dance in the ovary of the messenger RNAs for the α-subunit precursor of inhibin is estimated from Northern blots to be at least 10-fold greater than that for the β_A precursor, and about 20-fold greater than for the β_B precursor[6]. This suggests that there may be secretion of free α-subunit or its precursor. As free α- or β-subunits are devoid of FSH-releasing or inhibiting activity, antibodies directed towards the α-subunit of inhibin may cross-react with the free α-subunit, therefore overestimating the amount of inhibin in a sample. In a preliminary report[8], however, free α-subunit of the hormone could not be detected in bovine follicular fluid.

Antibodies raised against the β-subunits of inhibin (β_A or β_B) may prove even more troublesome in that they may well cross-react with the β dimers as well as with inhibin. This again would lead to an overestimation of the levels of inhibin. Similar problems can be expected with antibodies raised against the β dimers, as these may show major cross-reaction with inhibin. Furthermore, bioassays of inhibin may underestimate the actual level of the hormone in a sample if the β dimers are also present and countering the effects of inhibin.

Until now it has been an accepted principle of endocrinology that gonadal feedback control of FSH secretion is under the dual control of steroids and inhibin. Introduction of β dimers or an equivalent as a third candidate would neccessitate a major rethink about control of the hypothalamic-pituitary-gonadal axis. Finding out how the function of this third factor interacts at the pituitary level with the actions of LHRH and with those of the recently described LHRH-associated peptide (GAP)[14,15] and elucidating the local roles of inhibin and the β dimers undoubtedly presents reproductive endocrinologists with a considerable task but it also promises more surprises. □

1. de Jong, F.H. & Robertson, D.M. *Molec. Cell. Endocr.* **43**, 95 (1985).
2. Vale, W. *et al. Nature* **321**, 776 (1986).
3. Ling, N. *et al Nature* **321**, 779 (1986).
4. Ramasharma, K. *et al. Science* **223**, 1199 (1984).
5. Beksac, M.S. *et al. Int. J. Androl.* **7**, 389 (1984).
6. Mason, A.J. *et al. Nature* **318**, 659 (1985).
7. Forage, R.G. *et al. Proc. natn. Acad. Sci. U.S.A.* (in the press).
8. Miyamoto, K. *et al. Biochem. biophys Res. Commun.* **136**, 1103 (1986).
9. Ying, S.-Y. *et al. Biochem. biophys. Res. Commun.* **135**, 950 (1986).
10. Brown, K.D. & Blakeley, D.M. *Biochem. Soc. Trans.* **12**, 168 (1984).
11. Mizunauma, M. *et al. Brain Res. Bull.* **10**, 623 (1984).
12. Ying, S.-Y. *et al. Biochem. Biophys. Res. Commun.* **136**, 969 (1986).
13. McLachlan, R. I. *et al. Lancet* i, 12 (1986).
14. Aldelman, J.P. *et al. Proc. natn. Acad. Sci. U.S.A.* **83**, 179 (1986).
15. Seeburg, P.M. & Aldelman, J.P. *Nature* **311**, 666 (1986).

Con G. Tsonis is in the Department of Obstetrics and Gynaecology and Richard M. Sharpe is in the MRC Reproductive Biology Unit at the Centre for Reproductive Biology, University of Edinburgh, Edinburgh EH3 9EW, UK.

Precambrian geology

The most ancient rocks revisited

from Stephen Moorbath

THREE years ago, a group of workers from the Australian National University surprised the geological world by reporting[1] uranium–lead (U–Pb) dates of between 4,100 and 4,200 million years (Myr) for 4 detrital zircons out of 102 analysed from the Mount Narryer quartzite in Western Australia, which was probably deposited and metamorphosed about 3,600–3,350 Myr ago. On page 766 of this issue[2], W. Compston and R.T. Pidgeon report a further occurrence of such old detrital zircons, identified once again with the ion-microprobe SHRIMP, in a conglomerate from the Jack Hills metasedimentary belt at a site about 60 km north-east of Mount Narryer.

In Compston and Pidgeon's study, 17 zircon grains out of 140 analysed yield U–Pb dates greater than 4,000 Myr. Indeed, one zircon grain registers the exceptionally old date of 4,276±6 Myr, which may still be a minimum value for its original age. The authors regard the 'old' zircon population as either having a single original age close to 4,300 Myr with subsequent early as well as recent Pb loss, or as a mixed-age population that formed during discrete events over an extended time period between 4,100 and 4,300 Myr ago. The age of these ancient minerals constrains the time of the earliest preservation of Earth's solid crust.

As at Mount Narryer, the majority of zircons at Jack Hills register very much younger dates than 4,000 Myr, probably related to igneous and/or metamorphic thermal events 3,100–3,500 Myr ago. In principle, early gain of Pb (or loss of U) followed by recent Pb loss could produce anomalously old apparent U–Pb zircon dates, but although this process has been demonstrated in a zircon from Mount Sones, Antarctica[3], it is not regarded by the Australian workers as a plausible model for Mount Narryer and Jack Hills.

What clearly needs to be done next is to subject the Jack Hills zircon population to conventional solid-source mass spectrometry and isotope dilution analysis of single grains and individual fragments of single grains. Schärer and Allègre[4] performed this type of analysis on 32 single zircon grains from Mount Narryer; they obtained no 4,100–4,200 Myr dates and interpreted the results solely in terms of zircon crystallization 3,800–3,300 Myr ago. From simple statistics, Compston *et al.*[5] countered by postulating that Schärer and Allègre had simply been unlucky in failing to find any zircons more than 4,100 Myr old at Mount Narryer. (The chance of selecting 32 'young' grains in succession was shown to be 27 per cent.) Because the proportion of 'old' zircon grains at Jack Hills is about five times that at Mount Narryer, the conventional analytical approach will be greatly facilitated.

The morphology as well as the U and Th contents of the Jack Hills zircons suggest to Compston and Pidgeon that their source consists of a mafic rock which has undergone granulite-facies metamorphism. In contrast, the source rock at Mount Narryer may have been a felsic igneous rock not recrystallized by granulite-facies metamorphism. Thus, the ancient source terrain of the detrital zircons, not yet found *in situ*, may have had considerable geological complexity although, as I pointed out in a previous *News and Views* article[6], one should be cautious in attributing a truly continental character to the source-region crust. Perhaps the ancient source terrain was more like an early non-continental volcano-sedimentary assemblage of greenstone belt facies, such as the now well-known Isua Belt of West Greenland which, with a well-established age of ~3,800 Myr, is the oldest *in situ* terrestrial rock assemblage known[7,8] and has survived in a relatively pristine condition until the present day. It is highly significant for any model of early crustal evolution that a 4,100–4,300-Myr-old source region should have remained exposed for at least 600–800 Myr at such a very early period of the Earth's history and preserved from recirculation into the mantle by plate tectonics or by any other process.

It may be too much to hope that the source rocks of the oldest Mount Narryer and Jack Hills zircons will actually be found *in situ* and thus become amenable to dating by other isotope methods. In the meantime, I shall try to repress a recurring nightmare that SHRIMP will one of these days come up with zircon U–Pb ages significantly greater than 4,600 Myr, the widely accepted age of the Earth. It would not be the first dating method to have undergone this embarrassing trial, and yet emerged triumphantly. □

1. Froude, D.O. *et al. Nature* **304**, 616 (1983).
2. Compston, W. & Pidgeon, R.T. *Nature* **321**, 766 (1986).
3. Williams, I.S. *et al. Contrib. Mineral. Petrol.* **88**, 322 (1984).
4. Schärer, U. & Allègre, C.J. *Nature* **315**, 52 (1985).
5. Compston, W. *et al. Nature* **317**, 559 (1985).
6. Moorbath, S. *Nature News and Views* **304**, 585 (1983).
7. Moorbath, S., O'Nions, R.K. & Pankhurst, R.J. *Nature* **245**, 138 (1973).
8. Baadsgaard, H. *et al. Earth planet. Sci. Lett.* **68**, 221 (1984).

Stephen Moorbath is Reader in Geology at the Department of Earth Sciences, University of Oxford, Oxford OX1 3PR, UK.