

the super-powers will at this stage in their affairs be prepared to exchange technical information about such things as the accuracy of rocket systems and then to forgo improvements, or to abandon the development of submarine defences (which are potentially but still remotely destabilizing), it is hard to see how the super-powers can now avoid biting the bullet of an extension of the Partial Test-Ban Treaty to underground tests as well as those in the atmosphere. To shrink from this issue will be to jeopardize the survival of the limitation on strategic striking forces beyond 1977.

Why is this such a contentious issue? The simple answer is that the military have not so far been seriously hampered in the continuing development of their strategic forces. Even under the new agreements, research and development on ABM systems will not, for example, be prevented. And Mr Laird will no doubt be granted his wish that research and development on the improvement of existing striking forces, which must necessarily involve the continued testing of warheads, will be accelerated. An agreement not to test warheads even underground would quickly put a stop to this, and would have the further advantage of persuading some of those nations which protest that the Non-Proliferation Treaty is unsymmetrical to sign on that dotted line. The objections to a comprehensive test-ban treaty are of two kinds. Some protest that no method of remote sensing could be relied on to detect all possible violations of a treaty, but with seismology continually improving, violations must surely be too great a hazard. It is also argued that if there were a ban on all kinds of testing, there would be a chance that one side or the other would be able, on the basis of laboratory experiments or theoretical calculations, to develop warheads and then weapons of which the other side was ignorant. But can this be a serious cause for anxiety? Generals are notorious for their unwillingness to trust in weapons which have not been tested, and there is in any case a chance that the nation embarking on the deployment of untested weapons would weaken and not strengthen its position. It is true that a comprehensive test-ban would be a serious impediment to the continuing growth of military technology, but is it not inevitable that some such restriction must be inseparable from effective measures of arms control? And surely it is not unreasonable that one sector of high technology should suffer, in order that the future of other sectors be better assured by a genuine restriction in the proliferation of nuclear weapons?

Whether the SALT negotiations can continue as a dialogue between the super-powers is another issue to be faced in the months ahead. Five years from now, China will be more than a power to be feared for its potential, and the degree to which the super-powers will be prepared to make deals between themselves will be compromised, to say the least of it, by their dispositions towards China. But it is also clear that a comprehensive test-ban would be a nonsense if France did not adhere to it, and following the recent tests of trigger devices in the Pacific Ocean, undertaken in the face of vociferous, if ineffectual, opposition, it is apparent that she too intends to join the super-powers in the nuclear club. The difficulty for the super-powers is that they will not be able to persuade the smaller fry to be reasonable without making concessions of a political character that will eventually undermine the strategic monopoly

which at present gives their bilateral talks a curious air of cosiness. Crudely, it would be necessary for them to stomach the idea that China would not agree to restrictions on strategic development unless it were assured of commensurable strategic power. There are also potential complications in the likelihood that British accession to the European Communities at the beginning of 1973 will revive earlier dreams of a European Defence Community.

But would it not indeed be disastrous if the list of strategic powers were to grow? This is the received doctrine. There must, however, be some level at which a comprehensive agreement on the disposition of nuclear striking forces would be preferable to the present arrangements under which the super-powers pretend that no other tensions than those between themselves are relevant to arms control.

100 Years Ago



THE *Journal of the Franklin Institute* calls attention to the following interesting lecture experiment:—It is well known that a light ball, as of cork, is sustained for some time near the summit of a vertical jet of water, issuing from an orifice of such a nature that the steadiness of the jet is maintained. The experiment becomes more striking when a vertical blast of air issuing from a large bellows is substituted for the jet of water, as in this case there is no apparent support for the ball, which comports itself in a very amusing manner. When a strong blast cannot be obtained, if a slender wire, about four times the length of the diameter of the ball, be passed through its centre, so as to have one-fourth of its length projecting from one end, and one half from the other, the balancing is more readily obtained, as any considerable change in the relative positions of the centre of gravity and the point of support is prevented by the movements of the rod.

WE learn from the *Journal of the Society of Arts* that the directors of the telegraphic lines of France have recognised the absolute necessity of improving the theoretical and practical knowledge of its clerks, and with this view elementary courses of telegraphy have been arranged in all the chief towns, at which the attendance of the *employés* is obligatory. In addition to this, a superior course of instruction is to be opened in Paris, and those clerks who have most distinguished themselves in the provinces will be sent to the capital to complete their instruction. The courses are all to commence on the first of October.

WE notice from the *Field* that on September 3 and 4 a sale of the surplus animals of the Zoological Gardens of Antwerp is to take place. The collection to be disposed of includes many of the rarer species of mammals and birds. In the former figures a young Indian rhinoceros, several species of antelopes, mouflons, and a male markhare ("which," says the *Field*, "offers a chance for any one desirous of increasing the size of our Welsh goats"). The birds include ostriches, several species of rare and new pheasants, and a considerable number of the rarer water-fowl, serpents, pythons, &c.

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