field strength (~1 Oe) in several CC[11, 20] (Table 1) inspires confidence in their validity. In contrast, the lunar palaeointensity determinations are notoriously controversial[23, 25–27]. Some of the new techniques used (refs 25, 28, 29) are not yet established even for terrestrial rocks, whose magnetic mineralogy is more familiar and better understood. Banerjee and coworkers fuelled the debate with 'reliable' palaeofield estimates of ~0.01 Oe for three Apollo 15 basalts[28, 29], including one (15535) which they had earlier shown to contain no useful remanence at all[30, 31]. Their later work on an Apollo 17 foliated breccia boulder produced no less than three distinct sets of paleointensities (0.18–0.74 Oe)[32, 33], differing significantly both within and between adjacent foliation layers. These and divergent directions of 'stable' palaeoremanence forced the conclusion that the lunar magnetising field must have changed considerably both its direction and its intensity during the assembly of this 2-m boulder 4.0×10^9 yr ago. It seems more plausible to argue that the magnetic data are not internally consistent, or to ascribe the magnetic behaviour of breccias to textural effects of compaction shock[24].

Another corollary to the BM hypothesis is that similar palaeofield strengths imply a common source for lunar rocks and CC. Such reasoning could lead to the fallacious conclusion that the oldest (3.85×10^9 yr) terrestrial rocks were also magnetised by extended solar wind fields. Within the BM context, comparable magnetic field strengths imply that the Moon and the carbonaceous meteorites condensed and accreted at the same heliocentric distance, in contradiction to most current chemical nebular models[34]. If the CC have originated in the asteroid belt[13] (3–5 AU), whereas the Moon accreted near 1 AU, the present radial dependence of the solar wind magnetic fields would require at least 3–5 Oe for a tightly wound spiral configuration, but up to 10–25 Oe for radial flow. These values are high even by the currently inflated lunar-magnetic yardstick.

A. BRECHER

Department of Earth and Planetary Sciences,
Massachusetts Institute of Technology,
Cambridge, Massachusetts 02139

BANERJEE REPLIES—There was one major point that we had wanted to make in our original communication[1]. Before, and even since the publication of our note, there have been no lunar palaeointensity experiments in which, first, a direct, thermal method had been used on three sub-samples from one rock and, second, magnetic monitoring by Anyhsteretic Remanent Magnetization (ARM had been carried out on the samples before and after the heating. In spite of the well-known magnetic variability of lunar samples, as underlined by Dr Brecher[2], what was amazing to us was that our three samples were magnetised homogeneously enough to yield an average palaeointensity of 0.4 Oe with a s.d. of about 40%. In contrast, in the lunar palaeointensity measurements, the highest reliability that one usually hopes to achieve is the order of magnitude of the field!

Our second point was that if the palaeointensity was indeed of the order of 0.4 Oe at about 4.0×10^9 yr (the average radiometric age of the rock), and if the field was internally generated from the Moon, the Sonnett and Runcorn[3] dynamo in a small, early lunar iron core could be the only plausible internal source. We then drew attention to the similarity of the size of this field to that postulated earlier for carbonaceous chondrites (age ~ 4.4×10^9 yr) by us[4], and by Dr Brecher[5]. I agree wholeheartedly with her that "the fact that entirely different experimental techniques have yielded similar values for the ancient field strength (~1 Oe) in several CC (carbonaceous chondrites) inspires confidence in their validity. In contrast, the lunar palaeointensity determinations are notoriously controversial". But, we have done our best in searching for better methods, used multiple subsamples and published the details of our technique[6]. Our interpretation, and that of any other groups of scientists, must necessarily be a function of our knowledge at the time of writing. None of the references quoted by Brecher can convince anyone that "it seems more plausible to argue that the magnetic data (that is, the data of refs 1 and 6) are not internally consistent", specifically when such a search for internal consistency of palaeointensities has not been undertaken.

Our hypothesis that both the meteorites and the ancient lunar samples could have been magnetised by external solar fields is admitted by the fact that the upper limit T-Tauri phase solar wind pressure would correspond to a magnetic pressure of the order of a few Oe at 1 AU. But, as we pointed out, whether this was actually so cannot be proved without more extensive and reliable data on both meteorites and lunar samples. We had also suggested that the apparently large (0.4 Oe) field could be the result of a smaller ambient solar field, magnetohydrodynamically amplified by plasma dynamos operating on the lunar crust during the intense collisioning stage, at and before 4.0×10^9 yr. I am sure there are others who could think up more alternative explanations. The purpose of our communication was to alert other workers about the existence of our data and to encourage them to think of plausible models.

S. K. BANERJEE

Department of Geology and Geophysics,
University of Minnesota,
Minneapolis, Minnesota 55455

1 Banerjee, S. K. & Mellema, J. P. *Nature* **260**, 230 (1976).
2 Banerjee, S. K. & Mellema, J. P. *Lunar Science VII* 29 (Lunar Science Institute, Houston, 1976).
3 Wetherill, G. W. *A.. Rev. nucl. Sci.* **25**, 283 (1975).
4 Kaushal, S. K. & Wetherill, G. W. *J. geophys. Res.* **75**, 463 (1970).
5 Lewis, R. S. & Anders, E. *Proc. natn. Acad Sci. U.S.A.* **72**, 268 (1975).
6 Podosek, F. A. & Lewis, F. S. *Earth planet. Sci. Lett.* **15**, 101 (1972).
7 Wetherill, G. W., Mark, R. & Lee-Hu, C. *Science* **182**, 281 (1973).
8 Price, P. B., Hutcheon, I. D., Braddy, D. & MacDougall, D. *Proc. 6th Lunar Sci. Conf.* 3449 (Pergamon, Oxford, 1975).
9 Jeffery, P. M. & Anders, E. *Geochim. cosmochim. Acta* **34**, 1175 (1970).
10 Sonett, C. P. in *Solar Wind*-3,36 (I.G.P.P., U.C.L.A., 1974).
11 Brecher, A. in *On the Origin of the Solar System* **260** (CNRS, Paris, 1972).
12 Brecher, A., Briggs, P. L. & Simmons, G. *Earth planet. Sci. Lett.* **28**, 37 (1975).
13 Chapman, C. R. *Geochim. cosmochim. Acta* **40**, 701 (1976).
14 Kuhi, L. V. *Astrophys. J.* **140**, 1409 (1964).
15 Iben, J. *Astrophys. J.* **141**, 993 (1965).
16 Larson, R. B. *Mon. Not. R.Astr. Soc.* **149** (1973).
17 Papanastassiou, D. A. & Wasserburg, G. J. *Proc. 6th Lunar Sci. Conf.* 1467 (Pergamon, Oxford, 1975).
18 Runcorn, S. K. *Nature* **253**, 701 (1975).
19 Russel, C. T., Coleman, P. J. & Schubert, G. *Space Res. XV*, 621 (1975).
20 Brecher, A. & Arrhenius, G. *J. geophys. Res.* **79**, 2081 (1974).
21 Banerjee, S. K. & Hargraves, R. B. *Earth planet Sci. Lett.* **17**, 110 (1972).
22 Butler, R. F. *ibid.* **126** (1972).
23 Fuller, M. *Rev. Geophys. Space Phys.* **12**, 23 (1974).
24 Brecher, A. *Earth planet. Sci. Lett.* **29**, 131 (1976).
25 Stephenson, A. & Collinson, D. W. *Earth planet. Sci. Lett.* **23**, 220 (1974).
26 Brecher, A., Menke, W. H. & Morash, K. R. *Proc. 5th Lunar Sci. Conf.* 2795 (Pergamon, Oxford, 1974).
27 Pearce, G. W., Hoye, G. N. & Strangway, D. W. in *Lunar Science VII* 676 (Lunar Science Institute, Houston, 1976).
28 Banerjee, S. K. & Mellema, J. P. *Earth planet. Sci. Lett.* **23**, 177 (1974).
29 Banerjee, S. K. *ibid* **23**, 185 (1974).
30 Hoffman, K. A., Banerjee, S. K. & Mellema, J. P. in *Lunar Science V* 345 (Lunar Science Institute, Houston, 1974).
31 Hoffman, K. A. & Banerjee, S. K. *Earth planet. Sci. Lett.* **25**, 331 (1975).
32 Banerjee, S. K., Hoffman, K. A. & Swits, G. *Proc. 5th Lunar Sci. Conf.* 2873 (Pergamon, Oxford, 1974).
33 Banerjee, S. K. & Swits, G. *The Moon* **14**, 473 (1975).
34 Grossman, L. & Larimer, J. W. *Rev. Geophys. Space Phys.* **12**, 71 (1974).

Digynic triploidy after superovulation

DIGYNIC triploidy after superovulation in mice reported by Takagi and Sasaki[1] may be closely related to the aging of eggs at fertilisation rather than superovulation through the administration of exogenous gonadotrophins. It is well known that the fertile life of eggs after ovulation is about 10 h and that ageing of eggs results in a decrease of fertilisation rate, an increased incidence of abnormal fertilisation and subsequent degeneration of embryos. Suppression of the second polar body formation resulting in digynic fertilisation occurs when eggs age in the