

## **2009 SIR JOHN CASS'S FOUNDATION LECTURE**

### **THE DEMOCRATIC INTELLECT – WHAT DO WE NEED TO SUCCEED IN THE 21st CENTURY?**

#### **INTRODUCTION – THE IDEAL OF THE DEMOCRATIC INTELLECT**

The child is the father of the man, William Wordsworth, wrote. And the place where I first heard those lines, and that name, is the place where I grew as a child into manhood and the place that influenced me more than any other – my school.

I was educated in Scotland and the virtues that shaped Scottish education shaped me. I learnt to love literature – Wordsworth and Burns – Lewis Grassie Gibbon and George Eliot – and I learned to value science – the discoveries of Faraday, Rutherford, Fermi and Oppenheimer - in an environment where the love of learning was the highest good.

For Scotland's character has been defined over the decades by a very particular approach to education. That idea has been encapsulated in the concept of The Democratic Intellect. It is, like almost all the best ideas, a product of the Enlightenment, specifically of the great flowering of liberal thought that made the Edinburgh of the eighteenth century the intellectual capital of the world.

The thinkers of the Scottish Enlightenment believed in the power of reason and science, and the wider diffusion of knowledge, as the best means of countering poverty, inequality and backwardness, the best protection against economic mismanagement, arbitrary rule and human misery. And their thinking was rooted in the traditions of Scottish culture which had grown up since the Reformation.

John Knox, the leader of the Reformation in Scotland sought to establish a school in every parish – and a college in every important town. He believed that every child should have access to knowledge – instead of a society built on outdated hierarchies with an unrepresentative clerical elite keeping knowledge and power to themselves, there should be an educated population using its learning to hold the users of power to account.

The recognition that knowledge is power – and therefore in a proper democracy knowledge, like power, should be in the hands of the people - became the animating force behind the idea of the Democratic Intellect. Scots thinkers fought for wider access to school and university for children of every background. The idea of the lad o'pairts, the cottage born boy whose ability recommends him for a life in education, became a potent part of Scottish self-definition.

The pursuit, in particular, of a rigorous, scientifically-based, education for more and more, for longer and longer, became a national mission – sustained by a special respect for the role of teacher, an innate appreciation of the worth of knowledge and a network of schools and universities open to talent supported by generous endowments, bursaries and scholarships.

The ideal of the Democratic Intellect may have been formed in Scotland but it is certainly not unique to Scotland.

At the same time as thinkers from Francis Hutcheson to Adam Smith and David Hume to James Monboddo were developing the ideas of the Scottish Enlightenment the Sir John Cass foundation was beginning its work.

Starting with one school in the precincts of the City of London, designed to educate both boys and girls of slender means, the Foundation has gone on, over more than two centuries, to support the life of the mind, and democratise access to knowledge, in a way which is truly inspiring - and which reminds us that education is never solely the business of the state.

Your sponsorship of three academies, driving up achievement for some of our poorest children, and your support for specialist schools across London, including the sole parent-promoted school in London, Elmgreen School in Lambeth, is powerful testament to your continuing commitment to spreading opportunity.

And your role in Higher Education demonstrates that insisting on the highest academic standards goes hand in hand with practical preparation for the world of work.

So the principles of the Democratic Intellect are not the preserve of any nation – or any generation.

But they need defending and extending in this nation – and for the next generation.

## THE UNDEMOCRATIC DISTRIBUTION OF INTELLECTUAL CAPITAL

Because one of the most serious blights on our educational system today is the fundamental inequality of opportunity which still prevails. Indeed which is getting worse.

We should be providing more and more young people with access to the knowledge, the academic expertise, the qualifications they need to take control of their own destiny – to become authors of their own life story. But for our poorest children opportunity is not becoming more equal in Britain.

The former cabinet minister Alan Milburn has argued that, “over the past four decades social mobility in our country has slowed markedly”

A recent study we undertook of how the poorest children in our schools perform compare with the rest emphasises that as they go through school they fall further and further behind. Pupils eligible for free school meals are the very poorest in our society and from the moment they arrive at primary school – and as they go through those first seven years – they are progressively falling behind their contemporaries.

And then, in the first three years of secondary school – they fall yet further behind.

And then, when we look at GCSE results, the story becomes sadder still. Nearly 40% of those children eligible for free school meals fail to get a single C pass at GCSE.

By A Level, the gap is even worse. Overall, independent schools, which educate just 7 percent of pupils, produce more pupils who get three A's at A Level than every comprehensive school put together.

Recent figures show that more than 20,000 young people secured three As at A level – the basic passport necessary to secure a place at one of our top universities. Out of 75,000 children eligible for free school meals only 5,000 were even entered for A levels. Of these just 189 got 3As. Of that 189, only 75 were boys. Yet in the same year Eton had 175 boys who got 3As at A level - one school with almost two and a half times as many boys getting 3As as the entire population of our poorest boys on benefit.

Crucially, in those areas of academic achievement which give students the best chance of securing a good university place – and a good job – pupils eligible for free school meals are losing out dramatically.

Success in the rigorous scientific disciplines of physics, biology and chemistry at GCSE is the best route to degree level or equivalent courses in pure and applied science, medicine, engineering and technological disciplines. They, in turn, are the straightest paths to future prosperity, for individuals and the nation.

But these are paths to prosperity which are blocked for most poor children. Less than 4% of children eligible for free school meals even take GCSE Biology and less than 3% of them are even allowed to attempt GCSE Chemistry or GCSE Physics. In some of the poorest local authority areas of the country not a single child takes GCSE Biology, Chemistry or Physics.

By way of contrast more children eligible for free school meals sat GCSE Media Studies than all these science GCSEs put together. And, whatever the joys or benefits of GCSE Media Studies, there are now more students on further education courses in performing arts and media than there are jobs in the entire entertainment industry - including cinema usherettes and lap dancers.

Indeed, when we look across the range of rigorous academic subjects, those disciplines which involve engagement with the highest achievements of our civilization, we find the poor are, everywhere, denied access on equal terms.

While independent schools make up just 7% of the school population, they account for nearly a quarter of entries for Maths and Physics A-levels.

In mathematics the most desirable school-level qualification is an A-level in Further Maths but that qualification simply isn't open to many state school pupils. Research by Cambridge University revealed that when they surveyed student achievement in 2006 not a single student in Hackney, Newham or Lambeth got 3 top A-level passes including Further Maths.

Modern foreign languages are increasingly the preserve of the private sector and selective state schools. Fifteen per cent of schools with sixth forms did not enter a single student for a Modern Languages A-level and this is a particular problem in poorer areas. No pupil in Islington, Barking or Dagenham got 3 top A levels including a modern foreign language in the last year for which we have figures.

And History is dying out in comprehensives. More than 131 schools did not enter any pupils for GCSE history in 2008.

Three out of 10 schools no longer teach History as a standalone subject to 11- and 12-year-olds. A study of 700 history teachers' experiences in almost 650 secondaries

identified one school that admitted that it taught the whole of the key stage three curriculum – designed to span the first three years of secondary school – in just 38 hours.

According to the survey conducted by the Historical Association, a third of comprehensives reported that the amount of time dedicated to history lessons in year seven had reduced. Some 117 schools said teaching time for history was being reduced in year 9 and 5% had dropped it altogether. Only 30% of pupils go on to study History GCSE and they come disproportionately from independent schools.

More pupils at Eton got an A in history than the entire population of children eligible for free school meals.

What makes the situation worse is that even when state schools do offer these subjects to poorer students those pupils are often still operating at a disadvantage.

Private schools are increasingly abandoning the state-run GCSEs for the independent, and more rigorous, International GCSE or the Middle Years Programme of the International Baccalureate and they are moving away from the A level to the IB or Cambridge University's new Pre-U. Because they can offer their pupils more rigorous qualifications, with broader and deeper knowledge bases, fee-paying schools secure their students a crucial advantage when it comes to university entry and the job market. And so for those children born into poverty, the routes out are increasingly harder to scale and out of their reach...

## DEMOCRATISING ACCESS TO KNOWLEDGE – THE BEST THAT HAS BEEN THOUGHT AND WRITTEN IS EVERYONE'S INHERITANCE

It would, of course, be wrong to see education merely in instrumental terms - as a means of economic empowerment. It is a good in itself. One of the goods in which a prosperous nation should wish to invest. The pursuit of learning for its own sake is one of the marks of a civilized society - along with a commitment to greater equality of opportunity and a determination to give the vulnerable a stronger voice in the public square.

And it is because knowledge is a good in itself that I am so angered by how unfairly it is rationed. I want to see access to knowledge democratised.

I want to see more young people being taught, and acquiring a deep subject knowledge in, the hard sciences. Of course, science qualifications, particularly in physics, catapult students to the front of the earnings queue. But for me, what is far more important is that physics, chemistry and biology are the disciplines by which our finest minds have made sense of the physical world. Immersion in these disciplines, the acquisition of the knowledge at the core of each and an understanding of scientific method, empirical reasoning, the importance of proof and the falsifiability of hypotheses, are all ways of enriching the mind more powerful than any I know.

I want to see more young people being taught, and acquiring, a deep subject knowledge in, modern foreign languages. Of course fluency in foreign languages confers an advantage on young people in an increasingly globalised labour market. But what for me is far more important is that language learning sets parts of the brain to work which other forms of study cannot. Neural pathways are strengthened. And as well as intelligence being deepened so are human sympathies. Learning French, German, Italian or Spanish

opens up different cultures, different ways of viewing the world, different moral traditions, different sensibilities. Learning the language, and entering the thoughtworld, of Goethe, Schiller and Wagner or Stendhal, Balzac and Zola is to engage directly with the greatest minds of our civilization in a way which broadens human empathy and roots individuals in a meaningful cultural landscape.

I want to see more young people being taught, and acquiring a deep subject knowledge in, mathematics. Of course success in maths is a precondition of success in almost any field of modern commerce. But what for me is far more important is the way in which mathematical thinking roots habits of logic, reasoning and curiosity in young minds. Mathematics is about more than just numeracy, it is the language of Newton and Leibniz, Fermat and Fibonacci, Einstein and Gödel, the means by which some of the most original and creative individuals who have ever lived communicated their thoughts of greatest profundity and relevance. Studying mathematics gives every young person the chance to see further, and more clearly, by standing on the shoulders of giants.

I want to see more young people being taught, and acquiring a deep subject knowledge in, English literature. Of course a decent pass in English will help convince an employer that a student has the "communication skills" the modern world of work requires. But what for me is far more important is that in this country there is a Great Tradition of literary achievement in which the general reader will find the most profound, affecting and insightful analysis of the human condition known to man. Whether in Shakespeare or Pinter, Jane Austen or George Eliot, Dickens or Hardy, Wordsworth or Yeats, the canon of English literature, as critics such as Leavis have been right to point out, is a civilizing force in the history of mankind.

And I want to see more young people being taught, and acquiring a deep subject knowledge in, geography and history. Of course these subjects train the mind in the sifting and analysis of evidence, in a way which recommends their students to sophisticated employers. But what for me is more important is that both are areas of learning in which the restless curiosity innate to our character, the itch to know, is most richly fulfilled.

We are hard-wired to ask questions about what is home, to search for identity amidst flux - and that is what geography and history address. The dimensions of our earth and the forces which shaped it, physical and political, are an eternal source of fascination to us. And the stories which shape us most profoundly, the chronology of what came before us, the causality that made our world, and our nation, the way it is, excite the human mind like almost nothing else. That is why we instinctively accord a special place to historians, from Gibbon and Macaulay to Cannadine and Colley, Andrew Roberts and Niall Ferguson, asking them not just to explain our past but to guide us into the future.

Giving all children access to the best education means appreciating that for some vocational learning is the best way to make the most of their talents. We need to offer these pupils credible and respected qualifications which are tailored to their more practical abilities. The Government's Diplomas are failing to enthuse either students, heads or employers. The scientific and business community have made clear that the Diploma programme has been badly managed. If elected, we will stop the "academic" Diplomas immediately. We are discussing with the scientific community and businesses how the vocational Diplomas might be salvaged.

Working to spread knowledge more widely in all these areas, ensuring intellectual capital is more equitably distributed, is a great and noble progressive cause, which should be as dear to champions of social justice as any other battle.

Indeed I would argue it is the great progressive battle of our time.

If we are to build a truly successful multi-ethnic society then we need to strengthen the common culture we all share, and that means deepening every individual's knowledge of English literature and British history.

If we are to develop the habits of empathy, tolerance and understanding on which both our cohesion and our success in the world depend then we need to spread the virtues which spring from an understanding of foreign languages, and literature.

If we are to be able to sift good arguments from bad, test foolish prejudices to destruction and win support for good causes which will benefit those in need, then we need to instil those habits of reason, and rooting in empiricism, which spring from maths and science.

If we are to make our democracy work in the interests of every citizen then we need to make our education system work so that every citizen can play their fullest part. A commitment to the ideal of the Democratic Intellect - the belief that every child has a right to draw on the inheritance of the best that has been thought and written - is essential to the health of a modern democracy.

## THE DEMOCRATISATION OF PUBLIC SERVICES

And the changes which are occurring in our democracy now only make the acquisition of knowledge on the part of every individual more and more important.

My colleague David Cameron has described the historical period we are now entering as the post-bureaucratic age. As a phrase, it's never going to be the catchiest way of capturing the zeitgeist, hardly up there with Cool Britannia or the Giving Age or any of the other new dawns which we were invited to be dazzled by ten years ago. But what it may lack in pithiness it more than makes up for in prescience.

The post-bureaucratic age describes precisely the new world being shaped by the economic, cultural, social and technological forces of our time.

Originally, authority in society was exercised on the basis of clan, family and local loyalties. The county gentry administered the law, individual noble houses marshalled men for conflict, news was exchanged at the parish pump or village inn, commerce was carried on at the market town and status was overwhelmingly a matter of birth. Even during upheavals which appeared to be driven by ideology, like the English Civil War or the Thirty Years War, the pattern of loyalties for most was dictated as much by clan, feudal or dynastic factors as anything else.

Then, with the growth of technology and internal communications, the establishment of canals, turnpike roads and railways, national newspapers, national parliaments and national banks, we moved into the bureaucratic age. The new nation states of the nineteenth century raised their taxes, enforced their laws, deployed their armies and provided for the welfare of their increasingly enfranchised citizens by establishing more

and more powerful bureaucracies. The golden age of bureaucracy was the long twentieth century - from the establishment of Bismarck's welfare/warfare state after 1870 until 1979. In Britain Balfour, Lloyd George, Chamberlain, Butler, Attlee, Churchill, Macmillan and Wilson all oversaw a growth in the role of the central Government bureaucracy, paralleled by what happened in America under FDR, Truman, Eisenhower, Johnson and Nixon.

The economic shocks of the 1970s halted the forward march of the bureaucratic state. But we only really moved into the post-bureaucratic age over the course of the last ten years as the knowledge, and ability to allocate resources, which used to confer such power on bureaucracies has become increasingly dispersed.

In the last ten years information technology has revolutionised how services are provided. We can perhaps see it most acutely in the media - for example in the realm of broadcasting. When I was growing up in the 1970s access to the airwaves was very tightly controlled by bureaucratic means. And the most powerful bureaucrat of all was the Controller of BBC One. That single man, and it always was a man then, could control what the nation watched and when they watched it, creating shared moments of national unity around the Christmas Morecambe and Wise Show or determining which sports should enjoy the prestige, and resources, which came from primetime exposure.

But whereas there was only one all-powerful channel controller when I was a child now every one of us has the potential to be our own channel controller now. Thanks to innovations such as Sky Plus, Tivo and iPlayer we can all decide what we want to watch, from an almost infinite range of options, and decide almost without restraint, when we want to watch it. This transference of power from the centralised bureaucracy to the empowered individual in broadcasting is a metaphor for what is happening across the economy, and across society.

Traditional travel agents are increasingly obsolete when you can choose everything from your flight operator to your hotel and even your children's slot on the white water rafts online in advance.

A and R executives, and record shops for that matter, are increasingly obsolete when you can search online for the music you want, not the music the middle men think you should have.

Doctors and pharmacists are no longer distant gods in white coats when every diagnosis and prescription can be cross-checked within minutes and a million second opinions can be downloaded instantly.

And Members of Parliament, for that matter, are no longer aloof and unaccountable creatures of unrepresentative party caucuses when you can monitor their votes, speeches, absences and, yes, expenses, instantly online and hold them to account publicly for any breach of faith.

This technological revolution has helped accelerate social trends which were already gathering pace, in particular the decline in deference towards established authority and the growth in a consumerist approach towards all institutions. And all of these factors have been underpinned by changes in how global markets have been operating, with capital more fluid and innovation more dynamic than ever before.

So in this new, post-bureaucratic, age where information about performance is much more accessible, costs are more transparent, individuals more powerful and impatience with middle men more pronounced every institution has to adapt.

The most successful institutions and nations will be those that recognise most quickly, and profoundly, how this more interdependent world will work. Instead of hierarchies there will be a premium on decentralised networks. The innovations which define our time, whether it was the medical collaboration which defeated SARS, the intelligence collaboration between Sunni tribal chiefs and the US military which made a success of the surge in Iraq, or the open-source collaboration which defines Wikipedia and many new software projects have all been generated by individuals working outside traditional bureaucratic boundaries.

And all these collaborations emphasise that access to, and mastery of, knowledge will increasingly confer the sort of advantage which family connections and inherited position used to secure. Intellectual capital will be the most valuable kind. Network theorists like Alberto-Laszlo Barabassi also teach us that the more contacts there are between people with a rich stock of intellectual capital, the more decentralised traffic there is between those with knowledge to share, the more new knowledge, insights, innovation and growth are generated, and the more quickly errors are spotted and fixed. The clusters of innovation around Cambridge, Boston and Palo Alto emphasise that the combination of investment in knowledge and distributed decision-making and institutions, rather than centralised bureaucratic control, accelerates our progress into the future.

But while the world has been moving faster and faster into a post-bureaucratic age in which knowledge matters more than ever, our country's education system has been moving backwards in the last few years, becoming ever more bureaucratic, with the place of rigorous knowledge being downgraded.

## GOVERNMENT TODAY – GOVERNED BY THE GRIP OF THE BUREAUCRATIC MINDSET NOT THE IDEAL OF THE DEMOCRATIC INTELLECT

In the period since Tony Blair left Downing Street the English education system has taken several retrograde steps.

Instead of fulfilling the ideal of the democratic intellect, education policy is now in the grip of a bureaucratic mindset.

The physical weight of bureaucracy has increased - with schools and teachers being sent more and more paper every week to the extent that last year each head was sent more to read in new departmental circulars than there are words in the King James Bible.

The ability of any institution to free itself from bureaucracy has reduced - with Academy schools, which were meant to be independent state schools, now finding that they have lost control over the curriculum, over staffing, over recruitment, over building design, over procurement, over IT, over who their sponsors can work with and over what their relationship with the local authority might be.

The curriculum has suffered as a result of bureaucratic interference - with a greater level of politically-driven prescription than ever before, squeezing out academic subjects.

Science in particular has suffered as a result of bureaucratic interference. The GCSE science syllabus has been devalued in a way the Royal Society of Chemistry has described as 'catastrophic'. Physics A Level used to teach calculus – it no longer does, but the new Pre-U, outside Government control and increasingly adopted by private schools, has restored calculus to its physics course.

The ability of teachers to innovate has been restricted by bureaucratic control - with the curriculum specifying programmes of study and the inspectorate checking to see if certain practices are being followed - so we have bureaucrats dictating not just what should be taught but how it should be taught.

Choices for students have been restricted because of an increasingly bureaucratic way of measuring performance. Because schools are judged almost solely on their ability to secure 5 C passes or better at GCSE for their pupils weaker schools, most often in poorer areas, steer students towards those qualifications which boost league table rankings rather than securing the greatest benefit for students. Pupils are often entered for qualifications, such as BTEC Diplomas which are nominally equivalent to a clutch of GCSEs but which in fact have none of the rigour, or robustness, of proper GCSEs

The Government's latest initiatives - its Schools White Paper this summer and the Children, Schools and Families Bill which has just been published only increase the level of bureaucratic control which ministers wish to exercise.

The Government's answer to parental dissatisfaction with the range of schools on offer is not greater diversity and choice but a bigger role for the local bureaucracy. The Government's means of driving innovation in pedagogy and supporting teachers grow as professionals is prescribing, in ever greater detail, hour by hour, what should be happening in every school. The Government's answer to the crisis in vocational education is a new system of diplomas so bureaucratically confusing it creates more than a hundred novel types of qualification to which every child in the country has a notional entitlement and three quangoes where there used to be one, resulting in a situation so complex even someone as fluent as the Secretary of State can't explain it to a Radio Four audience.

And because parents have grown used to choice in other areas of life, because they know how much rigorous qualifications matter, particularly in areas such as maths and science and because they see how the bureaucracy currently denies them both the choice and the rigour they want they go outside the system.

A recent report by the Sutton Trust revealed that 22% of children nationally enjoy private maths tuition on top of their schooling, with the number rising to 43% in London. Those figures underline the deep public dissatisfaction with our current system of education. They are a standing condemnation of the education bureaucracy. And they are also another powerful reminder of the inequity at the heart of our educational system. Because while the relatively wealthy can afford this tuition the poorer cannot. The principle of the Democratic Intellect – the idea that all should have equal access to knowledge is mocked by these sad statistics.

The current Government's approach doesn't just entrench inequality, with the poor falling further behind wherever you look, it has also widened the gap in achievement between this nation and other democracies.

The most recent PISA results comparing our country's performance to our competitors in a range of academic subjects emphasised what so many observers have noted, that we are increasingly falling behind other nations.

And what is conspicuous about the success of other nations is that those which are generating some of the most impressive educational performances - and those which are achieving the greatest gains in equity - those which best embody the ideal of the Democratic Intellect - are those which are moving in a post-bureaucratic direction.

## LEARNING FROM THOSE DEMOCRACIES WHICH ARE SHOWING INTELLECTUAL LEADERSHIP

In America President Obama is increasing federal funding for charter schools - those which operate outside central and local bureaucratic control. He is pursuing merit pay for the best teachers - breaking with the bureaucratic employment practices of the past. And he is backing those school commissioners - like Joel Klein in New York and Michelle Rhee in Washington - who are facing down bureaucratic opposition to give parents more diversity and choice.

President Obama has seen that the schools in America which help black and minority ethnic children most are the charter schools run by organisations like KIPP - the Knowledge is Power Programme - with long school days, knowledge-rich curricula and an expectation that every child should go to college. Their gains have only been possible because their founders were prepared to defy entrenched bureaucracies. And because President Obama is impatient to see more minority children succeed he is, rightly, impatient with the bureaucracies which stand in the way.

In Canada the province with the best educational record - indeed the jurisdiction in the English-speaking world with the best state school performance - is Alberta. And again the secret of that Province's success is breaking down bureaucratic barriers. In Edmonton Alberta, the Schools Superintendent Angus Macbeath has achieved superb results by, in effect, making every school a charter school, allowing heads to manage their own budgets, set their own ethos and shape their own environments. Rather than the bureaucracy allocating school places the Province allows parents to choose freely between them all. Parents and children are encouraged to visit every school and are given objective data about every school. Macbeath is explicit about how this discipline has driven improvement for all. Good schools have expanded, weaker schools have had to up their game, competition has driven improvement and the same virtuous dynamic has delivered better value for money.

In Sweden, educational performance has also improved following the break-up of the bureaucratic monopoly which saw all state schools run by local authorities. The creation of new, non-selective, state schools outside local bureaucratic control has introduced greater diversity and parent choice into the system, and results have improved across the board, with results improving fastest in those municipalities with the widest range of choices.

Sweden isn't the only Scandinavian nation to benefit from choice and diversity in the school system. Denmark has a dynamic and pluralist system with a wide range of organisations running state-funded schools. And in Finland, often deliberately contrasted with Sweden, diversity and choice are crucial. Schools boast a variety of specialisms, including providing teaching in the English language, and parental choice is highly valued.

As Andrew Adonis pointed out in a previous Cass lecture half of Helsinki parents eventually choose to place their children in schools other than those which they were originally allocated.

While I'm on the subject of previous Cass lectures I must pay tribute to my immediate predecessor on this podium - the current Secretary of State Ed Balls. In his Cass lecture last year he appeared to concede the logic of our position, give ground to our arguments and accept the nature of the post-bureaucratic age.

He acknowledged that schools outside bureaucratic control - specifically those academies set up before he took over at the Department - were "not only driving up standards, but aspirations too". He acknowledged that had meant "parents are voting with their feet" and this increased choice and competition had created "pressure for improvement in other local schools too".

But the Secretary of State has not followed through on the logic of his argument. Instead of giving schools more autonomy, and encouraging greater diversity, he has tightened the bureaucratic straitjacket.

He mentioned parent-promoted schools in passing but only one new parent promoted school has been created on his watch - and that school - in West Sussex has been supported not by central Government but by Conservatives in local Government.

When I asked him if he agreed with me, and James Purnell, that Academy freedoms should become the norm for state secondaries he said no.

When we proposed extending Academy freedoms to primary schools the Government announced that our proposal would send 'a shiver down the spine' of every parent.

When we have argued for greater freedom for professionals and greater flexibility in teaching the Secretary of State has sought to stifle the innovation which pluralism generates, which diversity demands, and which drives improvement. Indeed, instead of applying the lessons which innovation in this country, and other nations, has generated, this Government has chosen to go turn inwards and take us backwards.

I believe instead that we need to adopt more and more of the practices which characterise the best performing, and fastest improving, education systems in the world. If we are to realise the ideal of the Democratic Intellect then we need to learn from those nations which have been most successful in democratising access to knowledge.

## INVESTING IN INTELLECTUAL CAPITAL WHERE IT COUNTS

And as well as greater diversity and choice, one other hugely important factor unites all those nations which are successful educationally. There is a relentless focus on the quality of teaching. And teaching is seen, as it should be in every nation, as a high prestige profession. Entry to the teaching profession in those nations which perform best educationally is tightly restricted to the best qualified graduates in any year. The top performers at university, who in this country might be tempted to go into the city, into the top law firms, into the fast stream of the civil service or into graduate traineeships with organisations such as the BBC choose to go back into the classroom.

In Finland teachers are drawn from the top ten per cent of graduates, in Singapore and South Korea from the top third or quarter. The bar on entry into the profession, like entry into the most attractive milk round positions here, is deliberately set high so that securing a place as a teacher is a clear sign to all that the candidate is among the most intellectually distinguished of his generation and also a natural leader. In South Korea the bar is set even higher for entry to primary school teaching because they, quite rightly, recognise the unique importance of the early years.

We have consistently argued that Britain must always be learning from the most successful education nations and that means we must act, quickly, to enhance the prestige and esteem of the teaching profession. Crucial to that mission is raising the bar on teacher quality. We are fortunate that the quality of young people coming into teaching is improving all the time. But we must go further.

That is why we have insisted that every new candidate for teaching must have at least a lower second degree at undergraduate level before the taxpayer will fund teacher training.

That is why we have insisted that every candidate for teaching in primary schools should have at least a B pass in both GCSE English and Maths, so they come from among the top third of candidates and have the grounding necessary to master the whole curriculum.

And that is why we have insisted that we strengthen the regime around the current literacy and numeracy tests which police entry into the profession, and which can be taken an infinite number of times, so that there is only one chance of a resit.

We still face significant challenges however – particularly in the maths and sciences.

Only 47% of those teaching maths in state secondary schools have any maths degree.

Only 2% of graduates who go into primary school teaching have a degree in a science, technology, engineering or mathematics subject.

And in the B.Ed. course taken by most primary teachers, just 20-30 days at most is devoted to mathematics teaching in the whole three years for people who will be teaching primary children maths for years to come.

That is why today I want to go further in raising teacher quality. One of the areas where we most need to improve as a nation is science. I mentioned earlier the woefully low number of students from poorer backgrounds allowed to attempt science GCSEs. But our performance in science across the board places us dramatically behind other nations. In Singapore 80% of all A levels are sat in Maths and Science. Here it is barely 30%.

The number doing Physics A level has halved over the past twenty years.

The number doing Maths A level fell from 85 thousand in the mid-1980's to 54 thousand in 2002 before partly recovering over the last few years, though in the context of severe criticism of how the A Level has been changed.

The number of Physics and Chemistry graduates has fallen by over 25% in a decade.

Between 1994 and 2004, more than 30 per cent of the Physics departments in Britain disappeared.

And all this has been happening at a time of university expansion overall. So even as more and more people are going to university, fewer and fewer in absolute terms are pursuing these hard science subjects.

In engineering and technology the number of undergraduates following these courses, as a proportion of total undergraduates, has fallen by 32%.

The root cause of the problem has been our failure as a nation to attract high quality science graduates into teaching. As the pool of science graduates gets smaller, and the rewards for scientists in other areas grow, so the pool from which we can draw shrinks. And without great science teachers we cannot attract more and more young people into studying science.

Deep subject knowledge in science enables teachers to make their lessons compelling and gives them the confidence to organise exciting practical teaching with the sort of experimental work which can bewitch young minds. Science teachers with a mastery of their subject area are better equipped to communicate a passion for their discipline, better equipped to range beyond the curriculum in original, innovative and stimulating ways, better equipped to see how their subject relates, in an infinite number of ways, to students whole range of interests. Teachers with deep subject knowledge are less tied to the bureaucratic programmes of study, and the impoverished intellectual fare prescribed by the Government, and more able to capture young minds with fresh and breathtaking teaching.

At the moment there are far too few highly qualified science teachers in state schools. I applaud all the steps which have been taken to address that problem. The scientists and teachers behind The Physics Factory have created specific centres of excellence in high-performing state schools which share their expertise with neighbouring schools. Some of our most enlightened fee-paying independent schools, such as St Paul's, have also shared their best maths and science teachers with neighbouring state schools to provide gifted pupils with the most exciting and stretching scientific teaching possible.

I am a huge admirer of the individuals behind these initiatives, the pioneers of the Physics Factory, the scientist Jim Whittell and the Physics Teacher Dave Perks of Graveney School, Tooting, and Dr Martin Stephen, High Master of St Paul's. But we need as a society to go much further. That is why I want to announce today an ambitious programme to attract even more brilliant scientists into the classroom.

We will do as President Obama is doing and create new incentives for new teachers. We will offer every graduate with a first or upper second in maths or a rigorous science subject from a good university the chance to have their student loan paid off in its entirety if they opt to go into teaching.

For every year top science graduates spend in the classroom the state will bear the cost of paying off their loan obligations. If scientists make a long-term commitment to teaching then the entire burden of the loan will be lifted from their shoulders.

I expect that the majority of scientists tempted to take up this offer will want to go into secondary teaching, but the offer isn't restricted to those who go into secondary schools. We need great minds at every level in every school. We have undervalued primary school teaching in this country for far too long, and underplayed the importance of deep subject

knowledge in the primary curriculum. We have paid for that with generation after generation of young people arriving at secondary school significantly behind the level of achievement enjoyed by children in other nations. I want to see that change.

We will pay for the cost of this initiative - which could amount to as much as £40,000 per individual teacher - by abolishing a specific layer of bureaucracy in the Training and Development Agency for Teachers. I think it is right where we can identify savings to prioritise investment in those areas which really drive educational achievement and no priority for investment is more important in my eyes, or yields such dividends for the future, as investment in teachers and teaching.

I hope our initiative will create a new generation of superb science and maths teachers, I anticipate that these teachers will make a long term commitment to the profession, diminishing the churn that characterises the system now. And I believe we will have taken another significant step towards replicating the virtues of, indeed potentially overtaking, the world leaders in education such as Finland and Singapore.

I place a special value on science, because I remember to this day the science teachers who inspired me, who opened my eyes to the wonders of the natural world, who made me appreciate the scope and majesty of the universe, who taught me the rules, laws and forces which govern creation. And it was as a child studying science that I learned how to reason, how to deploy logic, how to challenge assumptions and defend propositions. In so far as I can deploy any of these skills it's as a result of the grounding in scientific knowledge I was given at school.

But the value I place on science is more than simply the personal. If we are to defend the principles of the Enlightenment, if we are to defeat superstition, bigotry and fanaticism then we need to strengthen the place of science in our national life.

If we are to defeat disease, end hunger and protect the poor from environmental depredation then we need to strengthen our science base.

If we are to generate jobs, growth and opportunity for a generation currently not in employment education or training then we need to foster the innovation which science alone can drive.

All of the virtues we associate with a healthy democracy – a liberal political culture, a proper concern for the poorest and greater equality of opportunity – are strengthened by a commitment to science. Which is why I believe we need a stronger commitment to science.

Because it is only through investing in intellectual endeavour, and democratising access to knowledge, that we can ensure the next generation enjoy the control over their destinies which it is our duty to secure.

ENDS

[Check against delivery]