

## 'Canals': 'Monuments to imprecision'

The famed Martian "canals" that began their popular existence with the work of Schiaparelli in 1877 not only fail to represent an intelligently produced mass transportation system, but they scarcely even match physical features on the planet's surface, according to a pair of Cornell astronomers.

Based on data from the 1971 Mariner 9 spacecraft, which photographed the whole of Mars at 1-kilometer resolution and portions at a mere 100 meters, Carl Sagan and Paul Fox of the Cornell University's Laboratory for Planetary Studies report in the August ICARUS that "the vast bulk of classical canals correspond neither to topographic nor to albedo features, and appear to have no relation to the real Martian surface." There are no more than 10 or 20 so-called canals that truly fit with observed features, they report, and no more than half a dozen "whose reality is beyond question."

Sagan has said repeatedly that one of the most striking features of Mars is the radical changes caused in its surface appearance by vast amounts of windblown dust, which can cover old features and reveal new ones in a matter of days. But, says the ICARUS article, "since Mariner 9 was in orbit around Mars for more than half a Martian year, it is unlikely that the planet was viewed at a time when canals were not to be seen."

In fact, the authors report, "We have the impression that there exists an anticorrelation between the cartographic accuracy of a [Martian] map and the number of canals it displays. The vast majority of canals appear to be largely self-generated by the visual observers of the canal school, and stand as monuments to the imprecision of the human eye-brain-hand system under difficult observing conditions."

## Salyut photos yield diverse data

Research conducted during the Soyuz 18/Salyut 4 mission, which set a Soviet manned space flight record of 63 days by the time the Soyuz descent stage landed July 26, has yielded data on matters ranging from earth's noctilucent clouds to black holes, according to Soviet officials.

About 8.5 million square kilometers of Soviet territory were photographed during the flight for earth-resources, mapping and presumably other reasons. (Soviet officials declined to take part in a joint earth-photography program with the United States during the Apollo-Soyuz mission, which took place while Soyuz 18 was in orbit, on the stated grounds that non-participating countries would be photographed without their permission.) Besides the glowing noctilucent clouds, atmospheric photography included the "polar lights," apparently aurorae. About 600 pictures of the sun were taken with Salyut's solar telescope, and emissions were recorded from 10 deep-space X-ray sources. "Data has been obtained with the orbital station," a Soviet source also reported, "that the star Cygnus X-1 is a black hole," presumably based on X-ray studies.

Launched May 24, Soyuz 18 carried cosmonauts Pyotr Klimuk and Vitaliy Sevastyanov, who were the second group to occupy the Salyut 4 station. Soyuz 17 cosmonauts Aleksei Gubarev and Georgi Grechko were the first in January and February, followed by an unsuccessful attempt in April.

## French-Soviet space agreement

Eleven areas of space research have been specified for coordinated efforts over the next decade in an agreement signed by French and Soviet officials. Though actual programs have not yet been defined, areas include biology, meteorology, planetary studies and others, with particular emphasis on infrared and gamma-ray astronomy and earth resources exploration.

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## Warming in Southern Hemisphere

In problems of global climatic change, we are all too often guilty of what might be called Northern Hemisphere chauvinism. The unusually warm weather in the north from 1890 to 1940 and the cooling trend since then are now widely known, and there has been much discussion about whether the earth could be descending into an ice age (SN: 3/1/75, p. 138). But such assumptions are derived mainly from Northern Hemisphere data. And data used from the Southern Hemisphere is usually limited to areas north of latitude 40 degrees south.

Two scientists from the University of Otago in New Zealand have analyzed extensive records of temperature, rainfall and air pressure for 10 locations in New Zealand. They find that climatic trends there in the past century have exactly countered those in the Northern Hemisphere.

The period 1900 to 1935, when the Northern Hemisphere was experiencing some of its warmest years, was the coldest over New Zealand in recorded history. Conversely, in the past three decades the New Zealand area has warmed up (by 1 degree C.) while northern continents have been cooling rapidly. New Zealand is now enjoying its warmest weather since temperature measurements began. The investigators, M. J. Salinger and J. M. Gunn, say in the July 31 NATURE that the data call into question climatic predictions computed with little regard for Southern Hemisphere data from south of the 40th parallel.

## The collision of India and Eurasia

It is now well accepted that the collision of northward-moving India with Eurasia some 40 to 50 million years ago created the Himalayas. Peter Molnar and Paul Tapponnier of the Massachusetts Institute of Technology have analyzed Asian tectonics to better understand the details of this particular massive continental collision. The effects, they find, are wider than often supposed. Their report is in the Aug. 8 SCIENCE.

They conclude that most of the large-scale tectonics of Asia are the result of the India-Eurasia continental collision, "which apparently not only created the Himalayas but also rejuvenated an old orogenic belt (Tien Shan) 1,000 kilometers north of the suture zone, caused important strike-slip faulting oblique to the suture zone and as much as 1,000 kilometers from it, and perhaps ripped open two rift systems 2,000 kilometers away. It is no wonder that relative motion between India and Eurasia decreased markedly at the time of the collision."

Nevertheless, they point out, these two giant crustal plates continue to converge at a rate of about 50 millimeters a year. This, they say, "surely must place an important constraint on simple models for the driving mechanism of plate tectonics, which consider only forces equivalent to pushes from ridges and pulls by downgoing slabs."

## Listening for the sounds of earthquakes

Preliminary results of a pilot study to listen to the audio output of microseismic activity along the San Andreas fault indicate that monitoring acoustic emissions may prove helpful as a tool for predicting earthquakes. The research, conducted by the California Division of Mines and Geology, is reported in the July CALIFORNIA GEOLOGY.

The preliminary study has definitely detected acoustic emissions in small but varying amounts at some six stations. According to geologist C. Forrest Bacon, the results seem to hold some promise for prediction, although the critical question, whether there are detectable variations in acoustic microseismic emissions just prior to quake-causing movements along a fault, remains to be answered.

105