

THE OPEN MIND

HOST: Richard D. Heffner

GUEST: Sir Paul Nurse

TITLE: A Vital Dialogue: Science and Its Paymasters

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I'm Richard Heffner, your host on **The Open Mind**, and it was back in 1963 that I became a consultant on the public understanding of science for the American Association for the Advancement of Science.

The triple AS was concerned then that the huge sums of public money required by science and scientists in the years after World War II would simply dry up and disappear - *if* the public didn't understand more about the nature of the scientific pursuit, *if* scientists didn't explain themselves better to what my guest today calls their "paymasters" - the American public.

But more than four decades later, when Sir Paul Nurse - Nobel Laureate in Medicine, formerly Chief Executive of Cancer Research in the United Kingdom, and now President of the prestigious Rockefeller University - first joined me here on **The Open Mind** a year and a half ago, his repeated concern was that for scientists to retain what he had called their "license to operate" they had to do more than talk *at* the public, explaining their wares.

Instead, they had to enter into a continuing *dialogue* with the public, discovering public questions and concerns about the scientific enterprise, hearing and responding to them.

Dialogue, Sir Paul Nurse insisted, is not only desirable...it's absolutely necessary.

Well, these many months have gone by...and I don't know if YOU'VE seen or heard any dialogue...but I know I haven't.

Yes, I've seen some Charlie Rose specials in which Sir Paul was billed as sharing hosting honors. And, indeed, in one program my guest's role was finally enlarged, probably by brute force.

But what we had once again was dialogue only between and among some generally wonderfully articulate scientists themselves ... while the public - those vaunted "paymasters" - were nowhere in sight.

And so I STILL must ask Paul Nurse if and when the real business of mixing it up with the common folks - or even their proxies - is going to take place. When?

NURSE: Well, you've made a very fair point, Dick, I have to say. I think that the, the sorts of events and television programs such as the Charlie Rose Show ... they have a very important role. I do think communicating the issues and I think trying to explain the complexities of something that's very important. But as you just argued, I think dialogue needs to be carried out in addition.

Now I'm not sure television is the best place for dialogue. I think it is a medium which can be used for dialogue. But where I see it starting, I have to say, is in more face to face meetings with smaller groups or with audiences. I've done a little bit of that since I've been here ...

HEFFNER: MmmHm.

NURSE: ...but I'm sure you would argue nowhere near enough. But based at Rockefeller University we have occasional talks and discussion groups, often not with just the ordinary person off the street, I have to accept that with lay people who are interested in the university or interested in, in science ... so I do accept we're not talking to those who would have no obvious engagement.

But in these sorts of meetings what we tend to have are panel discussions which involve a lot more audience engagement; responding to questions, often quite difficult questions; questions that scientists would never think of, because we don't think in that sort of way.

But I accept that we need more of that and we need to get out more, away from the citadels of learning, out into the boroughs, out elsewhere to talk to people. There are issues of course always with time and so on and, and ... one thing I think that's important here is to think about ways in which younger scientists, students, graduate students, postdoctoral workers could get engaged in this because there, I think, we have a real opportunity to teach students and postdocs who are starting a research career about the need to engage with the, with the public. So I think there is more that we can do there. But frankly I think I could have done better, so I stand corrected.

HEFFNER: Well I think you've done brilliantly on the air, in truth. And you know I said I was going to needle you and that I wouldn't say that if I, if I didn't mean it. Take that for whatever ...

NURSE: Yeah.

HEFFNER: ... weight you want. But tell me what about ... what are people, even the ... not Joe and Florence Blow, but ...

NURSE: MmmHm.

HEFFNER: ... what do the people you've been talking with, what do they want to know?

NURSE: What do they want to know? I think they ... I think what I'm struck by is how so many people are interested in science, but are nervous about it.

HEFFNER: Nervous?

NURSE: Nervous ...for two reasons. One is that they think it's difficult to understand. Which actually it is quite difficult to understand.

HEFFNER: It is, indeed.

NURSE: And I'll say something about that in a moment. But ... and secondly, also the impact that science can have on their lives, both good and bad. And the ... this gives rise to lots of questions, often in a ... initially in a very tentative way because they don't want to appear foolish by asking the so-called "stupid" questions. Whereas in my book there is virtually no such thing as a "stupid" question ... there may be a question that, that needs explanation or clarification, but often you'll find that half the audience need that clarification, as well.

So I'm all in favor of so-called "stupid" questions. So, what is worrying ... what are worrying the general public? Well, first of all the difficulty of science. One thing that always strikes me about science is because of its complexity, what we have is a group of people, such as myself, professional scientists who work in an area for many years and master some part of it.

And quite a lot of, of life is built upon it. You know, everything that's happening in the studio here is built upon some scientific understanding. But you and I wouldn't have a clue how that camera really works, that's behind you, over your right shoulder. If we had to take it apart, we'd have certain problems with it, even understanding the physics of it ... even for me as a scientist, would give me some trouble.

So what we have is, we have a sort of cast of scientific workers, who I sometimes call "the witch doctors" of society because we are needed, but nobody quite understands what it is we do. And we sort of ... we're a bit of a frightening sort of group of people.

And I think that's something we as scientists have to recognize, that because we know things other people don't have yet ... because society relies on us a lot, we have a sort of slightly ambivalent relationship. And that's one reason why this dialogue is important to indicate really that scientists are ordinary people. That they have the same sort of problems as everybody else. And they're struggling often with understanding the world just like everybody else, and they're no better than anybody else in thinking about the applications.

So I think that sort of fear of the shamen quality, if I can put it that way, of scientists is a very real one.

HEFFNER: But they must be fearful of specific threats that they believe that science sets before them ... environmental ... I mean, one of the things that must be certain to come out is that science presents us with so many challenges. And so many ... "if you don't do this, this is going to happen" to you. That again, and again seems to me to be what it is that science says to us.

NURSE: Well science brings knowledge. And sometimes it's unsettling knowledge. Science brings ... certainly in the last several decades with the rise in biology, which has really been one of the major success stories in science in the last 20 years, it brings challenging questions about what we really are as a human being.

Challenging questions about when does life start? When does life end? How are we distinguished from the rest of the living world? How are we different from an animal or an ape? And what is really life itself? And how, how can it be defined? What is consciousness? What is our own identity?

These are all questions which are of a very general nature and which have been asked ever since the early Greek philosophers. Which science is shedding new light upon and that, that's very

exciting. It's also very unsettling. And what comes with that understanding is sometimes a technology and an ability to manipulate those issues in ways which again are very unsettling.

We can keep people alive now who would have certainly died within days if they'd been taken off a life support system. And yet that raises the question, "When is somebody alive? When is somebody dead? When can we say they, they still have some qualities of human life?" And some of these questions are very, very difficult to answer so I think one of the issues here is that science digs deep into cherished beliefs and it also allows the manipulation of things such as human life which many people, quite rightly, find quite disturbing.

HEFFNER: You feel that the manipulation is a source of anxiety then. The ability of the, of the Dr. Frankenstein ...

NURSE: I think it is. I mean you ... you know, if ... the myth of Frankenstein is really a good one. I mean Shelley got it ... I mean she, she got it right. I mean this idea of creating artificial life which somehow was partially human, but not ... and yet was created by humankind.

It raised all the questions that we face, we face today. The difference is that we can get much closer to that than we could 200 years ago ...

HEFFNER: So that ...

NURSE: ... when the book was written.

HEFFNER: ... you're a more fearful entity for these people.

NURSE: Well ...

HEFFNER: ... because of your power.

NURSE: ... we, we have an understanding, which as I explained is a ... is a ... sort of like a specialist understanding ... and science ... as a consequence of science ... it leads to the ability to manipulate nature and what we are ourselves. There's fear there, but of course, there's also promise there. And that's the other side of the coin.

So, not only do we have the issues that are risen by science, which people feel uncomfortable about, but we also have the fact that we now live so many years longer than we did at the turn of the last century ... partly due to issues such as public health and good sanitation, but they're built on good science, too. Understanding what you had to do, partly due to direct scientific advances like antibiotics and the like.

So there's clearly many, many good things that come out of science, together with the fearful ones. So it's a very mixed bag in many respects. I'm a scientist who believes that knowledge is a good thing. But the use of that knowledge has to be discussed well with society so that it is used well.

I personally think that nuclear power, producing, in other words, energy from nuclear ... from the atom is ... has got great promise. I think it's a very difficult issue. We can talk about the

environmental issues. But I think that's got great promise. Using the same atomic power for the nuclear bomb I have always been completely against.

So it, it ... that's the classic divide of, of science. Things that can be used for good. Things that can be used for bad for society.

HEFFNER: Dr. Nurse, at some point ... at any point in terms of your discussions with these people, were you tempted ... and this may not be a fair question ... were you tempted to say, "This doesn't work, the dialogue is a wonderful concept, but it doesn't work, the gap between us is too great?"

NURSE: No, I'm never prepared to say that because ...

HEFFNER: Not "prepared" ... tempted.

NURSE: (Laughter) Well, one's always tempted, of course. There's many temptations in life which I have to avoid.

HEFFNER: Okay, we won't get into that.

NURSE: But, umm, no I'm not even tempted there because I, I have a very clear position. If there's a problem of that sort of divide, if there's a problem of not communicating properly or having a proper dialogue, that's my problem ... it's not my ... the person I'm talking to ... it's not their problem, it's my problem, because I'm the person with the understanding and the knowledge. And if I'm not explaining it correctly, then that, that's my problem.

Of course you meet unreasonable people in this, in dialogue, but then, you know, you could be unreasonable. I may be talking to an unreasonable person across the table, I mean, or meeting an unreasonable person in the bus. That happens in all human encounters.

But specifically in dealing and having dialogue about science, if it gets difficult, I think that's my ... that's my problem to sort out, I'll take responsibility for it.

HEFFNER: And when you survey your colleagues, your fellow scientists? Do you find that same generosity of spirit?

NURSE: Well, I wouldn't like to call it "generosity of spirit" (laughter) but I thank you for saying that. I think I have a more extreme position maybe than most of my colleagues, but then maybe I've also done more of it than most of my colleagues. I think many of them, if they'd had to be involved as I have done, I'm sure they'd have a similar position to me.

HEFFNER: You mean involved in working with the public?

NURSE: In working with the public, talking with the public, having discussions like this one with you, which I think's great that we can talk about this in such a wonderful public media ... talking in the smaller groups in dialogue.

I think if they'd had as, as much opportunity as I have then they would also most certainly have a similar position.

HEFFNER: Is Rockefeller University organizing these groups? Is this a program now of the University?

NURSE: We do have a number of public meetings, normally in ... associated with people who have an interest in the university. I mean quite a wide number of people, so I wouldn't say we're getting out there into the boroughs, because I ... we're not ... except with some outreach schools type programs. And I'm ... it would interest me to be able to do that, although my time is pulled so many ways that I find it difficult even to do it myself.

HEFFNER: But don't you have to? Don't ... doesn't scientific community have to do that if it is to keep its license?

NURSE: It does have to do it. And my response to you is that we ... people like me, in leadership positions ... have to show an example to our younger colleagues so that they can get engaged as well. I'm very strongly supportive of that.

So if our students or post-doctoral workers ... 20s ... in their 20s or 30s would wish to get involved in this, wish to get organized I'd be very, very supportive of that.

HEFFNER: Aren't you putting that ... no you're not putting the burden upon them, rather than yourself. But isn't that a particularly weighty burden for those who are young, in particular ... when you talk about the postdocs?

NURSE: No. it is. What I feel is that, that these sorts of programs have to be driven from below. I do think you have to involve people who have sufficient interest to get engaged. What I think I'm saying is that the institution will support, not put barriers, because it's very easy to put barriers in the way of these sorts of initiatives.

What I'm slightly more cautious about doing is organizing a "top-down" program ...

HEFFNER: MmmHm.

NURSE: ... and then having to persuade people to get involved and it all just not working quite properly. So I think that the real point is having commitment and engagement and interest and then leadership, such as myself, providing the oil. And in some cases the resources to get that to work. It may sound a bit flabby. I, I do accept that. But I think it ... in the end it may be more effective than two "top-down" sort of initiatives.

HEFFNER: It's not inappropriate for me to ask a scientist if you have any evidence that the "bottom-up" or the "bottom and up" mode of conducting dialogue works.

NURSE: Well, it isn't inappropriate and I think my response on evidence is more my experience of human nature that youth on the whole is more idealistic and, and driven to these things. And they just need to have good examples and, and not have barriers put in their way and it will work.

What they tend not to like so much is the specific programs, you know, where they feel forced to do something. So, evidence? Well, I, I have to say probably just my experience of human nature. Is that good enough for you?

HEFFNER: No.

NURSE: No.

HEFFNER: No. Not at all. I want to ask you whether in the United Kingdom there is ... are there programs that lend themselves to this kind of exchange?

NURSE: Yes, in the United Kingdom I did more with ... you nearly said it ... Joe and Joanna Public ...

HEFFNER: MmmHmm.

NURSE: I, I did because I was involved in a national program for which we have national resources through the UK's Academy of Science, called the Royal Society ... it's equivalent to the National Academy of Sciences in the US. And I chaired an initiative for a number of years which, which promoted dialogue.

And there we did experiment in different ways of carrying out dialogue and I had quite considerable resources ... that is money to do this, more than I would have at Rockefeller for this particular purpose.

And did a number of meetings and ... each year ... including going out to the equivalent of the outer boroughs of New York. Including just going to rather dull suburbs of, of medium sized cities and getting people off the streets to talk about these issues in small groups. This is expensive and it's time consuming to do it, so you can't do it on a, on a shoestring.

HEFFNER: Well, you have some experience then with that. What is the difference between the average public person in England and Wales and Scotland ...

NURSE: Compared with the United States?

HEFFNER: Yeah, right.

NURSE: You know, I think that there is a difference and I think it's perhaps a very general one. I find that the average American is very optimistic about science, very excited about science.

I think that in the UK there's a certain wariness. But that wariness just goes across all life. There's ... it's not just science, it's just a certain reserve.

HEFFNER: The weather ... does that.

NURSE: It's the weather. Everything in the UK can be explained by the weather. And, you know, the fact that we never get terribly excited about anything in the UK is because, you know, it's never very hot, it's never very cold, it never rains ... believe it or not ... a lot. We just have a gentle drizzle all the time and our nature's tend to reflect that.

In the US people tend to get excited. And they get excited by progress and excited by science.

HEFFNER: Is ...

NURSE: Now ... oh, sorry ... can I just say one thing?

HEFFNER: No, no, go ahead ... please.

NURSE: Now that isn't always mirrored I would have to say with the US government. And just at the moment, I wouldn't say that we have a government which is particularly sympathetic to science. I mean they ... you could ... say ... well, he's always saying things like that ... scientist.

But I think we could do ... I think the US public could do with a bit of assistance from its political leadership, because I think they would respond to support for science, which maybe our leadership has not.

HEFFNER: You're saying then that the faith based approach of our present administration is not reflective of what Americans feel generally?

NURSE: I don't think it is when it comes to science. Because science is not faith based, science as you already teased me about ...

HEFFNER: MmmHmm.

NURSE: ... is based on evidence. Faith by its very nature, you have to take certain beliefs based on faith. And that's perfectly acceptable as an individual's belief system. But it's not appropriate for science where we have to evaluate a position based on observation, experiment and evidence. And come to as an objective point of view as we can. Because I mean, clearly, all inquiries have some subjectivity. So that's the nature of science and I think that Americans see that in science and whatever their personal beliefs may be that's how they see it.

Now, if you have a President who is influenced too much by their own beliefs, their own faith, meddling in scientific issues and meddling with judgments that's all together a more difficult problem. And I think that's what we had with issues like the stem cell debate, for example. That has not been a good debate here at the leadership level. And I think what we've seen in, in votes, in ... in ... in, which have been taken over this issue is that in fact the rest of the political system does not agree with the President over this issue and if you take polls throughout the country, they do not agree. So that's where we've seen a real divorce over a faith based President making decisions versus the majority of the American public.

HEFFNER: You have ... you talk about faith based, you have a lot of faith in the American public.

NURSE: Well I, I think I told you ... I'm an optimist.

HEFFNER: Yeah. But it's more than that.

NURSE: And so I have, I have a faith that in the end it will work. I don't say it's a straight line. And I don't say that the American public will always get it right, because, I mean, you know, they may not be advised properly and so. But in the end I think there's still this principle of the enlightenment around there in which this great nation was forged. And that is respect for ... honesty ... respect for a truthful analysis, a reliance on evidence. All those great qualities of the enlightenment. Which I, I still see here. And I think though it's not a straight line, although it's sometimes down as well as up, it's basically forward progress. I think the American public respects science, they know what it can produce. They know that the quality of their life, protection of their environment ... all of these factors, not just in biomedicine ... is ... comes out of science and I think they respect that.

HEFFNER: Al Gore seems to feel that reason has been undermined to such a great extent in this country that he couldn't match your optimism.

NURSE: No. And he is right to say this is important. And he's right to point out that we need to return to reason ... I didn't say it was always upward in a unidirectional way. There are ups and downs.

What I did say is I think the general direction is up. But he's absolutely right to focus on the importance of reason. That's exactly where I come from. I just feel that it, it will work, in the long run.

HEFFNER: You know sometimes I feel, when you say, it's exactly where I come from ...

NURSE: MmmHmm.

HEFFNER: I think of your accent and I think of ... you know what you're really talking about ... is you're talking about you national origins. Not you intellectual conviction, or not only your intellectual convictions.

NURSE: Explain what ... explain a little more.

HEFFNER: I, I, I assume, not being a Brit ...

NURSE: MmmHmm.

HEFFNER: That reason is valued more there.

NURSE: Well, we, we do value reason. But as I said, reason is valued here, too. I think ... where there's a difference ... is one of optimism. I think that Americans are very positive people. You know the British have been around a very long time and they be slightly more cynical. I quite like it, too. I work well in that system as well. But it is refreshing to see this optimism and positiveness about ... what I really care about which is science, which I find in this country.

HEFFNER: What do you think is going happen in terms of your quest for dialogue?

NURSE: Well, I think that America isn't doing so well here. I think I hinted at that as, as ... in the UK in particular. I wish I could spend more time and you, you have no idea how you struck a guilty cord in me when you ... in the way you introduced ,,,

HEFFNER: Good.

NURSE: ... because I know I could do better. And I would like to see more of this happening because I think that we do certain things well in this country with the, the public communication. I think things like the, the Tuesday science news in the *New York Times* is really very good. I think that the sorts of discussions that we have ... such as the Charlie Rose discussions are very good at communicating out certain ideas. But exactly the point you made. This question of dialogue, of getting in there with ordinary people and discussing the issues, need a lot of attention, it need a lot of time and unfortunately needs a lot of resource. And that's one thing perhaps I, I should touch upon. Because it's difficult ...

HEFFNER: In a half minute.

NURSE: ... it's difficult for a small institution like Rockefeller University to take leadership role there. It is something that's got to be national, something that comes from the Academies of Science and comes from the scientific profession, as well as the politicians to really drive it out there.

HEFFNER: I'm glad you said "as well as the politicians" and thank you so much for joining me again, Dr. Nurse.

NURSE: A great pleasure to be here again. Thank you.

HEFFNER: And thanks to you in the audience. I hope you join us again next time. For transcripts please send four dollars in check or money order to: THE OPEN MIND, P. O. Box 7977, F.D.R. Station, New York, New York 10150.

Meanwhile, as an old friend used to say, "Good night and good luck".