## SCIENCE DIMENSION



National Research Conseil national Council Canada de recherches Canada

## Vol. 11, N° 4, 1979

ISSN 0036-830X Indexed in the Canadian Periodical Index

This publication is available in microform.

## CONTENTS

- 4 Threading the eclipse needle Sun blanked out
- 8 Lighting laboratory Research to reduce energy consumption
- **14 The Crash Position Indicator** Locating crashed aircraft
- **18 The Batfish** A versatile oceanographic research vehicle
- **22 Medicine at the molecular level** Drug action revealed
- **26 Fibres and fabrics** 50 years of research

Science Dimension is published six times a year by the Public Information Branch of the National Research Council of Canada. Material herein is the property of the copyright holders. Where this is the National Research Council of Canada, permission is hereby given to reproduce such material providing an NRC credit is indicated. Where another copyright holder is shown, permission for reproduction should be obtained directly from that source. Enquiries should be addressed to: The Editor, Science Dimension, NRC, Ottawa, Ontario. K1A 0R6, Canada. Tel. (613) 993-3041.

Editor-in-chief Loris Racine

Editor Wayne Campbell

Executive Editor Joan Powers Rickerd

Design ACART Graphic Services

Editorial Production Coordinator Patricia Montreuil

## The energy jig-saw puzzle

The energy problem. Most people are confused or stunned by the scraps of information they read and hear. Few have the time, or perspective, needed to construct a complete picture from such glimpses.

But Dr. Leslie Cook does. He is a former vice-president of NRC, and has worked in the nuclear, electrical and oil industries. Recently, he returned to Ottawa from the United States to deliver a lecture (one of a series on Canada's Energy Future) in which he attempted to put the pieces of the energy jig-saw puzzle together.

According to Cook, Canada — and the world — is not facing an *energy* problem, but an *oil* problem. Oil is the one fuel we cannot do without. It is absolutely essential for producing mobile work — for powering cars, trucks, combines, earth movers, airplanes. Our entire way of life here in the Northern hemisphere is based on oil.

The problem is not that we are running out of oil — there is more untapped oil in the Canadian tar sands than in all the Middle East — but that the cost of getting it out of the ground is soaring. Ten years ago, it cost about \$200 to find and tap a unit flow of oil of one barrel per day in the Middle East. That figure jumped to about \$10,000 for the North Sea. The pilot plant at the tar sands in Alberta cost \$16,000 per barrel-a-day unit of capacity, and future plants will cost more. Getting a flow of oil of one barrel per day from the ocean floor off Labrador is projected to cost at least \$20,000.

Already we are beginning to feel some effects of these changes. Soon we will feel their full force. The bulk of the oil we hope to use in the 1990s has not yet been discovered or developed, and unless capital is invested

The energy problem. Most people are confused or stunned by the scraps of information they read and hear. Few decade of incredible turmoil.

Where will the capital come from? From us, the customers.

How? Through higher prices, higher taxes, more government sharing in the costs and risks of producing energy.

We will be forced - not just encouraged, but forced - to conserve oil for its one indispensable use, powering mobile engines. Other sources of power, such as coal and nuclear fission, will have to be used in many of the places where we now use liquid fuels, even though they may be technically inferior. We can burn coal instead of oil in our furnaces, as we did 60 years ago. Oil replaced coal because it packs far more punch in a small volume, but in the near future we will have to go backwards to this inferior technology, and on a massive scale. No individual, corporation or government has any experience in such regress, and no one wants to lead the way

We will also have to improve the efficiency with which we use oil. Cars, the most familiar of our mobile engines, have been designed more for comfort and convenience than for hauling weight along the road. The push delivered by the wheels of a car is only about two per cent of the energy in the gas tank, very little, and wasteful, when compared to, say, electrical generating plants, where 40 per cent of the energy in oil is converted into useful work in the form of electricity.

For researchers, the challenges and opportunities are immediate. As a senior General Electric executive told Dr. Cook recently: "Unless we get going now, we may not be able to get there from here." Séan McCutcheon



2