

him to raise the bid by another 5 cents and thus cut his losses. Seen from the outside, the rational thing to do is not to enter the game in the first place, or to form a coalition against the auctioneer.

Now, the interesting thing about the dollar auction is: it almost always works, because initially – it's a sliding reinforcer trap – you think, only five lousy million and we get a defence system which keeps us permanently ahead of the other side. The other side then thinks, just another lousy five million, or trillion as the case may be, and we too are ahead. And then what you get to very quickly is the situation we're in now, which is that both sides know that the eventual prize is not worth what they're spending on it, but they think that perhaps by spending just a little bit more they might recoup their past losses. So both sides are absolutely reasonable, sane people, both are adding just a little bit more to get an advantage, but the consequence is an insane situation.

How can we escape from these social traps? It's very, very hard. You either have to have an outside authority, which stops it, or you have to do a lot of education so that people don't get into the trap in the first place. What are the solutions?

(From the audience: *People should stop bidding at one dollar; it doesn't make sense to continue after that.* Consider that you have just bid me a dollar. But the other person had previously bid 95 cents. Now, if we stop the auction there, that person will lose 95 cents. By going up to \$1.05, you minimize your losses, because if you won you'd have got the dollar and you'd have only lost five cents; if you don't raise the bidding you are guaranteed to lose 95 cents. One of the basic engines of competitive conflict is the attempt to minimize losses.)

What are the solutions? You can assist nations to negotiate, to understand some of those competitive situations, by giving them specific techniques, and that's where most psychologists want to put their energy, because it seems to have high pay-off. You can try generally improving relations between states so as to reduce the image of the enemy. You can try to impose an outside authority. You can ask them to stop – you can see that that's a non-starter, because it's not going to have any effect. Or, by various types of citizen action, you can either prevent one nation, or various nations, from participating.

The initial image I gave you was of a helpless child between two citadels. I think that what we have to work towards, both in terms of our science and in terms of our psychology, is an understanding that on the best available evidence even the enemy has the same nervous system that we do, and that family life is extraordinarily the same. Cultural experience does vary somewhat; however, that is now changing with the globalization of entertainment and travel. Political experience and expression differs, but that too is now changing. I would say that our shared experience is so much greater than our differing experience, that we have to concentrate on that fact and thus bring about a change in the perception of the enemy which will eventually deflate the forces which sustain the arms race.

## The Militarization of Science

Rainer Rilling

Department of Sociology, Marburg University and  
Bund demokratischer Wissenschaftlerinnen  
und Wissenschaftler,  
P.O. Box 543, 355 Marburg, FRG

### 1. MILITARY R&D AND SCIENCE POLICY

The choice of subject of my statement – "The Militarization of Science" – reflects a growing concern of and in the scientific community. Today, military R&D indeed occupies a commanding position in the system of world science, being its most powerful, most dynamic and most expensive sector.

Military and armament political objectives have always played a key role for science development. The history of science has always doubled as military history. Admittedly the tie-up of the two has varied considerably in the course of time. And it certainly cannot be overlooked that the importance of science and research for the conduct of wars was limited up to the Second World War.

Such as James Conant, President of Harvard University and leading science organizer of the Manhattan-Project reports that – when during the First World War he had offered the services of the American Chemical Society to the Secretary of the War Department of the USA – he received the answer it was not necessary as they already employed a chemist. At the same time just one physicist was a member of the Scientific Commission of the Department of the Navy. The chairman of the Commission, a certain Mr. Thomas Edison, suggested to President Wilson at that time to appoint also a mathematician – as he said just in case something would have to be worked out mathematically.

However, these conditions are long foregone.

Beyond any doubt, a revolutionary restructuring of the relationship between science and military had been taken place in the USA since 1940/41. Within a few years a new pattern of regulation and distribution of science resources was created in which military institutions played a dominating part. This pattern has remained stable across decades and still leaves its mark on the science system to this day. What was this pattern like?

As *politicized* science it was extensively directed to military objectives. A trend of nearly unbroken *increases* of expenditures for military research developed. *Federal* military institutions for science control evolved. *Secret* R&D dominated the science system for the first time and remained an important feature not only of the science system in the socialist countries,

