

TELEVISION REVIEW

Broadening Horizons

HORIZON, BBC Television's science feature, has eased its way back on to our screens for the autumn with little of the fuss and fanfare surrounding one-off specials like *The Life Game*. With true professionalism, the series has built from a gentle start with Konrad Lorenz and his performing geese followed by the immediate human impact of the problems of spastics, before moving on to the hard stuff of plant genetics and the even harder stuff of black holes. Even granting that Lorenz provided in some way an easy first programme, however, whether by luck or judgment the *Horizon* team can bask in the knowledge that their programme was screened just a few weeks before the man was awarded a Nobel Prize.

Like the series itself, individual programmes seem designed to lead the casual viewer gently into the mysteries of the week's chosen topic; rose gardens, for example, providing an easy lead in to the mysteries of genetics and the possibilities of easing the world food problem by genetic tinkering. This ordered structure is a great aid to the viewer, and the two *Horizon* programmes (*Gilding the Lily* and *The Black Holes of Gravity*) which appeared in the weeks immediately before and after *The Life Game* (reviewed in *Nature* last week) emphasised only too clearly the failings of the latter in this respect. The first beat *The Life Game* at a part, at least, of its own game; the second covered an

equally broad topic more clearly, more entertainingly, in less than half the time and at much less than half the cost.

What were the particular virtues of *The Black Holes of Gravity* which made this programme such a striking example of both good science and good entertainment? Continuity is perhaps the key without which all technical tricks are useless, and the programme, after a quick pre-title flash, began at the beginning of man's fumbling with the secrets of gravity, building from Greek ideas to those of modern relativists. Indeed, black holes were not mentioned after the titles for a full 40 minutes, in a programme only 55 minutes long. Given the logical buildup of the theme, the visual aids available to TV were used imaginatively and helpfully in the context of the theme. Both graphics and models assisted the viewer to understand the theories being propounded, although in one case it did seem that a computer graphic display was used because it was pretty (which it certainly was) rather than because it was informative (which it certainly was not).

With one notable exception, the programme also avoided straying into sensationalism in what is, after all, a pretty sensational subject. For example, Professor Joseph Weber's enthusiastic claims that 200 gravity wave events are being recorded by his equipment each month was matched by Dr Tony Tyson's sober assessment of what is now the general view, that Weber is probably observing something other than gravity

waves. It was a little odd that the possibility of a gravitational "constant" which varies with the age of the Universe was introduced without mentioning Hoyle's work—but on the other hand it was pleasant to see a British-made programme about the frontiers of astronomical knowledge which showed a few different faces, and no doubt that explains the absence of that bastion of astronomy in this case.

The exception to this sober approach unfortunately came right at the end of the programme, and thus left a slightly sour aftertaste. Professor John Taylor, gazing earnestly into the camera, spoke sincerely of the philosophical implications of black holes, and how they will swallow up the Universe so that "in the future there will be no future". Stirring stuff, but he did neglect to point out that this calamity is not due to take place tomorrow, or even in the next 10^9 years, so that we can for the immediate present concentrate on the more mundane problems facing the world.

Even with that caveat the programme stood as a glowing example of why the best of BBC TV science is the best TV science in the world. Perhaps the team responsible for the BBC science epics should, after their recent failure to maintain their own high standards, be made to take a refresher course in the fundamentals of producing entertaining and informative science programmes, by being set to watch a series of the best of *Horizon*.

JOHN GRIBBIN

CORRESPONDENCE

Smoking, Pregnancy and Publicity

SIR,—P. R. J. Burch (*Nature*, 245, 277; 1973) quotes some articles by Professor Yerushalmy which, he claims, support the notion that it is the 'smoker' rather than the 'smoking' which is responsible for the association between low birthweight and smoking in pregnancy. Unfortunately, Yerushalmy's analyses^{1,2} are statistically unsound, a fact I have discussed in detail elsewhere^{3,4}.

Briefly, what Dr Burch describes as "inconsistencies" in the "causal hypothesis" arise from straightforward statistical misunderstandings. The first so-called "inconsistency" is that among low birthweight babies ($\leq 2,500$ g), those whose mothers smoked during pregnancy have a lower perinatal mortality rate and a lower severe congenital anomaly rate than those whose mothers did not smoke. The explanation for this find-

ing simply follows from the (undisputed) fact that the distribution of birthweights for the babies of smokers is the same as that for non-smokers except that it is shifted downwards by about 170 g. It necessarily follows that, for babies $\leq 2,500$ g, the birthweight distribution has a higher mean value for smokers than for non-smokers. It is not surprising, therefore, that the low birthweight babies of smokers fare better than the low birthweight babies of non-smokers.

The second point concerns the fate of babies born to mothers before the mothers started to smoke. In comparing mothers who had never smoked with those who started smoking before they were 25, Yerushalmy unfortunately did not carry out an age standardisation. In particular, the latter group will tend

to have had babies at younger ages and would therefore be expected to have had lighter babies. To my knowledge, Yerushalmy has still not carried out a proper standardisation and until this is done his conclusions cannot be accepted.

It seems to me that the statistical evidence for an association between smoking in pregnancy, low birthweight and perinatal mortality remains strong. The only point which is really at issue is the nature of the mechanism responsible for the association, whether the smoking itself causes the lowered birthweight and so on, or whether some pre-existing characteristics of the woman are responsible for both. Some studies currently in progress, comparing babies born to women who have been actively persuaded to give up smoking during pregnancy with those born to women

who have not, should help us to distinguish between these two hypotheses.

Yours faithfully,

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¹ Yerushalmy, J., *Am. J. Epidemiol.*, **93**, 443 (1971).

² Yerushalmy, J., *Am. J. Obstet. Gynecol.*, **112**, 277 (1972).

³ Goldstein, H., *Am. J. Epidemiol.*, **95**, 1 (1972).

⁴ Goldstein, H., *Am. J. Obstet. Gynecol.*, **114**, 570 (1972).

SIR,—Your editorial (*Nature*, **245**, 61; 1973) raises a central problem in environmental protection: when action is justified on the basis of incomplete evidence. You are correct that the study by Goldstein *et al.* does not prove that smoking during pregnancy causes the deaths of 1,500 babies in Britain each year, but the study does indicate a substantial probability that it does. You may possibly be right that an effective campaign to prevent pregnant women from smoking might cause comparably serious side effects, but the probability that it would is surely much smaller. You place yourself in a curious logical position, because the standard of proof you demand—"that compulsory abstention produces the same sort of statistics as voluntary abstention"—could only be obtained by a campaign of the kind to which you object.

A determined campaign to eliminate smoking, started in the early nineties, would, if effective, have probably averted at least a million smoking-related deaths. Paraphrasing your arguments, it is "quite possible" that it would also have had undesirable side effects. "Perhaps" involuntary ex-smokers would have died in large

numbers from stomach ulcers, or road accidents, or other ill-defined consequences of "well-known tensions", but the balance of probabilities is and was against this. Those who opposed controls on smoking in the 1960s should now have a heavy burden on their consciences.

The same questions are raised by almost every major environmental health issue, whether sulphur in fuel, lead in petrol, DDT on food crops, or asbestos in beverages. It is never possible to 'prove' hazard completely, because of the host of uncontrolled variables and the lack of unexposed controls. Decisions to act against a hazard must always be made on incomplete evidence. But those who argue for inaction until the hazard is 'proved' bear as much moral responsibility for the consequences of their recommendations as those who urge action before the evidence for hazard is compelling.

In your case, the burden of responsibility is relatively light. The course of inaction which you recommend would probably result in the deaths of only about 1,500 babies a year in Britain, or perhaps 50,000 a year world-wide. As you say, perhaps the effects would be less serious, or even beneficial. But the weight of evidence, as it exists now, is against you. I hope your conscience will remain clear.

Yours faithfully,

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A list of books received will appear in the November 2 issue of *Nature*.

Announcements

Erratum

In the book review 'Electromyography' (on page 437 of this issue) the title of the book should be *New Developments in Electromyography and Clinical Neurophysiology*.

International Meetings

December 2–5, **First International Symposium and Exposition on Ozone for Wastewater Treatment** (International Ozone Institute, 24 Central Avenue, Waterbury, Connecticut 06702, Myron E. Browning).

December 3–4, **The Mammalian Fetus-Comparative Biology and Methodology** (Dr E. S. E. Hafez, Department of Gynecology-Obstetrics, 550 E. Canfield, Detroit, Michigan 48201).

December 3–5, **Advances in Analytical Toxicology** (Registrar, Institute of Clinical Toxicology, PO Box 2565, Houston, Texas 77001).

December 4, **Technology of Superplasticity** (The Meetings Officer, The Institute of Physics, 47 Belgrave Square, London SW1X 8QX).

December 4, **Analytical Techniques for the Museum and Art Gallery** (The Society for Analytical Chemistry, 9/10 Savile Row, London W1X 1AF).

December 4–5, **The Selection of Materials in Machine Design** (Conference Department, Institution of Mechanical Engineers, 1 Birdcage Walk, London SW1H 9JJ).

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