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his goal, encapsulated in the strong programme, as being "to understand the nature of knowledge in a scientific manner". He adds: "I have been continually struck by the fact that philosophers of science were not actually working like scientists."

Bloor says that he, Barnes and Shapin share a common curiosity about science. The problem, he suggests, is that "we do not want a philosophical celebration of science, but a matter-of-fact analysis of it". Bloor argues that it is this approach that appears to have upset people, admitting that he is "shaken and shocked" by the reaction.

Shapin, who now teaches the history and sociology of science at the University of California in San Diego, describes his own role at Edinburgh as being "to give some of the basic ideas we were working on an empirical grip". Now widely known for several key historical studies, including a recent reinterpretation of the Scientific Revolution of the seventeenth century, Shapin reacts sharply against the argument that the work of the group ignores the importance of experiments. "We have a great respect for what scientists actually do," he says.

He suggests that part of the reason for the hostility towards the Edinburgh school lies in the way that it deliberately set out to provide a critique of a rationalist philosophy of science — the idea that scientific practice follows a set of established and accepted rules — as expressed by philosophers such as Karl Popper and Imre Lakatos.

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Popper: too 'rational' for science's good?

"If our fundamental philosophical position was anti- anything, it was anti-rationalist philosophy, not anti-science," says Shapin. "I find it very odd that the scientists who are upset are those that are hitching their wagon to impoverished and unsustainable philosophies. Why do they see criticism of Popper as criticism of science?"

Honouring science

Indeed, Shapin suggests that, rather than pursuing an 'anti-science' agenda, the sociologists of science are "doing scientists an honour by showing that science is a much richer, more complex and more heroic activity" than some rationalist explanations imply.

Shapin's arguments on this score are shared by Harry Collins, now professor of sociology at the University of Southampton, author of an influential study of scientific practice[3], and co-author with Trevor Pinch of the controversial volume *The Golem*[4]. Collins, who started his research in the sociology of science at the University of Bath in the early 1970s, is not a product of the Edinburgh school, although his name is often linked with it by others.

Indeed, there are some clear tensions between the sociologists themselves. Members of the Edinburgh group openly express their disagreement with what they claim to be the 'idealism' in the work of Collins, who appears to argue that scientific ideas are determined less by the behaviour of the material world than by that of the scientists who examine this behaviour.

Collins describes this as "a theoretical argument that has been going on for 25 years", but says that the differences separating him from the Edinburgh school are relatively unimportant compared to what they have in common, especially when it comes to detailed studies of scientific work.

Some argue that the Edinburgh school holds less influence today that its critics think, pointing out that its popularity was already being overtaken in the late 1980s by writers such as the French sociologist Bruno Latour, who rejects 'social constructivist' ideas and directly studied how scientists actually carry out research in the laboratory, not merely what is written about it.

"In the 1970s, the 'strong programme' was the intellectual spine against which any other school of thought in the sociology of scientific knowledge had to define itself, in the same way that Latour and the people around him became the centre of things in the 1980s," says one sociologist.

Other philosophers remain sceptical of the whole endeavour, arguing that supporters of the 'strong programme' — ironically in common with some of the philosophical rationalists they criticize — are wrong to ignore the important ways in which science, however chaotic an activity, does enable the emergence of basic truths about nature.

"The sociologists of science have done a lot of exciting and interesting empirical work," says David Papineau, professor of philosophy at Kings College, London. "But they are wrong in their view that this experimental approach shows that science is 'constructed', and that it does not get at something that we can call the truth." But that interpretation is challenged by members of the Edinburgh group, who claim to be looking at how truth is 'discovered' through being 'constructed'.

David Dickson

European sparks fail to ignite

Despite a few light skirmishes (see opposite), and the fact that the work of various European researchers has been dragged into the conflict in the United States, the Science Wars have so far failed to ignite into a major conflagration in Europe itself.

Earlier this year there were signs that it might be about to happen. The fuse appears to have been lit when articles stimulated by the 'Sokal hoax' appeared in newspapers such as *Le Monde* in France, Germany's *Die Zeit*, and Britain's *Times Literary Supplement* (see *Nature* 385, 381; 1997).

There have also been isolated instances in which aspects of the conflict have flared up in individual universities. One historian of science, for example, failed to be appointed to a chair at one European university after newspaper coverage about his possible appointment — although there is no clear evidence that his academic views were responsible for the decision.

But there has been little of the violent reaction to the sociology of scientific knowledge that has become a prominent feature of the US academic scene over the past couple of years. Nor do the growing number of groups that teach such subjects at universities feel themselves threatened in the same way.

Some claim that this is because the achievements of the area known as 'science and technology studies' (STS) in analysing the impact of social pressures on the content of science and technology are becoming increasingly embedded into important aspects of government strategy.

"One of the success stories of STS in Europe is its significant contribution to the techniques of 'constructive technology assessment', which is becoming accepted in countries such as the Netherlands," says Wiebe Bijker of the University of Maastricht, who has already given seminars on 'social constructivism' to top government officials.

Bruno Latour, of the Ecole des Mines in Paris — one of the authors whose work has been both influential and frequently criticized in the United States (as well as in Europe) — suggests that support for European scientists is not as directly dependent on public opinion as it is in US politics, and is not therefore felt to be as threatened by public criticism.

"In many European countries, science has grown up embedded in [the machinery of] the state," says Latour. "This makes scientists feel more secure." Latour experienced US reaction to his ideas about how science works at first hand when he was turned down for a position at the Institute for Advanced Study at Princeton University several years ago.

He points out that in France virtually no natural scientists have taken part in debate about Sokal's article, and that its impact has been primarily among social scientists, some of whom agree strongly with Sokal on the limitations — and occasional absurdities — of post-modernist writers.

D.D.

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