9/1/73, p. 134). Some 80 EMI brain scanners are used in the United States alone.

Now EMI Limited has developed an EMI body scanner based on the same principle as the brain scanner. It promises to revolutionize the diagnosis of various bodily ailments, such as the enlargement of, or changes in bone, organs or tissues caused by cancer, heart disease, lung diseases or other illnesses. Like the brain scanner, it also offers certain advantages to the patient over conventional X-ray diagnosis.

The way the brain or body scanner works resembles this pattern: A device is

placed around a patient's head or body. On one side of the device is an X-ray beam source; on the other side is a crystal. The device rotates 180 degrees around the patient's head or body. As it moves, the X-ray beam source shoots 160 different areas of the brain or body. The amount of radiation that passes through the head or body with each scan is then picked up by the crystal on the opposite side of the device.

The crystal digitizes the amount of radiation, and the information is fed into a computer. Thus the computer digests some 160 scans, which consists of solving some 28,000 simultaneous equations. The computer then turns out a three-dimensional picture of the brain or of a certain area of the body. Conventional X-ray diagnosis provides only a two-dimensional picture of the head or body since X-rays are shot through only one place on the head or body.

The EMI brain or body scanner provides a hundred times more information about the brain or body than X-rays and other diagnostic techniques combined. The brain scanner, for example, shows the difference between white and grey matter in the brain; conventional X-rays do not. It also shows up lesions in the optic nerve that have not been visualized before, and it reveals brain tumors and blood clots that are difficult to pick up using conventional diagnostic techniques.

The body scanner shows up bones, organs and tissues that appear fuzzy or do not appear at all on conventional X-ray pictures, because the computerization of data by the scanner picks up extremely small differences in density which are impossible to show with ordinary X-rays. Thus the scanner should provide physicians with valuable information about organs, bones and tissues that otherwise would only be revealed by exploratory surgery.

The full potential of the body scanner is not yet known. Clinical trials with the scanner will be starting shortly in Britain at the Northwick Park Hospital, Harrow, Middlesex, and in the United States at the Mayo Clinic in Rochester, Minn., and at the Mallinckrodt Institute of Radiology in St. Louis.

"This new method of examination is destined to bring about a complete transformation in the use of X-rays in medical diagnosis," declared EMI's research director, W.E. Ingham. "It is as though a doctor can hinge open the patient's body at any point he chooses. . . ."

The body scanner also holds certain advantages for the patient over conventional X-rays or exploratory surgery. It can be done on an outpatient basis, so it should be quicker and less expensive. The scanner also exposes the patient to less radiation than conventional X-ray diagnosis because its electronic detection system is more sensitive than X-ray film is. Hence less radiation has to be used. □