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Obituary

Lord Robert (Bob) May OM, AC, FRS, FAA, FTSE, DistFRSN (Baron May of Oxford)

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If I had to choose one word to describe Bob May[1], whom I knew as a scientist, activist and friend from the late 1960s, that word would be "integrity." Bob was a seeker after truth, and his integrity was absolute. He was a lover of games, and saw science as a game of trying to understand the world and how it worked. His success at this game took him to the heights as President of the Royal Society of London and the recipient of many scientific honours. He also had a powerful sense of social responsibility. This was one of the factors in his move from pure physics to study the problems of ecology, and which eventually led to his accepting a position as Chief Scientific Adviser to the U.K. Government and becoming an outspoken spokesman for conservation and the dangers of climate change.

Bob was famous for his directness, which most of us who knew him or worked with him experienced at some stage in our lives. It was coupled with a strong sense of fairness, and a complete disregard for rank or privilege. The privileged members of a certain Sydney club learned this to their cost when the Sydney University chess team, with Bob at the head, turned up for a tournament scheduled to start at 8pm, only to be informed by a waiter that the members were still eating dinner and would be down when they were ready. Bob's very direct response was to break open the cupboards containing the chess sets, set up the boards, and start the chess clocks at 8pm in the opponents' absence.

When he received the Order of Merit in 2002 (a personal gift from the Queen, restricted to 24 members) Bob was thrilled, but not overawed. He reputedly found himself trying to explain Fermat's Last Theorem to her. "Don't worry, ma'am" he said, seeing the expression on her face, "there won't be a quiz."

Bob was an excellent teacher, and would list the points that he intended to make at the beginning of a lecture, and tick them off as the lecture proceeded. He carried this practice through to his many public lectures in later life, which covered topics ranging from chaos theory and the spread of BSE and AIDS to global warming and the wiles of politicians. In his honour I adopt

1 Much of the information in this obituary has come from Bob's colleagues and friends. The quoted passages, where not otherwise acknowledged, come primarily from an ABC Radio National interview with Robyn Williams in 2011 (https://www.abc.net.au/radionational/programs/scienceshow/australian-scientific-superstars-no.1---robert-may/3745700)

the same practice in this obituary, which puts some emphasis on Australian aspects. It will cover:

- Early days as a physicist at Sydney University (to 1972)
- Transition to Professor of Zoology at Princeton (1973–1988)
- Moving to England as Royal Society Professor (joint between Oxford University and Imperial College London) and Fellow of Merton College, Oxford (1988–2020).

Early days at Sydney University (to 1972)

Bob's parents separated when he was seven, and he and his younger brother grew up in the home of their grandparents. He attended Sydney Boys' High School, where his experience of the inspiring chemistry teacher Lenny Basser stimulated him to begin the study of chemical engineering at Sydney University in 1953 (shades of Nobel Laureate Paul Dirac, who began his career in theoretical physics studying electrical engineering at Bristol University). He was also a member of the all-conquering debating team, and later claimed that this gave him a useful training for his dealings with politicians.

All engineering students took the same first-year courses, which involved honours chemistry, honours mathematics, but only pass-level physics. Bob sat in on the honours physics lectures as well, because some of his friends were doing it. When it came to examination time, where he was only obliged to take the pass physics exam, he decided to try the honours exam as "an interesting game," even though he hadn't studied for it. He came top. Eventually he switched to physics and mathematics, gaining his B.Sc. (Hons) and the University medal in 1956 and a PhD in 1959.

I once teased him about his choice of subjects, and suggested tongue-in-cheek that he had switched to physics because it was easier than chemistry. I received the indignant reply that he had come top in chemistry as well, but found physics more rewarding.

After the then-obligatory time "overseas" as a lecturer in applied mathematics at Harvard University (where he met his wife Judith[2], then an undergraduate student at Brandeis), Bob returned to the physics department at Sydney University in 1962. Those were heady days. Professor Harry Messel, brought in to run the School in 1952, had raised it from a state that Bob later described as "rather moribund" to a world-class status in many areas, particularly in astronomy, cosmic ray research and plasma physics, with Bob publishing prolifically in the latter.

Messel also established the International Science School to encourage bright high school students to follow careers in science. Bob was especially pleased when the Federal Government later established (through the School) a prize for Leadership in Science, named at Bob's suggestion after Len Basser. Basser taught eight eventual Fellows of the Royal Society of London in the course of his career, including a President (Bob) and a Nobel Prize winner (John Cornforth). He also taught a number of other future science professors, including the pharmacologist Garry Graham, and Hans Freeman, who did a post-doc with Linus Pauling before returning to set up Australia's first X-ray diffraction laboratory at Sydney University.

Bob summarized the Physics School's activities in an article "Profile of a Physics Department" for *The Australian Physi-*

2 Judith née Feiner.

cist ("single issues fifty cents per copy") in June 1970. By this time he was knocking on the door of a chair, and had in fact been offered one in theoretical physics at the rival University of New South Wales. It was an offer that he probably used as a lever to secure one of Sydney University's first two personal chairs at the age of 34 — an early example of his unobtrusive but very effective political ability, where he characteristically used directness as a cover for subtlety.

The 1970 article was a classically sardonic May production, and hardly calculated to endear him to some of his colleagues. Speaking of the possible (but artefactual) quark tracks observed by the cloud chamber group, he wrote "The group is currently famous (or notorious) for its identification ... ". Commenting on the video lectures to large first-year classes, he said "The kindest thing to say about these telly lectures is that they are improving; certainly an inordinate amount of work is being put into them."

But he gave credit where credit was due, pointing out for example that "more than half the 50-odd pulsars so far catalogued have been found by the Mills Cross group." He could also be quite funny about his own theoretical work. "Some of this work makes contact with experiments," he said "and some of it is so abstract as to be quite indefensible." He also liked word play. Speaking of one of his own major theoretical contributions: "Following on from S.T. Butler's seminal work in the field of direct nuclear reactions (or, more colourfully, *stripping reactions* [my emphasis]), the group has developed a new approach ... ".

Sometimes the gags went a bit far by today's PC standards. He thought that the activities of the Computer Department, situated within the School of Physics, would be "of lesser interest to the readers of this journal" but added as a footnote "Actually, the procedure by which the computing department selects its pulchritudinous programmers *would* be of fairly wide interest. Unfortunately, the department's published research on this topic is as scant as the miniskirts themselves."

He could hardly have got away with that these days.

In general, though, the article gave a fair (if colourful) assessment of the environment in which Bob found himself in 1970. His wife Judith and daughter Naomi were very central to that environment, which may have changed drastically when the parents smelled smoke coming from the kitchen early one morning. Bob told me proudly at dinner that night that the smoke had come from four peaches that little Naomi (then 3) had put on the stove top and turned the elements up to various levels to compare the effects. He was convinced that she would become a scientist, but she eventually became a prominent Californian artist.

Bob finished his article by describing "the other minor projects which keep the theoreticians quiet." These included "topics in the behavioural sciences (e.g. The Theory of Voting); and playing bridge at lunch time."

I met Bob through bridge, and we even won the Australian Universities championship together. Bob was very keen on his bridge, although inclined to become rather emotionally involved. Former post-graduate student Robert Hewitt told me of the time when Bob threw his cards at a window in frustration. Unfortunately, the window was open, and the cards had to be retrieved from the car park below.

The two Bobs were also involved in bringing more students to the department. In those days, different departments in the Science faculty could attract PhD students with scholarships by awarding them first class honours as undergraduates. It became clear that physics was losing out since it had stricter standards. The two Bobs set about quantifying the standards depending on a score of credits, distinctions and high distinctions earned over the first three years of undergraduate study. That made it difficult for any department to suddenly promote students to 1st class honours.

Bob's great pride was the time that we beat the U.S. National team; an event that he never failed to remind me of, no matter what the subject of our conversation or email exchange might be.

Non-bridge players can skip the next two paragraphs, although they bear on what follows. Briefly, we were non-vulnerable against vulnerable opponents, and playing a weak no trump system. I had passed, the opponent on Bob's right had passed, and Bob found himself with a hand containing just one jack. He knew that his left-hand opponent must be loaded.

So he opened one no trump! A brilliant psychic gamble, knowing that I wouldn't dump him in the soup because I had already passed, and that he could hardly lose more than the Americans would otherwise gain. The Americans were so flummoxed that they ended up in game when they had a lay-down grand slam, which our partners at the other table duly found, and which turned out to be the difference between the two teams.

Bob was not the only bridge enthusiast in the Department. Professor Stuart Butler was another, and I was rather awestruck to find myself in his and Charles Watson-Munro's company when Stuart was recovering from a heart attack, and Bob had decided that bridge would be an appropriate therapy. I ventured the comment that they must be really pleased to have Bob in the Department, and received the rather grumpy reply from Stuart that it would be OK if he could ever be persuaded to talk about physics.

Because Bob was already starting to think about the problems that would occupy the rest of his life. One of these was game theory — working out the best strategies for interacting with other people on the assumption that they were using *their* best strategies. I occasionally pulled his leg that his outrageous bid against the U.S. team was his first and only experimental investigation of this topic.

In fact he was just about to publish a paper[3] on one aspect of game theory. It was his first outside the realm of pure physics, and concerned with how to get the fairest result possible in an election.

That topic was no accident. Bob was very concerned with fairness, and with applying rigorous mathematical thinking to social questions. Harry Messel had been pushing him to think about even broader issues, and how to apply physics to biology in general. The linking factor was the burgeoning movement for Social Responsibility in Science. It was driven by sociologists like Sol Encel and Stephen Hill FRSN, along with science teacher Telford Conlon and physics professor Peter Mason from Macquarie University. Especially, from the point of view of this obituary, it was driven by Sydney University zoology professor Charles Birch, later to be a founding member of the Club of Rome.

3 "Some mathematical remarks on the paradox of voting." *Behavioral Science* **16**, 143–151 (1971)

Bob was enthusiastically involved, and this was how he found his way almost by accident into the field of ecology. He said, in his interview with Robyn Williams, "In discovering what I was being conscience-stricken and socially responsible about, I had read a book by Ken Watt on ecology and resource management."[4] It espoused the view, common at the time and supported by observation, that complicated ecosystems would be more stable than simpler ones by virtue of their very complexity.

Bob, being Bob, was sceptical, and decided to check out the question mathematically. He found that the opposite was the case. Large complex systems with random links between their members should, in fact, be *less* stable.

The resultant 1972 *Nature* paper[5], which has had over 2000 citations, took the ecological community by storm, and has provided the foundation for much of its activities ever since. The theorem that Bob proved (which had been proved earlier by Eugene Wigner in a physics context) became known as the May-Wigner theorem, and the disagreement between ecological theory and observation was called the May paradox. Resolving it has been one of the central goals of ecological science. In principle it is easy to resolve since, as Bob once said "Ecosystems are the winnowed products of evolution, they are not random." But "what are the special structures that … reconcile exploiting more niches, having more species and being more complicated with robustness against disturbance?" The question is an important one in our increasingly disturbed world.

Charles Birch, the co-author of the leading textbook on the subject, was fascinated by Bob's discovery, and acted as midwife in what followed. Briefly, Bob was due to take a sabbatical break, working on plasma physics at Culham in the U.K. and astrophysics at the Institute for Advanced Study in Princeton. Birch wrote to his biological friends in both places, urging them to deflect Bob towards more ecological pursuits.

The plan worked a treat, and population biologist Robert MacArthur, then suffering from advanced pancreatic cancer, even urged Bob to take his Princeton chair after he had gone. He was especially impressed when Bob saw immediately the mathematical solution to an important problem in niche overlap with which MacArthur had been struggling for some time.[6]

But Bob was happy in Sydney, and returned to do his thinking there. He did it in some odd places. One of these was the bridge table, where I more than once found myself landed in a surreal contract because Bob had manœuvred the bidding so that he could be dummy and get on with some calculations on a small piece of paper on the corner of the table.

Another favourite thinking place was the tennis court. Bob was an avid player, and with his friend Rod Cross could often be found practising on the university courts on a Wednesday afternoon. Bob was by now doing numerical calculations of population growth and decay, and plotting the resultant graphs using a programmable calculator (he hated programming the university's bigger computers). The calculator was in the Third Year laboratory, and supposedly

4 Kenneth E.F. Watt *Ecology and Resource Management: a Quantitative Approach*. New York: McGraw-Hill (1968).

5 "Will a large complex system be stable?" *Nature* **238**, 413–414 (1972)

6 Robert M. May & Robert H. MacArthur "Niche overlap as a function of environmental variability" *Proceedings of the National Academy of Science of the USA* **69**, 1109–1113 (1972)

for the use of students, but Bob took it over, rather to the dismay of the students and staff member in charge. It was so slow (especially by today's standards) that he had to check it out after every second game to see whether the program had finished. That calculator should really be in a museum, since it played a central role in the development of chaos theory.

The tennis competitions took place on Saturdays in Sydney's Eastern suburbs, where Bob could not access his calculator. He could not bear to be mentally idle, though, so set up a chess board at the side of the tennis court, with the clock to be tapped between games.

The tennis games had an interesting later upshot. Rod became an expert in the physics of tennis racquets, and a frequent consultant to the International Tennis Federation. He attended an ITF meeting in London in 2003, and suggested that Bob be invited to give the after-dinner speech, which was a great success. The following year the ITF gave Bob free tickets for the Wimbledon finals. He and Judith found themselves sitting next to Michael Parkinson, and Judith, who along with Bob seldom if ever watched television, asked him what he did for a living!

Transition to Professor of Zoology at Princeton (1973–1988)

It was Judith who stimulated Bob's move to Princeton. Some Australian ecologists (especially at ANU) had been urging him to join their groups, but Judith argued that Princeton was a chance that might not come again. So, according to Bob "I pick[ed] up the phone, rang the chairman John Bonner, and said `Have you fixed on Robert [MacArthur]'s successor or are you still looking?'" When told that they were still looking, Bob continued "I've changed my mind. I'd like to do it." Bonner said "Great" and that was that.

The work poured out of him, in what Bob described as the most productive period of his scientific life. He edited the standard textbook *Theoretical Ecology: Principles and Applications*. He expanded greatly on his seminal work on ecological networks and niches. And he laid the foundations for chaos theory.

The latter came about as the result of a puzzle. Bob had been working in Sydney on a key equation, derived by the Belgian mathematician Pierre Verhulst as long ago as 1838, which describes how population growth must slow down as it approaches the limit of the resources available, and even become negative if it overshoots that limit.

The equation is oh so simple, but behaves in an extraordinary way depending on the rate of growth, first breaking into "boom" and "bust" regimes at around a population tripling rate, and eventually breaking into wild (chaotic) oscillations at a critical higher rate (just above 3.596), called the "point of accumulation," with the symbol lambda.

Bob couldn't figure out what was going on. Outside his office in Sydney, he had a notice board. According to James Gleick in his book *Chaos*, there was at one stage a notice that read "What the Christ happens when lambda gets bigger than the point of accumulation?" In fact, as Bob once told me, the language was rather more colourful than that.

Eventually, in Princeton, he figured it out, and produced one of his most famous papers "Simple mathematical models with very complicated dynamics,"[7] which has been cited over 7500 times. In that same year

7 *Nature* **261**, 459–467.

he also produced the wonderfully quirky "Ecology of dragons[8]," in which he discussed (among other things) the over-exploitation of dragons for pharmacological purposes, which may have led to their extinction. It was a theme that was to reappear in more serious vein many times in his later career. He later used it cleverly to suggest that climate change may well lead to a resurrection of sleeping dragons from their slumbers.[9]

During his time at Princeton, Bob also became the chairman of the university research board. It was a position for which he turned out to be ideally fitted. He also chaired a committee to discuss the safety of the university's recombinant DNA research, and made sure that the local community was included in the discussions.

Bob would also return to Australia frequently during this time, and lectured at the International Science Schools that had been set up by Harry Messel in 1966, 1968, 1972, 1985 and 1987. On these occasions he would always contact Bob Hewitt ahead of time and ask him to round up "the usual suspects" for a game of bridge.

But things were moving. In the U.K. Professor Sir Richard Southwood from Merton College, Oxford, and others were conspiring to bring Bob to the U.K., with the bait of a Royal Society Professorship (joint between Oxford and Imperial College London) and a Fellowship of Merton College, not to mention the croquet lawn and real tennis court.

Move to England (1989–2020)

Bob's career in the U.K., later described by his Merton College sponsors as "stellar," swung wildly between the theoretical, the practical, and the bureaucratic. Much of it is covered in the many obituaries that appeared after his death. Here I can cover only a few highlights.

One undoubted highlight was his work with Roy Anderson at Imperial College. Together, the two built on Bob's earlier work to develop the now-accepted framework for epidemiological modelling.[10] "Mathematical epidemiology" became a field of biology, "central to understanding the dynamics and control of infectious disease."[11] It proved to be of great value in understanding and controlling the AIDS epidemic in Africa, the BSE outbreak in the UK, and the worldwide SARS and COVID-19 epidemics.

During this time Bob moved frequently between Oxford and London, although Oxford was always his first choice. I once asked him where he stayed in London, and he replied that he and Judith had a flat in Chelsea. I must have expressed some envy, because he went on to say laconically "Well, I have won a few prizes."

He certainly had. They included the Balzan Prize for biodiversity, the Copley medal of the Royal Society, the Japanese Blue Planet Prize for "contributing significantly to the improvement of the global environment," and the Crafoord Prize for ecological research. The latter is awarded

8 *Nature* **264**, 16–17.

9 Andrew J. Hamilton, Robert M. May & Edward K. Waters "Here be dragons," *Nature* **520**, 42–422 (2015).

10 R.M. Anderson & R.M. May "The population dynamics of microparasites and their invertebrate hosts," *Philosophical Transactions of the Royal Society of London B* **291**, 451–524 (1981)

11 J.A.P. Heesterbeek & M.G. Roberts "How mathematical epidemiology became a field of biology: a commentary on Anderson and May (1981) 'The population dynamics of microparasites and their invertebrate hosts' *Philosophical Transactions of the Royal Society of London B* **370** 20140307 (2015) http://doi.org/10.1098/rstb.2014.0307

for disciplines that complement those for which the Nobel Prizes are awarded, and is of similar value.

Bob also found his way into the power structures of various organizations where he thought he might be able to promote his social responsibilities, and especially his concern with conservation, and with making science more a central art of public dialogue. He became a trustee of Kew Gardens in 1991, and of the Nuffield Foundation in 1993, driving its student programmes. He was appointed to the Joint Nature Conservancy Council in 1994, and also became Chairman of Trustees of the Natural History Museum in the same year. Later, he would join HSBC's Corporate Sustainability Board, become an adviser to Tesco's Sustainable Consumption Institute, and join the U.K.'s Climate Change Committee.

He also began to give public lectures. Ian Sloan FRSN was present at one of these[12], organized in conjunction with Bob's visit to Australia for a conference "Chaos in Australia." The lecture was at the Powerhouse Museum, which seats around 300. But many more were present, and to accommodate them all Bob suggested that he give the lecture twice. It was a roaring success on both occasions.

The biggest surprise of all, though, was when he became Chief Scientific Adviser to the U.K. Government under John Major, and then Tony Blair.

Chief Scientific Adviser to the U.K. Government (1995–2000)

The tales of Bob's time as a scientific adviser are legion. He was certainly direct in his approach. Bob himself told the story of a meeting in the Cabinet office where he said of one proposal "that's absolute bullshit." As he left, in company with William Waldegrave, the latter said "I suspect that's the first time anyone's ever said 'bullshit' in the Cabinet office. But it shouldn't be the last."

One obituary reported that Bob was reproved by the cabinet secretary for swearing on the grounds that it was the first time that the f-word had been used in the Cabinet room. Sir Nicolas Bevan, former secretary to the Speaker of the House of Commons, wrote a letter pointing out that it was not the first time, and described the time in 1973 when Edward Heath had described a paper under discussion as "f***ing awful."

Bob had a great deal of respect for Tony Blair, whom he described to me several times as being "very bright." It was a compliment that he did not extend to very many other members of the Government, and he generally made a point of avoiding them and only speaking to Blair directly. That was as far as he went in talking with me about his dealings with politicians. He may have been very direct, but he also knew how to keep a confidence.

One of Bob's major goals as Government Chief Scientist was to explain the importance of science to policy makers, and to guide the ways in which it was used. One of his first actions was to produce a report on the efficiency of British science, showing that it was the most efficient in the world when it came to global impact.

It was while he was preparing this report that a British food research group came under press attack for wasting public money, after being awarded a spoof Ig Nobel Prize for studying how breakfast cereals became soggy when milk was added. In fact, the research was entirely funded by industry, but that didn't stop the press. Bob was jus-

12 As was your humble editor — REM.

tifiably annoyed, and wrote a sharp letter to organizer Marc Abrahams demanding that no more of these prizes be awarded to British groups.

Marc showed me the letter once, and it certainly was a beauty. Unfortunately it had the opposite effect, including my own Ig Nobel in 1999 for using physics to work out the best way to dunk a biscuit. This was the consequence of a project that I had used in my efforts to make science more accessible by showing how scientists think about everyday problems. One of my most treasured possessions is the letter that I received out of the blue from Bob, whom I had not seen for some time, congratulating me on the success of my endeavours.

Things took an interesting turn in the next year, when our mutual friend and colleague Sir Michael Berry (like Bob, a Royal Society Research Professor), along with real Nobel laureate André Geim, were offered an Ig Nobel Prize for using a magnet to levitate a frog. This was again work with a substantive purpose (to show that this theoretically possible effect could be realized in practice), and the frog was chosen as a quirky-sounding subject of about the right weight. Michael felt constrained to write to Bob (who, as then President of the Royal Society, Michael liked to refer to as his "boss") about whether he and André should accept the award. Eventually they did, making André the only person in the world to have an Ig Nobel Prize *and* a real Nobel Prize.

Another of Bob's actions was to prepare guidelines for scientific advice to Government, where he advocated "a presumption of openness in explaining the interpretation of scientific advice" — a presumption that was unfortunately diminished, and eventually lost by subsequent governments.

Sadly, he was unsuccessful (as all subsequent holders of the post have been) in persuading the majority of politicians about the importance and significance of science. "It would be quite helpful," he said at the end of his tenure "if some members of government found out who I was."[13]

President of the Royal Society (2000–2005)

Bob was knighted during his tenure as Chief Government Scientist, and it was as Sir Robert May that he was elected as President of the Royal Society of London in 2000, following in the footsteps of such luminaries as Isaac Newton, Joseph Banks, and T.H. Huxley. Bob commented that the majority who supported his candidature were keen that the Society should become more involved in public affairs, but there was a substantial minority who did not approve.

He had had the idea while in his Government role that the best way to hold an enquiry into an issue where science was the focus was "to get some scientific peer who had not been involved to get a group of scientific experts to give an analysis of the lessons to be learned." The lessons in this case concerned mad cow disease (BSE), but Bob's idea was not taken up, and the very expensive Phillips Inquiry took place, which Bob later described as "a legalistic enquiry that would go on for years until everybody was safely retired." The Phillips Inquiry did in fact take three years, cost £60M, and came to at least one wrong conclusion (that the disease was due to a rogue prion as a spontaneous mutation).

13 Sadly, it has taken the COVID-19 pandemic to induce politicians in the U.K. and Australia to act on scientific advice, at least on medical advice. We can still hope for action on climate science advice. [Ed.]

With his new role in the Royal Society, Bob had another chance. The problem this time was foot-and-mouth disease, and the government agreed to ask the Society to hold an independent enquiry along the lines that Bob had suggested earlier. The enquiry cost around 1% of the Phillips enquiry, and produced its report in less than 12 months. The report was also effective, causing the EU to change its rules on vaccination so as to minimize the chances of the problem being repeated.

Bob was not afraid to voice his opinions, and in his role as President of the Royal Society he publicly accused President George W. Bush of "fiddling while the world burns" by ignoring climate change.[14] He would later point out in a lecture to the Royal Society of Chemistry[15] that the very phrase "climate change" had been invented by a Bush adviser to displace the more specific "global warming."

His scorn for sloppy thinking was not confined to politicians. I was present on one occasion at the Royal Society when Bob was in the chair at a meeting where a prominent biologist attempted to give a physics parallel to a biological effect. "That's wrong," said Bob loudly.

Bob's "in your face" comments about major issues with a scientific component (especially climate change) sometimes caused controversy, and provoked opposition from those with vested interests[16] but set a trend for the Society that continues to this day.

Member of the House of Lords (2001–2017)

In 2000 the Blair Government established a "House of Lords Appointments Commission" whose job was to make recommendations for the appointment of non-partisan life peers. The very last time that we met in 2017, Bob told me gleefully "You just applied for them." And he did, wanting to be known as Lord May of Woollahra. But it seems that the *Australian* protocol people were not happy with this idea, and so he became The Lord May of Oxford.

But why did he want to be a Lord at all? The answer may lie in his suggestion years earlier about the use of scientific peers to lead enquiries. It was a role that he could still usefully serve, especially after his term as President of the Royal Society was over, and he took full advantage. He sat on the Science and Technology Committee, and contributed to 53 debates in his usual incisive style.

He also sat several times on the Economic Affairs Committee, and thereby hangs a tale. In the wake of the 2008 financial crisis Bob teamed up with Andy Haldane, now the chief economist of the Bank of England and regarded by *Time* magazine as one of the 100 most influential people in the world, to examine this crisis between a network of financial institutions. The idea was to examine the network from the perspective of Bob's ecological network theory, and to see whether this offered any ideas for avoiding future crises. It did, and the result was the brilliant "Systemic risk in banking ecosystems."[17]

14 https://web.archive.org/web/20050315035945/http://www.commondreams.org/headlines05/0307-03.htm

15 https://www.youtube.com/watch?v=_rFUC_5hBwI

16 https://www.thegwpf.org/images/stories/gwpf-reports/montford-royal_society.pdf

17 Andrew G. Haldane & Robert M. May "Systemic risk in banking ecosystems," *Nature* **469**, 351–355 (2011).

But there was a snag. Bob told me that they tried all five of the major economics journals, and that it was rejected by all of them. That is why the paper was eventually published in *Nature* — a premier journal for scientists, but not read by economists. Perhaps they should.

Bob certainly enjoyed his time in the House of Lords — including the bridge competition, where I would get regular reports about his success (especially when he won a brilliancy prize). But his success in using it as a lever to advance the cause of science in political decision-making was perhaps more problematic.

He had more success when it came to the many public talks that he was now giving. The Darwin lectures of 2011 were a particular example, where he spoke[18] on the topic "What does the future hold?" and argued that the rise in fundamentalism in both East and West is a reaction to the cooperative change that we need, but which would mean sacrifice of individual liberties (or, worse still, property).

He also gave talks on science advice and policy making, based on his experience as Chief Government Scientist, where he had begun his tenure with the belief that his job was to speak truth to power. As he said in one talk[19], he and other scientists sometimes found this difficult because politics has a different tribal culture. This was especially so when it came to public expressions about risk. With the MMR vaccine, for example, he was rapped over the knuckles for using the scientists' precise expression "There is no evidence that there is anything to worry about," when his political masters wished him to say "There is no risk" or, at worst "There is negligible risk." Nor were they interested in his comparisons with measles, where the risks have been quantified.

Bob was at his best in *explaining* science to non-scientists in an exact but understandable way. His abrupt, incisive style was less suited to getting over the message about what this meant, even though he was well aware of "how inherent uncertainties and imprecisions in the area of human social behaviour can affect our ability to gather and interpret statistical information about ourselves."

But no other style, whether that of Attenborough, Sagan, Asimov or others, has been notably more successful in making science more a part of our culture. Bob was a living example of how this could be achieved, and perhaps that is his greatest legacy — that, and the stimulus that he gave to so many of us.

Bob's portrait in Australia's National Portrait Gallery shows him with a taxidermy specimen of an extinct thylacine on his lap. To him, science was a game, but the conservation of our planet and its inhabitants certainly was not. His induction as a Distinguished Fellow of the RSNSW at Government House was presided over by Marie Bashir, whom his wife Judith remembers as "saying such nice things." We could do with more like him, even though in many respects he was totally one of a kind.

— Len Fisher

18 https://www.youtube.com/watch?v=PRato4F6ZyM

19 https://www.youtube.com/watch?v=_rFUC_5hBwI

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