Whither Science In The Trump Administration?

Editorial Comment by G. Warfield Hobbs

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Outstanding Science and technological innovation have given the United States a distinct economic competitive advantage. Oddly, the importance of science and innovation were not issues in the presidential election, and seem to be missing in action in the deliberations of President-Elect Trump's transition team. Of great concern to the scientific community is the fact that Mr. Trump is being advised by individuals with no scientific qualifications. His advisers and appointees would like to see the EPA's environmental regulations shredded; believe NASA should have nothing to do with climate science, and accordingly want to eliminate NASA's earth observatory satellite program; and as climate change deniers, want to pull the United States out of the United Nations Paris Agreement on Climate Change.

December 3rd-5th The Council of Scientific Society Presidents (www.sciencepresidents.org) met in Washington, D.C. to examine current leading edge scientific research, economic and political challenges to R&D, and how the scientific community should approach the Trump Administration. Conference speakers included the heads of the National Academy of Sciences, National Institute of Health (NIH), Defense Advanced Research Projects Agency (DARPA), and the editor of *Science*, the weekly publication of the American Association for the Advancement of Science. The writer attended the conference in his capacity as a past-president of the American Geosciences Institute (www.americangeosciences.org), a federation that represents 51 professional societies of every earth science discipline and has a combined membership of over 250,000

Renewable energy, nanotechnology, cybersecurity, the human brain, artificial intelligence, robotics, and medical advances at a molecular level, will be the principal areas of scientific research over the next decade. Expect to see research at a societal level in the areas of urban infrastructure; the next generation interstate highway system; adapting to climate change; obesity; the effect of marijuana on the teenage brain; drug pricing in America; and the economic and fiscal consequences of immigration. There will be an accelerated convergence of the physical, medical and social sciences in addressing scientific challenges.

Dr. Marcia McNutt, President of the National Academies, sees three likely trends in a conservative Republican administration. These are: 1) more research at the intersection of science and economics – with greater emphasis on the economic impact of basic research; 2) more blending of federal and industry and private foundation partnerships in R&D; and 3), less federal emphasis on international science partnerships. Economic analysis may benefit some research proposals, but an economic "truth test" should not be a hurdle to pure research grant proposals. More public and private partnerships in scientific research are beneficial. President Obama's Brain Initiative, for example, where private organizations such as the Carnegie

Institution and Kavli Foundation are collaborating with the public sector, will accelerate innovative technologies that will revolutionize our understanding of the human brain. A retreat from international scientific collaboration would be a mistake. The sciences, like the economy, are now global, and the USA benefits from breakthrough discoveries made overseas.

Dr. Jeremy Berg, Editor of *Science*, spoke about the importance of stable, multi-year funding of the sciences by federal agencies. Long-term physical science and medical research projects, and the laboratory infrastructure and scientific staff they require, simply cannot and must not, be turned "on and off" by political budgetary whim. The science community hopes that the Trump Administration will be supportive of stable appropriations for the life and physical sciences, and for K-12 grade STEM education.

The greatest concern of the nation's scientific leadership is that we seem to be entering the Post-Fact Era, where the "facts" simply don't matter anymore. This is anathema to a community that bases its research and findings on the scientific method. Data validity, rigor and transparency in scientific research are paramount. A small number of wealthy individuals and special interest groups, on both the right and left, are trying to influence scientific debate and policy by disseminating misinformation and non-facts. For example, the biggest lie currently being circulated is that the scientific community is deeply divided on global warming and the impact of human greenhouse gas emissions. This is simply not true. The debate is over in the earth science community about whether global warming is happening and the anthropogenic factor that is driving climate change. Our concern now is how do we adapt to climate change and mitigate its adverse ecological and physical impacts. Dealing with climate change will likely be the greatest economic, political, social and security challenge of the 21st Century. Policy makers must not ignore this for the good of humankind and planet earth. Mr. Trump's own waterfront properties are imperiled and they may soon be under water!

Science has become polarized, and instead of collegiality in scientific debate, we are now seeing harassment. Representative Lamar Smith (R., TX), for example, has issued subpoenas for all documents and correspondence relating to the work of climate scientists funded by the National Science Foundation and other government agencies. Peer review is under attack. Researchers are advised to make sure that their employers will cover any legal costs incurred in defending their conclusions. Unfortunately, scientific societies simply do not have the financial wherewithal to fight back.

In 1976, Congress established the Office of Science and Technology Policy (OSTP) to facilitate scientifically sound policy decisions by the Executive Branch. The head of the OSTP is known as the Science Adviser to the President. It is the hope of the scientific community that President-Elect Trump will appoint a nationally respected scientist as Science Adviser within the first hundred days of his administration. An early appointee to the Trump Administration was the legal counsel to the president in order to make sure that the President's policy initiatives are

consistent with the laws of the United States. The Science Adviser will assure that policy recommendations coming from the Oval Office are also consistent with the laws of nature.

Scientific societies are currently reaching out to their members to identify the most qualified candidates for leadership positions in the government science agencies, including the position of the Science Advisor to the President. A challenge, however, is that the science community has very limited professional or personal contacts within the Trump Transition Team. We need assistance in opening doors to the Trump Administration. The nation's scientists want to work closely with President-Elect Trump to assure that America remains on the leading edge of technological innovation and is #1 in the global economy. Readers are encouraged to help scientists 'knock" on the door at Trump Tower by expressing their support for a strong and respected Science Adviser @realDonaldTrump on Twitter.

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