

## A Coriolis effect for continents

Most theories on the causes of continental drift involve some kind of thermal convection in the mantle. Martin F. Kane of the U.S. Geological Survey has developed an alternative mechanism that links plate movements with known slow changes in the position of the earth's pole of rotation.

The mechanism he describes could be classified as a Coriolis effect. The concept explains the apparent deflection, due to the earth's rotation, of any object in motion. The Coriolis effect plays an important role in the large-scale clockwise or counterclockwise (depending on the hemisphere) circulation of the atmosphere and oceans.

In his concept he envisions, for example, a continent at the equator. As a result of a gradual change in the position of the earth's pole, the continent is at some later time displaced north of the (new) equator. In the latter situation, there will have been a loss of rotational inertia, because the continent is not as far from the axis of rotation as it had been. But the laws of physics say angular momentum is preserved. This is accomplished, he suggests, by a latitudinal (in this case easterly) movement of the continental plate in relation to the surrounding crust.

This type of polar movement could cause the part of a continental plate north of the equator to tend to move east and that part south to move west. The resulting

stresses could, he suggests, cause separation of the plates along existing lines of weakness.

In the March 24 *SCIENCE*, Kane compares the path followed by the north pole over the past 230 million years with the pattern of continental breakup and drift described by Robert S. Dietz and John C. Holden (SN: 10/3/70, p. 293). The continental movements that Kane's model predicts would result from these pole changes is "in reasonably good agreement" with those that actually took place, he says.

Kane points out that his theory also fits well with proposed links between seismic activity and polar wobble (SN: 12/12/70, p. 453). The total annual energy change predicted by Kane's theory as a result of observed annual changes in pole position is approximately equivalent to the amount of energy released annually by earthquakes. Kane suggests that polar wobble creates strain in a plate as it slows down or speeds up and this strain is manifested as earthquakes.

Kane says that though his theory has not been rigorously tested it fits the general patterns of observations and has advantages over thermal mechanisms. The problem with convection cells, he says, is that they are hard to quantify—their dimensions and elements are difficult to define. His model, on the other hand, is a relatively simple mechanical system in which elements can be defined precisely and predictions can be made. "It's a more tractable system," he says.

pressure to expand enrollment and provide educational opportunity for all Americans—particularly minorities and women. The commission recommends aggressive enforcement of immigration laws and civil and criminal sanctions on employers of illegal aliens. But the United States has traditionally said, "Give me your tired, your poor, your huddled masses . . .," and immigration has always supplied needed cultural inputs. With these considerations in mind, the commission says immigration should be kept at the present level.

The United States is becoming an almost totally urban society, and the commission recommends comprehensive planning to improve urban development and eliminate current patterns of racial and economic segregation. This should be done on an over-all metropolitan and regional scale—not through the current, fragmented city and country approach. Specifically, it says action should be taken to "reduce the dependence of local jurisdictions on locally collected property taxes."

Throughout the report, the commission notes that all recommendations are for the present and should be flexible, subject to future research. But, it notes, there is often as much as a two-year delay in the publication of such research. It suggests speeding up and modernizing the processes. The decennial census for instance, should be supplemented by a mid-decade census of the population. Expanded research would be coordinated through a National Institute of Population Sciences

within the National Institutes of Health, an Office of Population Growth and Distribution within the Executive Office of the President and a joint Congressional committee to provide legislative oversight.

Immediate implementation of all recommendations is not expected, but neither is immediate rejection. (The Commission on Marijuana and Drug Abuse recommended decriminalization of Marijuana [SN: 3/25/72, p. 197]. President Nixon rejected that tactic before and after he read the report.) Instead, the population commission hopes to see many of its recommendations turning up in future legislation. Last week, for instance, the Senate passed the Equal Rights Amendment and the Supreme Court ruled that unmarried persons should be allowed to purchase contraceptives. Both were recommendations of the population commission. □

## Prostaglandins: Involved in dental disease

Periodontal, or gum disease might well be considered the dental nemesis of all persons age 21 and over. More adult teeth are lost from this disease than from decay, accident or other causes. In fact, thousands of dentists are saddled with the job of annually yanking out millions of perfectly good teeth and replacing them with dentures. The reason is that the bony foundations of the teeth have been eroded by perio-

dontal disease.

True, the removal of plaque, a substance formed by colonies of bacteria that thrive on teeth and gums, may help stave off the disease. More and more dentists are motivating their patients to follow home plaque-removal measures. Warding off a disease, though, is a far cry from curing it once it sets in. Now a San Francisco scientist has laboratory and clinical evidence that both explains the causes of periodontal disease and provides a possible cure for it.

Jo Max Goodson of the University of California Dental School reported last week at a general session of the International Association for Dental Research in Las Vegas that he has found that local application of prostaglandins, secondary hormone messengers present in humans and animals (SN: 10/10/70, p. 306), can destroy the cranial bone of rats within several days' time. The lesions produced were similar to those caused by periodontal disease in alveolar, or teeth bone. Second, Goodson has found that bacteria from the mouth, which are implicated in dental disease, produce prostaglandins. "As far as I know," he says, "this is the first indication that bacterial species may be capable of synthesizing prostaglandins." (Prostaglandins have been discovered in other lower animals recently—in coral—by A. J. Weinheimer of the University of Oklahoma.

Consequently, Goodson is now trying to show that prostaglandins from bacteria actually erode the alveolar