

involve a more complex sequence of manoeuvres than initially planned, thus consuming greater quantities of fuel. In addition, the extra time needed to direct the equipment towards a particular target would severely limit the amount of data received.

Voyager 1 was launched last September, and is now over 200 million miles from earth. It is expected to start taking photographs of Jupiter and making spectral scans of the hydrogen

cloud surrounding the planet in December, 80 days before reaching the planet.

In late February 1979, eight days from Jupiter, it will begin coverage of the entire planet with its wide-angle camera, while the atmospheric infrared and ultraviolet spectrometers and the photopolarimeters will obtain data on atmospheric composition, temperature variation in the atmosphere, and the possibility of solid particles in the

clouds. Observations are, at present, planned to continue at least until April 1979.

A technical problem involving a jammed photopolarimeter filter wheel on board the sister spacecraft Voyager 2, which was launched 12 days earlier than Voyager 1 but on a slower trajectory, and will not reach Jupiter until July 1979, has already been successfully remedied.

David Dickson

## Cassava may lead to mental retardation

CASSAVA is the world's seventh most important foodcrop, following the major cereals, potatoes, and yams. Production is in the neighbourhood of 100 million tons, and it is likely to double by the beginning of next century. A major advantage of cassava is that it can grow on poor soil with little rain; it is the principal source of carbohydrates for about 300 million people, most of them in the developing countries of the tropics.

This background underlines the importance of the findings reported by a team of Belgian researchers, headed by Dr André-Marie Ermans of the Department of Radioisotopes at the Saint-Pierre Hospital, University of Brussels. In a study of the population of Idjwi Island on Lake Kivu, Zaire, they have shown that a steady diet of cassava inhibits iodine uptake by the thyroid gland. When iodine supply is marginal, this can cause endemic goiter, cretinism, and mental retardation.

The Belgian researchers are now following up their study with a campaign in the Ubangi region, in the north-eastern part of Zaire, where goiter is endemic in a population of about one million. They have found that 60–70% of the inhabitants have endemic goiter, and 1–10% are affected with cretinism. In addition an unknown number of people suffer from varying degrees of mental retardation. The objective of the campaign, financed by the Belgian government, the Zaire Institute for Scientific Research, and Canada's International Development Research Centre, is to eradicate goiter and cretinism in the Ubangi region. Some 300 000 people have already been "vaccinated" by receiving intramuscular injections of an iodine suspension in oil, that diffuses into the organism over a period of three to seven years; 700,000 more injections are planned.

Congenital hypothyroidism, with its sequels, notably cretinism, is one of the most widespread diseases in the tropics. In the past ten years or so, epidemiological studies in Africa, South America and Asia have revealed that more than 200 million people may be

affected by goiter. How much cassava, as a staple food, may contribute to this is yet to be determined.

In the past great emphasis has been laid on research to improve cassava



Cassava grinder

productivity and utilisation, but the findings of the Belgian team point to new, and imperative, avenues of research: the prevention of cassava-mediated hypothyroidism, better ways of de-toxifying the tuber before it is consumed, and the development of new lines that do not contain the chemicals responsible for this form of toxicity. (Cassava contains cyanogenic gluco-

sides; when ingested, these glucosides are detoxified, yielding thiocyanate as a by-product which inhibits iodine uptake by the thyroid.)

These findings, of major importance to developing countries in the tropics, are not without implications for industrialised countries. In Central Europe and in regions along the Mediterranean, where there is limited supply of iodine in food, other vegetables, such as cabbage, may have a similar effect.

François Delange, a Belgian paediatrician, who is participating in the Zaire programme, has carried out a study in cooperation with Sicilian physicians, and found that high thiocyanate levels are associated with goiter on the island. It is known that in Belgium the iodine content of food is rather low, and tests carried out on 1,800 newborn in Brussels have shown that 14 of them had thyroid insufficiency. If this is not corrected at an early stage, some of these children may become mentally retarded.

The Belgian version of screening for congenital hypothyroidism has certain advantages. It relies on the measurement of the pituitary hormone TSH (thyroid stimulating hormone). A high level indicates transient or permanent thyroid insufficiency. The advantages of the test is that it can be made on a single drop of dried blood, that it can be automated, and is relatively inexpensive (about \$3). It is likely that, as of the end of the year, it will be administered routinely to all newborn children in Belgium.

Alexandre Dorozynski

## Genetically engineered bacterium patented

The first patent for a genetically engineered microorganism has been granted by the US Court of Patent Appeals to General Electric for a bacterium which degrades crude oil more completely than any bacterium found in nature. A strain of *Pseudomonas* that can degrade about 60% of crude oil has been developed in General Electric's New York Laboratories by one of their biologists, Dr A. Chakrabarty.

Many strains of *Pseudomonas* naturally contain small loops of DNA coding for the breakdown of many of the complex organic compounds making up crude oil, but each strain by itself can only degrade a few of the compounds. Over the past few years, Dr Chakrabarty has constructed strains of *Pseudomonas* containing several of these DNA plasmids, thus extending the range of compounds that this bacterium can attack. □