

have not been adequately explained away. For example, many geologists have been worried by the loss of much of Central America in the Bullard fit, despite the fact that extensive areas of old continental rocks occur there, and attempts to get round this problem by seemingly arbitrary *ad hoc* tectonic displacements and rotations, have lacked plausibility.

Likewise, if one adopts the Smith-Hallam fit, West Antarctica does not run naturally into its obvious geological continuation in Patagonia. More disturbing perhaps, a large gap is left west of Australia, which has led to the suggestion that the Wharton Basin in that region was ancient ocean, now disproved by the Deep Sea Drilling Project which has demonstrated that the basin is underlain by oceanic crust as young as elsewhere. On the other hand, fitting India against Australia, as others have done, leaves a corresponding gap in the western Indian Ocean.

Such problems can indeed be resolved, as Owen points out, by extremely rapid Earth expansion, but before leaping to such a drastic conclusion it is worth looking more closely at the original computer least squares fit pioneered by Bullard and his colleagues. This and subsequent fits were taken at the 500 fathoms (~1,000 m) contour for purely geometric reasons, because this gives the best fit and usually lies on the steepest part of the continental slope and is therefore well defined. It is only strictly valid if it coincides closely with the boundary of continental and oceanic crust, but geological and geophysical evidence has been accumulating that this is not the case.

Thus Talwani and Eldholm (*Bull. geol. Soc. Am.*, **83**, 3575; 1972) argue persuasively that the extensive Vöring Plateau off Norway, with an average depth of 2,000 m, is subsided and thinned continental crust. Similarly, Jansa *et al.* (*Geol. Surv. Canada Pap.* 74-30, 51; 1975) make a convincing case for a wide zone off the Nova Scotia, eastern Newfoundland and north west African shelves as subsided continent, and suggest that the 3,500 m contour is a geologically more realistic estimate of the true continental edge. Very similar evidence and arguments have been put forward for the region offshore of Angola by Burollet and Byramjee (*Notes Mém. Comp. Fr. Pétroles*, no. 11, 71; 1974), leading to the same conclusion. An important implication is that a sector of subsided and attenuated continent well over 1,000 km wide in places must exist between Africa and America, and that the so-called Quiet Magnetic Zone is not entirely oceanic, as hitherto almost universally accepted by marine geophysicists.



A hundred years ago

VARIOUS sanitary measures (according to Dr Tholozoan) have recently been adopted by the Turkish and Persian Governments with reference to the outbreak of plague, which commenced in Mesopotamia in the early part of the year. Since the beginning of March a sanitary cordon has been established on the north of the invaded territory, on the most frequented route of Kurdistan and Syria, between Tecrit and Kilfiri. On the south a quarantine of fifteen days is obligatory since April 1 on all vessels sailing on the Tigris and the Euphrates. It is at Kourna, at the confluence of these rivers. The ports of the Persian Gulf are protected by a quarantine which vessels from affected localities have to undergo at the island of Kezzer, formed by junction of the Chotel Aral and Karoun. Since April 10 all communications by land between Persia and Mesopotamia are subject to a quarantine of fifteen days. For three years, it may be added, all pilgrimages into the infected country, by Persian subjects, have been interdicted. from *Nature*, **14**, July 6, 218; 1876.

Burollet and Byramjee extend their zone of subsided continental crust round to the East African offshore zone and elsewhere, which has a significant bearing on the arguments recently put forward by Kent and Tarling (*Nature*, **261**, 304; 1976) against a fit of Madagascar snugly against Kenya and Tanzania. This they dismiss as implausible because of the known extent east of these mainland countries for hundreds of km of a thick sequence of late Palaeozoic and younger shallow marine and continental sediments. Kent and Tarling treat this as an argument for a more southerly former position of Madagascar, thereby dismissing without obvious justification palaeomagnetic evidence to the contrary, instead of appreciating that all that may be at fault is the geologically implausible tightness of fit if the 500 fathom contour is used. In this connection it is interesting to note that some new palaeomagnetic data just published supports the northerly fit for Madagascar (McElhinny and Embleton, *Earth planet. Sci. Lett.*, **31**, 101; 1976).

Much more research on continental margins around the world will have to be undertaken before an accurate new continental fit can be reliably attempted, but already it seems likely that most if not all of the apparent geological inconsistencies of the older fits will magically disappear, and the Tethys will not seem such an awkwardly eastward gaping ocean. □

Future of space science

from S. I. Rasool

A symposium on the Future of Science in Space was held as part of the 18th COSPAR meeting which took place in Philadelphia on June 7-18, 1976.

THE future of space science is becoming a matter of grave concern to the space scientist. The national space science budgets have considerably declined in their buying power and for the large pool of space experimenters in the Western world opportunities seem to be few. At the same time the exploratory phase in many disciplines is over. The days are long gone when a simple magnetometer, a geiger counter, or a TV camera flown anywhere in space or to a nearby planet would make an instant discovery. Although the potential for major discoveries about the Universe is still great in some of the fields (such as infrared, ultraviolet and gamma ray astronomy) the emphasis in space science is going to be more towards "why" than "what". This immediately implies more sophisticated and correlative experiments in space, large space telescopes and observatories to study the remote regions of the Universe and more detailed study of the planets with orbiters, landers and probes rather than with flybys.

What are the chances that space science will progress at the same vigorous pace as it has done over the past two decades? What should be the major thrusts and priorities? What are the national policies towards space science? These were some of the questions discussed in a one and one-half day symposium and panel discussion convened by COSPAR (International Committee on Space Research) during its recent meeting.

If the objective of the organisers was to get a unified view of things, the meeting was a disappointment. Six individuals from six different countries not only gave a variety of views but made six different kinds of presentations. They ranged all the way from topical and systematic descriptions of future thrusts in space research to a philosophical discourse on the art of extrapolation and on the meaning of utopia. A few themes did recur and are noteworthy: space research in the future will be more focused and will need more justification; with the advent of the Shuttle, the cost of doing science will, it is hoped, go down; space science cannot survive in isolation, it should be integrated with classical disciplines in science; high energy