

THE BROADCASTING SERVICE

POISONED MINES : LEAD

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MISS S. SCHERWHEIM.

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JOHN FIELDING:

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Spaghetti Junction, Birmingham. Britain's best known piece of motorway. Dirty, noisy, efficient and poisonous. One million cars, trucks and buses use this interchange every week, each one leaving a trace of one of nature's most lethal poisons. Lead.

Massive lead poisoning brings death, but small amounts can damage the foetus or, in adults, induce brain damage, paralysis or coma. Since the 1920s lead has been added to petrol in Britain as a matter of course, to improve performance and reduce engine knock. As a result lead in minute quantities now pollutes everything we touch. To live here and in inner cities is to absorb more from cradle to grave than anywhere else outside industry. Houses, shops, schools, grass, water and air carry a burden of lead that inevitably and remorselessly is transferred to the blood, bones, teeth and brain of every one in the city. Even before Spaghetti Junction or the Gravelly Hill interchange was opened in 1972, there was concern that the road on stilts through the heart of Britain's second city would bring health dangers. Two years after its opening lead levels in local residents' blood had already more than doubled. But the latest Gravelly Hill monitoring exercise, completed in December last year, entitled "Lead Pollution in Birmingham," was reassuring in tone. In his foreward Minister for the Environment, Denis Howell, expressed only one note of mild concern. "There's some indication there may be a problem of lead intake for some preschool children living in central areas." But, he added, "Respiration of air borne lead seems not to be responsible. But this and other conclusions are queried by one man who helped draw up the report. Dr. Bob Stephens, Reader in Chemistry at Birmingham University.

DR. ROBERT STEPHENS:

It is a collection of data. Levels of lead in dust, air, and blood of men, women and children. But it's the interpretation to be placed upon those levels that's important and the brief of that working party was not concerned with that at all. There was no way in which they could make a scientific comment on the health significance of the levels they so carefully established.

J.F:

Well, I'm reading from the Minister - his foreward here, he says the studies have not shown any cause for special concern about lead pollution from such concentrations of traffic as there is around the Gravelly Hill interchange.

DR. R.S:

Well, the essence, the essence of the reply to that is there was no facility within that survey that would permit such a comment to be made scientifically.

J.F:

I assume from that comment of yours that you don't go along with the foreward by the Minister, is that right?

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DR.F.S:

Well, since the 1st or so of January 1978 that is so. Before that I was not really in a position to assess the data in the way that I can now, based on work from America, Canada and Western Germany. Science moves on, sometimes with incredible speed, and I think, in fact, the recent events illustrate this beautifully. There is no way in science where you can quite arbitrarily say the working party has ceased functioning therefore the problem is solved. No, science moves on. In fact, in this case it moved on with embarrassing speed, both for me and the other members of the working party.

J.F:

The recent events that have embarrassed Dr.Stephens are two psychiatric studies in which American inner city children, with officially acceptable lead levels, were put through a series of tests. Since these children were not obviously sick, the tests posed a challenging question: can lead levels well within previously accepted safety margins nevertheless effect such fundamentals as intelligence and learning ability? Dr.Oliver David.

DR.OLIVER DAVID: (Child psychiatrist)

I suppose it was an idea whose time came at about the time that I was thinking about it, when the logic of that association hit me I was convinced that the work had already been done because it seemed so reasonable. But when I went looking through the literature I found absolutely nothing bearing on that, and found that really there was this very heavy line called the threshold that somehow was magic, that beyond it you were sick, not beyond it you were well and it just doesn't make any sense.

J.F:

If you reject that idea of a threshold it must surely mean that very low lead levels may have a damaging effect on children that don't appear actually to be clinically sick?

DR.O.D:

Well, logic pushes you one step further. If, in fact, these minimally elevated lead levels are causing these milder clinical effects what about still lower levels causing deleterious effects that are not identifiable as illness? In other words, lead can effect the brain in a deleterious way and it need not be manifest as illness but it still represents a potential major damage. Certainly if we value the central nervous system as species anything that has the potential to deleteriously effect it is something to be guarded against.

J.F:

Dr.David's team checked a sample of New York children aged from five to 12. All showed apparently normal, apparently acceptable lead levels. Those with obvious physical or mental problems were excluded.

- FILM of children undergoing tests -

J.F:

Social and economic background, sex and cultural differences were also taken into account. This apparently normal, healthy sample was then assessed by parents, teachers, guidance councillors and finally doctors. The results showed a direct link between previously acceptable lead levels in blood and hyperactivity, learning difficulties, poor attention and disruptive behaviour. For years lead in the human body was only regarded as a danger to health, bringing serious illness in adults and irreversible brain damage and death to children, when it reached 80 microgrammes per hundred millilitres of blood. Fifteen years ago better monitoring and increased research resulted in a lowering of the danger threshold for children to 60 microgrammes then 40 microgrammes. In the 1970s the World Health Organisation reduced this level still further to 35 microgrammes and research continued. Studies began to indicate subtle but disturbing brain impairment especially among preschool children at levels as low as 20 microgrammes. American studies published in the last six months now suggest similar impairment at no more than 10 microgrammes.

The impairment is checked here at Harvard Children's Hospital in Boston. Can the child follow simple instructions?

- FILM of tests -

Another of 37 different tests measures the child's reaction time. A further test explores memory and verbal capacity. The findings from these Boston tests will be published next month. They reinforce the New York studies showing impaired intellectual ability in children with lead levels hitherto regarded as normal. The study was headed by psychiatrist who's especially concerned for preschool children, Dr. Herbert Needleman.

DR. HERBERT NEEDLEMAN:

The evidence is that the younger child is more vulnerable for a number of reasons. One is that the brain may be more permeable to lead. Secondly, that developmental sequences are unfolding at that time and generally when something is developing it's more vulnerable than when its development is fixed. So younger children certainly are at greater risk.

J.F:

Now, you're a psychiatrist, isn't lead poisoning really the area of interest for environmentalists and physicians?

DR. H.N:

Well, it became clear to me that lead was larger than a purely medical issue,

it was a social, environmental issue in that we couldn't do anything serious about it so we attacked it on those levels, and later I found myself in community psychiatry and my work with the schools convinced me that there were a number of children in the inner city who had severe behavioural deficits, intellectual deficit and raised for me the question how many of these were due to preventable experience with a brain poison.

J.F:

That brain poison is readily stored and easily measured in teeth. In fact, in 1974 a study financed by the City of Birmingham and carried out by Birmingham University compared lead levels in city children's teeth with those from rural children. Although much higher levels were found in the city children, they were thought at the time to be reassuringly safe, so no follow-up studies were carried out. It's only now that those old figures are being measured against the new criteria suggested in the latest work from Needleman.

DR.R.S:

He established two groups. One with a lower level of lead in teeth, one with a high level of lead in teeth. Now the figures that he gave permitted me then to use a survey that had been done independently in this department with funding from the City Council on levels of lead in Birmingham's teeth....children's milk teeth; and then I could assess from Needleman's studies roughly how many children in this city would come into Needleman's affected group.

J.F:

Now, what figures did you come up with when you ran that exercise?

DR.R.S:

About 19% of the Birmingham group would be in Needleman's affected group.

J.F:

Now, translate that into simple terms for me.

DR.R.S:

When the survey ended on the 31st August 1974 there were 210,300 children under the age of 12 in the City of Birmingham. So that's about 40,000 children across the city.

J.F:

That's a fairly staggering number isn't it?

DR.R.S:

Well, the situation, in fact, becomes more grave. I have a letter here from Professor Wineker* who is head of the Department of Physiological Psychology at the University of Dusseldorf. He establishes an effective group with a maximum level of lead in teeth which would mean that 30% of the children in Birmingham were above that range.

* phonetic spelling

J.F:

So far in Britain inner city children in their leaded environment have not been subjected to the psychiatric tests carried out in the United States and Germany. Although for the last four years two Birmingham University psychiatrists have been trying to raise the money to do so. So far they've been turned down twice by the Department of the Environment and also by the Medical Research Council, the European Economic Community and the Department of Health. They were asking for £40,000. Is the intelligence of these children already being eroded by lead? If only because of its immense implications nobody wants to answer that question. Bob Stephens.

DR.R.S:

They are subtle effects. They require very careful instrumented methods of assessment.

J.F:

Are they, in fact, so subtle that they're not worth bothering about?

DR.R.S:

Ah well, that's the big question. I think I ought to quote a very eminent medical statistician on this campus. He said to me not so long ago that a decrease of one unit of IQ in a population would be of great social significance, but there is no method available at present and he could not see there ever being a method available that would assess such a small change. The only way in which you would get an unequivocal demonstration of an effect is at a level of the order of 15 units of an IQ but such a situation would be calamitous, and that is the essence of the dilemma.

J.F:

In fact, Needleman has managed to measure IQ reductions more accurately and suggests that even very low levels of lead in children are responsible for a drop in IQ of between seven and 10 points. Psychiatric research in America is continuing but in Britain nothing.

Is there anything other than simple lack of awareness of the significance of the situation which people like you are up against in trying to get research off the ground?

DR.R.S:

Very difficult to say. I would say this though, that I am conscious of the enormous sums of money involved in taking preventive steps against lead in the environment, whether it be lead in water, coming from lead in water pipes in houses or lead in dust coming principally from lead in petrol. There are large sums of money, very large.

J.F:

So large that they affect decisions made at the highest levels?

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DR.R.S:

Well, so large as to make the cost of studies such as the ones we want to do trivial, that is the strange almost ironic situation that we're in.

J.F:

What is the simplest way of reducing the amount of environmental lead that is around?

DR.R.S:

The simplest way at the moment I think, the way that will have the biggest impact would be to remove lead from air because the lead in the air is contributing through dust to direct ingestion in young children, through sucking their fingers and hands, also through contamination of foodstuffs in city areas.

J.F:

Now, how do you set about doing that? To remove it from the air?

DR.R.S:

Well, one could remove lead from petrol.

J.F:

Would it be possible to say, for instance, if lead-free gasoline was introduced tomorrow and no more lead was ever added that half the environmental lead would disappear?

DR.R.S:

It would take a little time. One would have a purging process going on, rain and wind would slowly remove lead from cities. Now I don't know how long that would take but I think once the levels of lead in dust in cities had been reduced by these processes the blood leads of children would fall significantly, by something of the order of 30 to 40% at least.

J.F:

Three years ago America took the initiative in curbing atmospheric pollution by requiring all new cars to run on lead-free petrol. Before 1975 28,000 tonnes of lead a year entered the atmosphere by car exhausts. Now that figure has been cut by almost 50% and last month the American Environmental Protection Agency tightened its permitted levels of atmospheric lead to half those currently accepted in Britain and Europe. Oil technologist, Ted De Palma.

TED DE PALMA: (Universal Oil Products)

I personally believe that lead should be removed primarily because it's not good for me in my lungs and, you know, whether you're a man or a woman, tall, short fat, skinny, whatever, we all breathe the same way and if it's toxic I don't want it.

J.F:

Would it be an impossible task to physically modify the refineries so that they could go to 100% non-leaded gasoline?

T.D.P:

No, it is not physically impossible but what we must remember is there is no such thing as a normal refinery, just as there is no normal fingerprint. They are all different, you see, and there are some refineries that would be easier to upgrade than others, so it is not physically impossible, it's simply a matter of time and capital.

J.F:

If the oil companies were prepared to spend that capital what kind of benefits would there be for the motorist?

T.D.P:

We know, it's been documented, that spark plug life is increased by a factor of two or three. This is money in our pockets. Following that, coming on down through the combustion chamber we have looked at, and it's been documented by others, that piston ring wear, connecting rods, bearing wear, main bearing wear and so on is all reduced significantly as well as combustion chamber deposits. So that in the long run, if the engine lasts longer, it's money in our pockets. And then finally, looking at the exhaust piping, there is no question that the exhaust pipe, the engine pipe, the muffler, tail pipe, the life of those are all increased again by a factor of two or three. So this is real money in our pockets and it's been estimated that the value of this to the consumer is between three and five cents per gallon - very significant.

J.F:

Not only is unleaded petrol better for your wallet, your car and your health, one major oil company, Amoco, 40% of whose production is now lead free, is challenging the traditional argument that to manufacture unleaded petrol much more crude oil is needed. Dr. Kenneth McHenry.

When it comes to a question of using more crude to make unleaded gas, is that, in fact, true?

DR. KENNETH McHENRY: (Amoco)

Well, you don't use very much more crude. You use some more because the processing requires more heat and that requires the use of more energy in the refinery, but it's not an important factor.

J.F:

What is...is...can you put any figures on the difference, I mean in percentage terms or in any other way you like?

DR. K. Mc:

Well, I would...my best guess is that it's no more than a percent or two of additional crude that's required to make lead-free gasoline as compared to leaded gas.

J.F:

What do you say to the thought that there is a reluctance within the oil industry to ..to go ahead at full speed and convert to non-leaded gas?

DR. K. Mc:

Tough question. It's again the idea of who wants to be out there first and jumping into something that he doesn't know anything about and investing a lot of money in it, and hoping that the rest of the industry is going to go along. It's much easier once somebody says you have to do it then everybody knows where he stands.

J.F:

In Britain there is no lead-free petrol and no pressure to introduce it. In fact, the amount of lead added to petrol has been allowed to rise well above the 10,600 tonnes a year maximum the Government promised to maintain from 1971. Meanwhile in Germany the permitted amount of lead per gallon is already one quarter of the British figure. British oil companies would only discuss the question with us through the Institute of Petroleum.

STANLEY PARKINSON:

The position is quite simple, that if the competent authorities decided that the levels of lead in petrol are either too high or shouldn't be there at all then, of course, the Institute would naturally abide by whatever decision was made. At present though specialist committees have not been able to find any evidence which leads them to depart from the views expressed by these independent experts.

J.F:

Since lead is an acknowledged poison, why is it somebody other than the petroleum industry that has to take the decision to move away from lead in petrol?

S.P:

We prefer these judgments on health are not made by us, are made by independent experts. You ask where the Institute stands, it stands in that sense, there are independent experts, independent of Government and of us, and it is up to them to make judgments as to whether there's a health hazard or not, and then it's up to Government to decide if that health hazard exists, how large it is and what are the economic consequences of making a change of direction. We have come to the conclusion that we have no reason at present to disagree with the advice that the competent authorities have given the Government.

J.F:

What is your Institute's reaction to the American Environmental Protection Agency decision taken some time ago that progressive introduction should be made of lead-free gasoline in America?

S.P:

Well, if that is their choice it is presumably made by their Government in consultation with their appropriate authorities, a view that doesn't seem to be shared by the medical experts in this country.

J.F:

What's good about lead as far as you and I are concerned, as people who breathe the air in our city streets, anything?

S.P:

Not neces....no, I don't suppose there is and it should be reduced wherever possible, but where that reduction takes place, of course, weight has to be given to economic factors and this is something for the Government to decide.

J.F:

The Minister for the Environment is the Right Honourable Denis Howell, MP for Small Heath, Birmingham. Neither he nor anyone from his Department would reply on film, verbally or in writing, to a list of questions submitted by us relating to lead in our environment. Since the Minister's constituency is an inner city one and close to Spaghetti Junction, we decided to test the lead level of window dirt in Coventry Road, Small Heath, and check it against Government recommended safe levels for areas frequented by children. Birmingham University's Department of Analytical Chemistry removed the dirt from the window water and measured the lead content on a photospectrometer. The formal note of the findings stated that the lead content of the dust was 6,333 parts per million, rather more than 200 times higher than the Government's safe maximum safe exposure level. There is now no single place in the world that is free of lead pollution and by far the greatest source is motor car exhaust. It's a bizarre thought that while Birmingham year in year out breathes airborne lead from this and other motorways, the city earns millions by selling British cars for export to America designed at minimal extra cost to run on lead-free petrol. We now know more about lead than we ever have done and the information points strongly in one direction. It's bad news, according to experts both here and in America. Bob Stephens.

DR.R.S:

What one is looking for is an emerging pattern and over the past seven years of reading the literature diligently I detect a change which is now being verified by Needleman and Wincker.

J.F:

And, what I'm asking you is whether in the highest reaches of our health administration there are people who are taking whatever action you think is appropriate?

DR.R.S:

I'm not aware of it at the present time, no.

J.F:

Not enough is being done?

J.S:

I feel not, no.

J.F:

Is there a proper appreciation of the significance of what you're saying within the scientific community?

DR.H.N:

I don't think so. I think it may be the second most important disease for children in this country and I don't think it gets the attention that's warranted.

J.F:

Why not?

DR.H.N:

Because it is assumed to be relegated to the poorer segment of our population, somehow they are at fault for being exposed to this. There are interests at work in obscuring these alarming questions. I think that sums it up.

J.F:

Which interests?

DR.H.N:

I think commercial interests are...have exerted themselves to make the point that people like me are alarmist about lead.

DR.O.D:

I think that a population has to make a choice between its health and its industrialese or commercialese, and I know the choice that I would make, even if my gasolehe or car didn't run so well it's better than having a sick child.

J.F:

What are we doing to our children? Lead is a deadly poison. We could easily halve the amount to which we expose them yet we continue to do nothing.

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