acceptance of any model until more observations are completed. His studies of magnetic anomalies caused by certain star groupings are helping to devise a more accurate picture of the Galactic field.

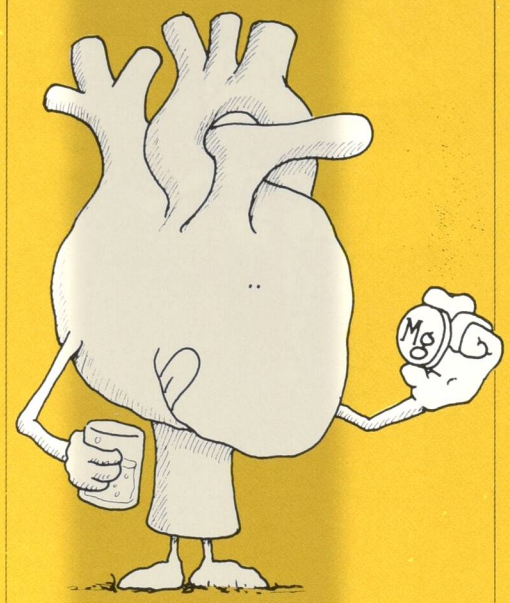
Using the Algonquin Park Radio Telescope, he has been making detailed studies of our "home" arm of the Galaxy — the Orion Arm. Scattered there, within 1500 light years of our sun, he and his colleagues have detected the presence of "bubbles" in the magnetic field lines. These distortions are caused by the pressure of gas and dust particles given off by the stellar winds of hot stars and by giant stars which have exploded in supernovae. Stellar winds and supernovae, the most violent of stellar events, produce enough energy to push like a snowplow against the surrounding material. The snowplowed gas and the field lines form a "bubble" in an otherwise regular structure. Mapping the curves of the bubbles and comparing them with the probable general structure can test proposed models against the data. To date, Vallée and his colleagues have located four of the distortions in the Orion Arm and are seeking others in the adjacent arms.

For your heart's sake

Whether they are aware of it or not, Newfoundland residents share a problem with people living in Japan and Finland. They are prone to hypertension, and hence, to heart disease. The shared cause is the high sodium (Na) intake in their diets (chiefly through heavily salted foods, like salted fish or soya sauce) and the low magnesium (Mg) levels in their drinking water.

In a recent paper, John Marier, of NRC's Environmental Secretariat, summarized the effects on the heart of magnesium levels in drinking water. In two studies conducted in the United States, coronary death rates were lower in cities with higher than average magnesium levels in the water.

Why should waterborne magnesium be so important? The answer may be found in the changing diet in North America and in other developed countries. Doctors have known



for some time that a certain intake level of magnesium is necessary for healthy heart tissue. Apparently, the traditional source of the element has been from bulk cereals, but we have increasingly turned to more processed versions of these foods, like polished rice, refined sugars and flours, and other non-cereal starch sources low in magnesium. It has now reached the point where in much of the modern world dietary magnesium intake ranges from minimal adequacy down to 50 per cent of the recommended intake. (Sugar refined from cane to the granulated form loses more than 99.9 per cent of its Mg; polishing rice removes 83.3 per cent; bleached flour has lost 96 per cent.) Higher levels of magnesium in the drinking water, then, compensates for the widespread deficiency.

The problems resulting from Mg deficiency are compounded when sodium or calcium intake levels are high, as they are in Newfoundland, Japan, and Finland. The healthy heart needs a balance of Mg and these other elements. In studies of various regions of the world, coronary death rate has been directly correlated with the dietary ratio of calcium to magnesium (Ca:Mg), i.e., too much Ca or too little Mg causes heart disease.

Marier's paper concludes with a strong recommendation for dietary magnesium supplements to reduce the Na:Mg ratio in areas like Newfoundland, Japan, and Finland. A simple solution indeed.

Insulin Overdose

If genetic engineers share any common dream, it is to create a microorganism that pours everything into carrying out the gene instructions they introduce by the new recombinant DNA techniques. Inducing microorganisms to 'express' valuable inserted genes, or to 'promote' them as scientists would say, has been a problem, particularly with higher organisms like yeasts. Now, researchers at NRC's Division of Biological Sciences appear to have come up with just such a blindly obedient bug. The microorganism, *E. coli*, which has had the gene for the human hormone insulin spliced into its genetic material, synthesizes so much of the protein that it quite literally commits suicide by drowning in the foreign substance. Electron micrographs of the bacteria show widespread darkened areas within the cell bodies that correspond to the hormone. These cells are much larger than normal bacteria, and, according to Dr. Ross Colvin, an expert in interpreting such pictures, they look unhealthy, and seem incapable of reproducing themselves. The dar-

kened regions indicate a mass of material that is insoluble in the cellular fluids, he says, which correlates well with what the scientists know about their hormone gene. To guard against degradation of the insulin by bacterial defensive enzymes (remember that it is alien material), the gene for one of the bacterium's