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AAP Presidential Address

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2008 Association of American Physicians Presidential Address

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I'll go ahead and give you the punch line first — although we are still the greatest country in the world, certainly with respect to science, technology, and innovation, unless we wake up and aggressively evolve, we are likely to find that “The American Way” will no longer be a dream that many aspire to. Our status as a superpower (in fact, the only superpower at present) makes us a virtual empire. Although I hope that our US empire status persists, if we look back at history, all empires eventually disappear, and when they do, they leave a legacy, either good or bad, in their place. Our legacy is still evolving, and in the end I hope that it is one that we will be proud of. The members of the AAP and ASCI, as leaders in this country, have the ability to influence the US legacy. There is no better time than now to start doing just that.

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History can teach us important lessons, and I have chosen to talk about lessons that we Americans can learn from the rise and fall of the British Empire, and from the legacy that empire has left us. The history of the British Empire, or of any empire for that matter, illustrates an important lesson for the US — that one's dominance in the world can be relatively fleeting in the grand scheme of things. I'd like to give a short review of the history of the British Empire to provide a feel for the active time frame of a modern empire, and then review some of the legacies that empire has left us. Then I'd like to turn and look at some of the possible legacies that we, as citizens of the United States, might leave to future generations.

The British Empire was the largest physical empire in history, and for over 2 centuries the foremost global power. The emphasis that England put on discovery, in the form of maritime exploration, formed the roots of the British Empire in the 15th century. For the US, discovery in the form of science and technology forms the basis of much of our dominance today. Britain's discoveries led to the acquisition of physical property, while US discoveries result in the acquisition intellectual property, the bedrock of today's US empire.

England began accumulating physical and economic territory in the early 1500s. By the 1700s she was already reaching across the globe, predominately by getting the upper hand on Spain, France, and the Netherlands. As one of the 13 colonies of England, America played an important supporting role in this first phase of the British Empire. But our restive ancestors were not fond of taxation without adequate representation (the same could be said of us today), and when we declared independence in 1776, the stage was set for a major transition in the British Empire. With our victory in 1783, Britain shifted its attention from the Americas to Asia, the Pacific, and Africa. At the peak of the British Empire, approximately 25% of the world's populations came under British rule, and the physical boundaries of the empire covered approximately 25% of the land mass of the earth.

But the rise and fall of empires, as well as superpowers, is not linear (just ask the Russians). Although it took over 400 years to build the British Empire to its peak, it only took a few decades until it started to unwind, due in large part to World War II. Many of those who had long remained part of the British Empire were ready to become independent, and over a few decades the number of people under British rule fell by 99%, from 700 million to 2 million. Thus the British Empire, and its status as the dominant world power, essentially came to an end.

The British Empire is now a far cry from what it looked like only a decade or two before WWII, and this all happened in a fraction of a single generation. The decline of the British Empire took less than one generation, while many of its values and systems will likely persist for much longer. If the leadership has made rational choices, paid attention to the right values, and built systems to last, then the influence of an empire can last for many hundreds of years. The British Empire has such a legacy, a legacy that the British can be proud of.

Other empires have come and gone, and there is no reason to think that things will be any different for the US. With the speed of communications and the rapidly changing political climate of today, it can be argued that a similar decline in our virtual empire can occur in an even shorter time frame. If, or rather when, the flattening world causes a diminution in US global dominance, will future generations of Americans be as proud of the legacy left from our age of dominance as the British are of theirs? Rather than worry about how long we can persist as a lone superpower, it is better to look at what our lasting legacy might be in this rapidly flattening world. The fortunate thing is that we, here and now, have the ability to influence this legacy. We don't yet have to think of what could have, or should have been, but rather, we have the chance to shape history by shaping our legacy.

Let's consider what the British Empire left us, and then think about what the US Empire is likely to leave as long-lasting legacies.



Although Britain underwent a rather precipitous decline in its physical presence, and a similar decline in its status as the predominant world power, a number of very important British characteristics were imparted not only to former colonies, but also to much of the rest of the world. For instance, the English language is the predominant language for business and science, and the second-most spoken language on earth after Mandarin Chinese. The English rule of law is the standard across much of the globe, and resulted in a legal framework that allowed for social stability and economic growth.

We Americans often think that anything different from what we do is an exception rather than the rule. Many of us grew up with the idea that everyone wants to be like us. Let's look at some examples of potential US legacies and see how well they might hold up for the generations who will follow us.

What about our system of measurement? Metric is the standard around much of the world, except of course for the US. Our insistence on maintaining the older English system long after the rest of the former British Empire moved to the newer imperial system has resulted in a whole group of US citizens who don't understand speed limits or gas prices in much of the world, can't choose the right club when playing golf in a foreign country, and even, on occasion, cause the costly loss of a sophisticated spacecraft because of our dyslexia with respect to measurement units.

Will our legacy be the creation of modern transportation systems? The English system of driving on the left side of the road is prevalent in much of the world, except for the home of the declining (or declined) American auto industry. The robust automobile industries at this point are most comfortable in placing the steering wheel on the right. And how many of us, other than Tiger, drive a Buick rather than a Lexus, Mercedes, Saab, BMW, or Prius, none of which are made by US-controlled companies. Henry Ford must be turning over in his grave at the decline of the US auto industry.

Speaking of the decline of US-founded transportation industries, it is not very comforting to realize that our US aerospace companies, such as Boeing, can no longer compete for even our own military contracts. Anyone who tried to fly in the last few weeks on Southwest or American is painfully aware of the state of maintenance (or lack thereof) of the US fleet. The Wright brothers must be turning in their graves in unison with Henry Ford. Good ole US inno-

vation and transportation industry leadership doesn't seem to have persisted any longer than the heart of the British Empire.

What about sports as a lasting legacy of the US? The British Empire had a lasting influence in this sphere. Cricket and rugby are major sports in the rest of the world, and when our overseas friends refer to football, they aren't talking the Super Bowl or the Rose Bowl. I have to admit that even though I'm a big fan of football, American football that is, after watching the soccer World Cup, or rooting for the New Zealand All Blacks during the rugby World Cup, one gets a little impatient watching the slow-moving and padded-up US version of the sport. It's hard to accept the fact that the All-American sports, including football, basketball, and baseball, that we grew up with are not much played, or even understood, in much of the rest of the world. And for the majority of the world's population, that is not likely to change.

What about our legacy being one of political systems? The parliamentary system of government, in which elections can be called when the population has lost confidence in the government, seems to have particular merit these days. This form of government is another of the lasting legacies of the British Empire. Some former colonies pride themselves on having governments significantly free of corruption, and make this a selling point with which to do business on the world stage. Will this be a similar legacy of the US? This won't be likely as long as we have Congressman stashing their ill-gotten gains in their freezers along with their organic beef, or writing up their price lists for influence peddling such as our own San Diego congressman Duke Cunningham. At least we can pride ourselves on the high moral character of our congressmen, right? Well, it looks like we need to work on that one a bit since we have those who consider a Senate page as a prime date or others who refuse to step down after pleading guilty to taking a "wide stance."

And I can't help mentioning what the likelihood is that our legacy will be world peace. We did manage to broker 1 unintended peace accord through the time-tested approach of "the enemy of my enemy is my friend." The fact that we managed to drive 2 long-standing enemies together, Iraq and Iran, who only 2 decades ago fought a bitter 10-year war, to oppose us isn't my idea of promoting world peace. And reciting "may he [or she] rest in peace" over 4,000 times certainly isn't the legacy that we want to be remembered for.

The current virtual US empire results largely from our economic dominance. Maybe this will be our legacy. Well, maybe not. It's difficult to imagine right now that we will continue long into the future as the dominant economy when considering the course of the US dollar over the last year. I guess the good news is that for all of us who used to go to Hong Kong to get great prices on goods, we can now do so right at home, assuming that we are being paid in some currency other than the dollar. Just look at what our own predatory lenders have done to the American middle-class dream of owning one's own home. With foreign investment funds and Sovereign Wealth Funds now the proud owners of large chunks of American institutions, and a recession likely, we may have a long wait before we can be sure that the legacy of the US empire will be a positive one with respect to the economy and to the financial system.

How about our legacy being our stewardship of the planet that we currently dominate? Maybe if there had been a few less hanging chads in Florida a couple of elections ago, we wouldn't have an administration view that global warming is a left-wing plot. Our relative position in protecting the environment isn't likely to assure that we will have a long-lasting positive legacy with respect to the environment. I guess the bright side is that if we chose to vacation in the far north, rather than being attacked by a polar bear, we may be tossing one a life ring. And speaking of drowning, maybe our legacy will be our ability to come to the aid of those suffering from a natural disaster? Hmm, that legacy is also a bit of a problem. Just ask the residents of the New Orleans area whether our disaster response capability, for either them or their 4-legged family members, should be a cornerstone of our legacy.

Another long-lasting influence of the British Empire was that of the first-rate universities such as Oxford and Cambridge. Attention to the importance of education as the great equalizer for the randomness of being born into the right social class or caste is a British invention that has not only survived the physical decline of the British Empire, but has flourished in most of the former colonies.

One excellent candidate for a positive US legacy is the talent for entrepreneurship and creativity. These characteristics are important not only for the sake of discovering new knowledge, but also, at least in biomedical research, for gaining a better understanding of human disease and for



developing new therapies. What, then, must we do to help to assure that these characteristics can serve as a long-lasting legacy of the US? First, the underpinning of creativity is knowledge. The saying that “chance favors the prepared mind” is indeed true. If one is scientifically and quantitatively illiterate, then it is difficult to turn creativity into accomplishments. Our legacy in entrepreneurship and creativity depends in large part on the education of the next generation in the US. So how are we doing in the US in teaching math and science?

The Organization for Economic Cooperation and Development (OECD) runs a Program for International Student Assessment (PISA) that evaluates 15-year-olds in a wide range of countries to allow international comparisons of expertise in math and science. This survey is done every 3 years, and in 2009 will encompass countries that contribute 87% of the world’s economy. I’ll show you some eye-opening data from the 2003 and 2006 PISA surveys. I thank my colleagues at the Burroughs Wellcome Fund for providing me these data.

So how are we doing in educating 15-year-old Americans in math? The data indicate that we come out 24th out of 29 countries, and this particular survey didn’t include China, India, or any of the Asian countries known to be strong in math and science education. This is not very promising. One can argue that some countries drill their students in math, so science scores are the most relevant data to examine. Well then, how are we doing in science? Again, not well. We were 21st out of 30 countries in this assessment of scientific knowledge. If we examine the trends, the results are even more alarming. If we just look at the 26 countries that took part in the 2000, 2003, and 2006 surveys, it is clear that our trend in educational competitiveness is downward, and that trend isn’t starting from a very lofty spot in the first place.

Maybe we can argue that although our mean scores bestow upon us second- or third-world status, that we have a lot of top students, and these students are better than others. Thus, our elite students will maintain our creative edge as they enter the work force. David Baltimore, referring to graduate education, recently said, “We do elite education better than anybody else in the world. Our best are better. And the best matters. We are way ahead of everybody else in the world. What we need to do is stay there. That’s what we are doing badly.” Let’s look at those 15-year-olds who will

be the graduate students of tomorrow. We rank 23rd out of 29 countries with respect to percentage of students in the highest achievement level on the standardized math test. Thus, the pool of the very best graduate student candidates of tomorrow will apparently contain a disproportionately small number of US-educated students.

Maybe math and science scores don’t measure the right thing. What we really need to assess is problem-solving ability. Our kids are good at that, right? Problem-solving ability can indeed be measured, and the PISA assessment does just that. More bad news. We ranked 24th out of 29 countries in problem-solving ability in 2003. The problem-solving assessment stratifies students in 4 categories, from level 3, who are reflective and communicative problem solvers, to below level 1, who are weak problem solvers. More than half of our 15-year-olds score at, or below, problem-solving level 1. Not only are our students not very competitive on the world stage with respect to quantitative math and science skills, they don’t score well in reasoning and problem solving.

Thus the current state of affairs in math and science education is not likely to provide us the legacy that we would like to be credited with. What can we do to change the course of this potential legacy? We can get involved in helping to improve math and science education. One of the best guides to getting involved comes from the NIH Science Education Office, and the Web site (<http://science.education.nih.gov>) contains an excellent monograph that is a how-to manual for getting engaged. Everyone here has a degree of influence in the communities in which they live. Take a proactive approach to getting involved in education. Your institution probably already has K–12 math and science education programs in place, and you can work to strengthen these programs.

In addition, you can do other things. You can provide professional training for teachers by doing such things as offering to serve as a resource for a group of teachers, or you can invite teachers to spend a summer in your laboratory setting. You can support informal science education through a science museum in your community. Another thing you can do is to work with parents and school boards on science education policy and on standards for the curriculum taught in the schools in your community. For example, the Burroughs Wellcome Fund plays an important role in improving math and science education for the state of North Carolina, and in doing so, is develop-

ing models that others can adopt. Finally, you can help schools implement a new science program by helping them select material to teach and by viewing the content of what is taught for accuracy.

And don’t forget about causes that are outside of science and education that you can influence. Everyone can contribute to some aspect of a positive legacy. Volunteering as a coach, at the humane society, with the elderly, or in environmental causes may not take optimum advantage of your years of education and your expertise, but it will help individuals and causes, and in doing so, it will make you a better person. If each of us devoted just 1 day a month to volunteer work, we could make a difference with respect to the legacy that the US will leave.

Finally, one can only educate the national, state, and local leadership if those leaders are able and willing to listen and learn. This is an election year, and I would be remiss in not taking the chance to emphasize the importance of being involved in the democratic process. Needless to say, I hope all of you will vote. I don’t care who you vote for (well, that might not be exactly right), but no matter what, vote. Many of us have the time and/or the financial means to actively support our favorite candidates, and we should do so to the best of our ability. And don’t forget about your local community and city governments. You can have a significant effect on the composition of such bodies as the city council and school board, and thus influence your community and state.

I’ll leave you with my favorite quote from Tom Friedman’s book, *The World is Flat*. This is an African proverb prominently posted on the wall of a factory in China:

Every morning in Africa, a gazelle wakes up.

It knows it must run faster than the fastest lion or it will be killed.

Every morning a lion wakes up.

It knows it must outrun the slowest gazelle or it will starve to death.

It doesn’t matter whether you are a lion or a gazelle.

When the sun comes up, you better start running.

It’s time for all of us to run a little faster to help restore America’s luster and to leave a positive legacy for future generations.

1. Swain, J.L. 1996. Is there room left for academics in academic medicine?: Presidential Address to the American Society for Clinical Investigation. *J. Clin. Invest.* 98:1071–1073.