

Soyuz is not a trolley-bus, but Comecon flights continue

SIGMUND Jähn, the first East German cosmonaut, together with his Soviet flight-partner Valerii Bykovskii, returned to Earth last Sunday, after a week aboard the Salyut-6 orbiting station. Jähn, the third non-Soviet cosmonaut to visit Salyut, completes the first phase of "international" flights; further launches, with the participation of cosmonauts now in training from other Comecon countries are scheduled for next year.

The manned "Interkosmos" programme, in which the Soviet Union puts into orbit crew members from her Comecon allies did not at first meet with the approval of the entire Soviet scientific establishment. Academician Anatolii Aleksandrov, President of the Soviet Academy of Sciences, was reported to be against any such non-Soviet participation ("Soyuz is not a trolley-bus!"). The programme appears to have been inaugurated partly as a visible expression of fraternal solidarity, and, more practically, as a recompense for the contributions made to the Soviet space programme by the Comecon allies. (It is notable that the first three countries to be honoured by a flight were Czechoslovakia, Poland, and East Germany, whose contribution has been particularly great).

As regards Jähn's particular contribution to the joint mission, one experiment, at least, codenamed "Rech" makes use of his linguistic background. During all communication sessions, he had to repeat "Zwei hundert sechs und zwanzig", so that the parameters of his speech—tone, volume, rate, etc., could be monitored and related to his physical and psychological reaction to weightlessness. (The significance of the number 226 is not clear—nor why the experiment could not have been performed using a Russian repeating "Dvesti dvadtsat' shest'!")

Reaction to weightlessness was the underlying theme of most of the East German experiments, including tissue culture and bacteria metabolism experiments, and an investigation of the cross-linking of micro-organisms and organic polymers. This last used "a Soviet apparatus modified by GDR specialists" (essentially a complex of polythene bags).

And, as in previous "international" flights, the "Splav" furnace was used to produce semiconductor compounds—in this case lead-tellurium and bismuth-antimony compounds, the experimental capsule being renamed for the occasion "Berolina". **Vera Rich**

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Taj Mahal out of danger?

THE Indian Government is considering a report from a committee of experts, headed by the chairman of the Indian Petrochemicals Corporation, Dr S. Varadarajan, on how pollution from an oil refinery being built near Agra will affect the Taj Mahal. The committee began its investigations four years ago after fears in scientific circles and in the press that sulphur dioxide waste from the refinery at Mathura 146 km south of New Delhi, would damage the white marble of the Taj Mahal and red sandstone of other historical monuments at Agra, 40 km farther southeast.

The committee's studies revealed that the sulphur dioxide content of the air in Agra is already 15 to 20 micrograms/m³ because of two power plants, numerous small industries and a railway shunting yard there. The refinery, according to the report, would only add a further 1 to 2 micrograms/m³ in the long term, although short-term peak concentrations of 65 micrograms/m³ might be expected under the worst meteorological conditions in winter.

Meanwhile the Government also engaged an Italian firm, Techneco, which specialised in the damaging effects of pollution on marble, to study the problem. The firm in its report ruled out any potential threat to the Taj from the refinery. Another study by the Indian Meteorological Department (IMD) on the expected ground level concentrations of sulphur dioxide in the Agra region because of the refinery also sought to allay the apprehensions. None of the two reports have been made public so far.

However, some experts and technical agencies have expressed doubts about the validity of the findings of Techneco and IMD which they say are based on wind data not of Agra but of Delhi. They alleged that the mathematical models, which were developed abroad, and the constants used were not appropriate for the local weather conditions. The Archaeological Survey of India, which is responsible for the maintenance and conservation of the monuments, is of the view that the emissions from the refinery would certainly discolour and wear away the white marble of the Taj.

Further critics say the Varadarajan committee has avoided the main issue: the report does not say in unequivocal terms whether the threat does or does not exist. They point out that the terms of reference did not include the possibility of shifting the refinery to another site away from Agra. (The Minister of Petroleum and Chemicals, Mr H. N. Bahuguna, had reportedly given the assurance last year that he would reconsider the moving of the refinery to Etawah, 100 km east of Agra, if the expert committee definitely said there was potential danger to the Taj.)

Nevertheless the committee recommends some control measures: that long-term emission of sulphur dioxide from the refinery should be limited to 1 to 2 micrograms/m³ and that three monitoring stations should be set up between the refinery and Agra to keep a constant check on this. The committee also puts forward plans to reduce the overall sulphur dioxide