

One man, two cultures, one discipline

Robert Walgate speaks to a former film-maker who subjected himself to the 'discipline' of science, and succeeded

"IT WAS a pretty nasty business" said Michael Shallis, gesticulating from his office chair against a blackboard backdrop of equations and graphs, "making cinema commercials. I spent a year as a staff film director for the Rank Organisation." He laughed. "It was really quite ludicrous — we'd make about six a day."

Dr Shallis is now a research fellow with Professor Donald Blackwell in the Department of Astrophysics at Oxford, making ultraprecise, painstaking measurements of the oscillator strengths of spectral lines of iron and other elements, to create a new basis for classical stellar spectroscopy.

He took no interest in science at school; avoided university; and joined a film school in London. He became an editor with Movietone News, the last of the cinema newsreel makers.

But during the sixties he became "exposed to science in one or two curious ways. I was absolutely spellbound by a series on television by J. Z. Young, the biologist — I've still got the little BBC two and sixpenny booklet that went with it. I found that the way he thought was very like the way I thought".

"In the film industry, the way I thought was very different from the people I was working with. I can't really explain it because I didn't at the time understand it myself."

Could he understand it retrospectively? Very diffidently Shallis said that he had an objective curiosity which he could see reflected in Young; whereas the people in the film business work mainly from their emotional rather than intellectual centres.

Shallis felt he wanted to make a film about the way science shaped us, how society might develop — but he found it difficult to interest a backer. "I spent quite a lot of time seeing if I could combine some sort of interest in the sciences with other things . . ."

Shallis's shift to the physically objective, the rational — wasn't that totally against the trend of the times, which was to abandon science and technology for the mystical?

"Yes, as that happened I did exactly the opposite. Then I reached a decision in

1970, when I was 27, that the only way I'd understand about science was by going and doing it."

The next thing was to work out how to do it, with A-levels in art and English. He started reading books on science, and began to see that he was more interested in cosmological and astronomical ideas than biological. Shallis was amazed to discover Professor Elton's conversion course from arts to sciences at the University of Surrey. He spent a year on that and emerged four years later with a first in physical sciences. Both courses have now closed.

There was a lot of spectroscopy in the course; he was interested in astronomy (he built a photometer for his telescope as a final year project); and when it came to choosing where to do research he chose Blackwell's group.

"I don't regret the decision. I think the work we do here is the most interesting in ground-based astronomy in this country. I'm a pragmatic person; so I'd always have been an experimenter or an observer. I was pragmatic in film-making too, interested in behaviour rather than inner psychological motives."

Wasn't the kind of science he was doing with Blackwell very painstaking and unspectacular? Wasn't the amount of emotional return that he could get from measuring the width of a spectral line pretty small?

"Well it was something I really needed to do. From the almost "anything goes" attitude within films, to the highly disciplined work that we do . . . I had to work very slowly and carefully, to learn that sort of rigorous discipline, which I'd never learnt in the arts at all. So I needed in the sciences very much to discover that rigour — in order, in fact, to release my creativity.

"The gap between the two cultures is probably widening. Up until the age of 27 I'd never met a scientist. At school they were completely a different breed. But now I've crossed the gap and discovered they are not a different breed at all, but actually doing the same thing. That has always interested me."

So why is the gap there? Partly for social and educational reasons — it's the way we

are brought up; partly because scientists like it to be there. There's a sort of class distinction on both sides.

But also it's a matter of access; anyone can buy a book or a record. "You can go up to a man in the street and say have you seen the latest Woody Allen or have you heard about the Picasso exhibition at the Tate gallery and he'll say yes I have, I haven't seen it, but I know about it and I think Picasso's bloody awful; but if you ask him about the latest experiment in particle physics he'll look at you and gape and say, Ugh! At least the creative arts are accessible.

"People's hostility to science is growing and will continue to grow. As pollution and nuclear accidents and these things continue, hostility will grow and will grow rampantly.

"One of the problems scientists face is that they are so bound up in what they are doing, they generally fail to see why other people aren't. They find it very hard to see that other people don't necessarily find what they are doing fascinating. One sees this in the arts too. But it's more important in the sciences, because of the impact of technology on lives."

Now that Shallis has been through his creative period and his discipline he wants to loosen the discipline again.

"In a sense I want to integrate my experience. There are a lot of things I want to say about it. Which is why I want to move more into communication, writing books, teaching with the Department of External Studies. However fascinating research is, I still feel it is missing out on a lot of things, and there are other things I want to do.

"There are a lot of gaps to be filled in popularisation. The man in the street has very lopsided and wrong views about the nature of science, in ways that affect his life — like interpreting statistics.

"The thing that concerns me most within science itself is — I'm stepping carefully here — the lack of an ethical basis and the lack of a spiritual basis. It worries me very greatly.

"I came across a quotation from Jung last night: 'The rationalist unbeliever who has no gods left in his heart is tormented by the devils in his brain'. I think that's very good. Science as a collective thing has become a sort of rationalist unbelieving



Michael Shallis: film-maker turned astronomer

entity with no gods left in its heart. And so it is tormented by the devils in its brain.

"One sees it in individual scientists to a greater or lesser extent. There's a scientist I know who believes — and it's a very widely held view — that ultimately everything in the universe can be reduced to physics. It is a very very sterile view, and one that I think is untenable. And in a sense their lives reflect this, their lives become extremely barren. Science is getting more and more materialist.

"Dora Russell said in her autobiography that science became inaccessible with relativity theory; and she saw that as the source of a lot of difficulties in the 20th century. Relativity theory was the first step towards obscurity."

How could ethics be grafted onto or grow out of science? "I'm sure there can be an ethical basis for science. The ethics have to come into the applications and the choice of science. It's tied up with the ethical basis of society."

Doesn't the scientist now have the ethics of the mercenary? Will he not do his science for whoever pays? "Yes. He thinks the freedom to investigate nature how he wants is his ultimate right. But I don't think anyone has ultimate rights.

"Take the use of animals. What ethical basis can you have for doing experiments with animals? The scientific community says animals should be available for whatever purposes we deem we need them for. We will be as humane as we can within those terms, but ultimately our interests over-ride the concern for the animals. I think that is a devastating ethic for science."

The discussions are always expedient, rather than ethical. "Of course that is a difficulty that our society in general faces — society doesn't have an ethic any longer that gives us any basis for our political judgements, our economic judgements, our personal judgements."

What about the spiritual element? "It is certainly lacking. Very few scientists have a feeling of awe about the universe; a few talk about it; but the whole thing becomes rather mundane for them."

But what should a group do? Every Saturday morning gather round and have a contemplation exercise? Shallis, laughing: "Maybe they should, quite possibly . . . I haven't any answers, you see, I'm just beginning to become concerned with these things, and the more I think about it the more I become worried."

Does Shallis get any spiritual return from his spectral lines? "Out of science I get very little." But what kicks, I asked, *does* he get?

He is very enthused by the programme of Professor Balckwell's department. "Yes, that is very interesting, this is the kick, but so what? Can we justify that kick on other grounds? Is it enough? Matisse gets a kick out of doing a painting; a scientist out of his piece of science. On an individual basis that's fine. But what happens then?

Animal or vegetable?

VEGETARIANISM is a fascinating and delicate subject. It must be treated with tact because to many people it is of religious significance, but its scientific side compels interest and discussion. Bernard Shaw used to tell hostesses who invited him to dinner that he would not come to eat dead animals. He also refused to eat asparagus, which he said was a very nasty vegetable. His ebullient contemporary, GK Chesterton, in contrast, wrote some rollicking verses that made fun of non-meat-eaters, and non-milk-drinkers ("I will stick to wine and sherry, because they are so very, so very, very, very vegetarian").

An important step towards asserting the rights of plants was taken when it was found that cytochrome *c* of wheat and vertebrate animals had amino acid sequences so similar as to betoken the sharing of a common ancestor¹. Indeed, the sequences of the cytochromes *c* show a phylogenetic relationship throughout the eukaryotes and extending to the purple bacteria. We cannot even eat a mushroom without devouring a relative. Some people talk and play music to their house plants, and we may soon hear of a Society For The Prevention Of Cruelty to Vegetables.

Deficiencies in foods of vegetable origin have been responsible in many countries for slow growth in children and, in consequence, for undersized adults. Even in the "developed" countries, it is sometimes ruefully pointed out that farm animals often receive better dietary treatment than human beings. This may be partly because cows do not read.

About 40 years ago it was evident that something in meat and fish, an "animal protein factor", was needed by chickens and pigs to correct a deficiency in diets consisting of foods of plant origin. Soybean meal, although a valuable food, lacked the missing substance. It was amusing and paradoxical that a vegetarian friend of mine, Lester Smith, successfully hunted down the missing substance in beef liver. In 1948, he isolated the anti-pernicious-anemia factor, which was also the animal protein factor. Simultaneously, the substance had been isolated from fermentation of a soil microorganism *Streptomyces griseus*². The compound was re-named "vitamin B₁₂", and the catchy designation did wonders for it. US professional football players, so I read recently, sometimes receive vitamin B₁₂ injections to prepare them for the fray. Faith can move mountains.

Green plants do not make or need

someone buys the painting or not is an irrelevancy to him; but the products of science are used and manipulated. I have no objection to the individual scientist; it is the influence of the collective. But then where does one draw the line?" □



THOMAS JUKES

vitamin B₁₂. It all comes from microorganisms. Animals receive their supply from milk, or by predation, or from bacteria in the digestive tract, or by voluntary or involuntary coprophagy. The ruminating cow has an internal fermentation vat from which vitamin B₁₂ gets in her milk to the benefit of lacto-vegetarians and other consumers of dairy products. Rabbits, less fastidious, consume their own faeces at night to obtain vitamin B₁₂. McGee³ described the preservation, drying and consumption of faeces by the Seri Indians of Tiburon Island in the Gulf of California, who felt that endurance for the hard warpath on prolonged chase was augmented by this practice. Perhaps this was another case of faith moving mountains.

The consumption of meat is currently under criticism because its production is wasteful of food resources, such as cereal grains, that could be consumed directly by people. Against this, it is argued that grains are deficient in iron, and are poor sources of proteins. It is also true that ruminant animals supply us with meat and milk while consuming large quantities of forage and roughage, such as stalks and straw, that are not edible by human beings. The fermentation vat of the rumen converts the roughage to soluble nutrients. Some of the rumen organisms, *Methanobacteria* are strict anaerobes that may be "living fossils" of a very ancient era.

(1) Stevens, F.C., Glazer, A.N., and Smith, E.L. *J. Biol. Chem.* 242: 2764-2779, 1967.

(2) Rickes, E.L. *et al Science*, 108: 634-636, 1948.

(3) McGee, W.J., *17th Annual Report, Bureau of American Ethnology, Part 1*, p.212, Washington, D.C., 1898.