

## Quarks out of the bag?

In a paper given at the American Physical Society Spring Meeting in Washington DC, Drs W. M. Fairbank, A. F. Hebard and G. S. LaRue of Stanford have presented evidence for the existence of fractional electric charges. The experimenters emphasise that they are claiming the existence of fractional charge; they do not mention quarks.

Their experiment is a sophisticated version of the classic Millikan oil-drop apparatus. A superconducting niobium sphere 0.25 mm in diameter is floated in a magnetic field and its net residual charge deduced by analysing its behaviour in an oscillating electric field, the net charge can be altered by integer values of the electron charge  $e$ , by using a radioactive source. Fractional charges of  $\frac{1}{2}e$  or  $\frac{2}{3}e$  carried by a quark would be detected as the sensitivity claimed is 1% of the electron charge.

The most severe background is electric and magnetic dipole moments on the spheres which mimic the effect of a fractional charge. These dipole backgrounds are now understood and have been eliminated, according to the experimenters.

Of eight spheres measured, two show evidence of fractional charge: the first was seen last September and the second in mid-February. One had a measured residual charge of minus  $0.331 \pm 0.070 e$  which went to zero after handling at room temperature. A second sphere has a charge of plus  $0.337 \pm 0.009 e$ . It has been measured on three occasions and the charge remained after the sphere was taken to room temperature.

Preparation of the spheres includes heat treatment during which five spheres were supported by niobium and three by a tungsten substrate. The two spheres showing fractional charges came from the tungsten substrate set.

Why have all other quark searches been fruitless? In an interview with *Nature*, Dr Fairbank argued that searches have only been carried out on a limited variety of materials. If quarks were released in extremely energetic events during the early stages of the universe one can speculate that they go through some unknown evolutionary process to end only on heavy elements.

Initial reaction to the announcement is firstly surprise that quarks could be so abundant as to show up on two out of only eight spheres, and secondly amazement that an antiquark is seen. The experiment cannot distinguish a residual charge of  $+\frac{1}{2}e$  from  $-\frac{2}{3}e$ .

If these quarks are genuine they will challenge much recent theoretical work. Present understanding of quarks inside protons is that they are light and bound within the proton—to remove one would require an infinite amount of work. Heavy free quarks could be accommodated within the theory but they would be very different objects from those inside the proton and much of the aesthetic beauty of the theoretical framework would be lost.

Future plans of the Stanford team include measuring more spheres, investigating the significance of their mode of production and evaporating the material to separate and collect the charges.

Stuart Sharrock

## IN BRIEF

### Brenner's appointment

The UK Medical Research Council (MRC) has announced that Dr Sidney Brenner will become leader of the MRC Laboratory of Molecular Biology (Hills Road) in Cambridge on the retirement of Dr Max Perutz in 1979.

The news is little surprise for those who have heeded the rumours that followed an internal MRC report produced last year on the future of Hills Road, suggesting a radical change in organisation. The MRC has followed this, for whereas Dr Perutz was chairman of the Governing Board of the laboratory, Dr Brenner is to be its Director.

The Governing Board at present consists of Dr Perutz, Dr Hugh Huxley (whose appointment as Deputy Chairman has also been announced), Dr Brenner, Dr John Gurdon, Dr Cesar Milstein, Dr Fred Sanger and Dr John Smith. It has been collectively responsible for the running of Hills Road, with no particular power being vested in the chairman.

In 1979, however, the Governing Board will probably be disbanded. Its replacement, if any, is currently under discussion, but whatever the outcome Dr Brenner is certain to end up with a good deal of power. What is more, several of the senior staff at Hills Road will have left by the time Dr Brenner becomes Director. Dr Francis Crick has recently announced that he is to remain at the Salk Institute where he is currently on sabbatical, and David Blow has just taken up a chair at Imperial College, London. It is also rumoured that two other senior members, both on the Governing Board, have their eyes on other posts.

Another novelty for Hills Road is the fact that it is a shrinking laboratory. The staff is to be gradually pruned by 25%, back to its 1972 level.

All told Sidney Brenner will have a considerable challenge on his hands if he is to maintain the world-wide reputation of Hills Road during the course of his Directorship, which automatically lasts (as does the laboratory) until 1987, when he is 60 years old. Dr Brenner was recently heard to say "I am going downhill and I am going with a lot of noise". Only the second part of that statement is true.

### Atkinson for NSF

Richard Atkinson, a former professor of psychology at Stanford University, has, as expected, been named by President Carter to be Director of the US National Science Foundation (NSF). Generally regarded as an effective administrator well versed in dealing

with Congress, Atkinson has been Acting Director of NSF since August 1976, when the previous incumbent, H. Guyford Stever, departed for a brief stint as science adviser to President Ford. Atkinson was deputy NSF director for 17 months before that. A top-flight researcher in fields ranging from the development of memory to the application of computers to instruction, Atkinson is the first social scientist to be appointed Director of NSF.

### Whose power to choose?

There is now "a unique and possibly unrepeatable opportunity" to bring international action to redirect the worldwide use of nuclear power, according to Brian Johnson, author of a paper published by the International Institute for Environment and Development, *Whose Power to Choose?* At a time when President Carter is committed to controlling nuclear proliferation and the US nuclear industry gets 70% of all nuclear power station orders, there should be the opportunity, he argues, to bypass the plutonium economy by assuring countries of fuel for the thermal reactors they need, safeguarding the international community from proliferation and creating programmes to develop alternative energy sources.

To implement such proposals he suggests a reformed IAEA: its Department of Safeguards and Inspection should be strengthened, all nuclear facilities should be licenced with the IAEA to ensure security and environmental safety, and it should enforce internationally agreed measures for waste disposal. A new energy agency could be developed, independent of the United Nations but with support from OPEC and the US, to look into ways of helping poor countries shed their dependence on oil and nuclear power by developing alternative energy sources.

### Uranium for Europe

President Carter's statement in last week's energy message to the US Congress that it was time "to resume uranium enrichment services" to Europe and elsewhere is likely to be well received in the European Community. The Nine's dependence on imported energy and on nuclear power was stressed heavily by the President of the European Commission, Mr Roy Jenkins, when he met Mr Carter earlier in Washington. Mr Jenkins told Mr Carter that without adequate and assured supplies of enriched uranium. European countries would be more