industries stay competitive in today's global marketplace.

H.R. 1158, the Steel and Aluminum Energy Conservation and Technology Competitiveness bill before us today authorizes the Department of Energy to develop a public and private partnership to build upon important research goals, such as energy efficiency, increasing competitiveness of the U.S. metals industries, and improving the environment. By working together, both the taxpayers and share holders can benefit from this federal cost share between the government and the metals industries.

The domestic steel industry alone has come a long way since the steel crisis began in 1988. In my home state of Illinois, the crisis has resulted in four steel companies filing for bankruptcy, including Laclede Steel and the parent company for Granite City Steel, which are in my Congressional District. Approximately 5,000 steel workers lost their jobs in Illinois alone.

Now, prices are stabilizing and the industry is restructuring and consolidating. All of this has happened without hampering the availability of competitively priced steel products. However, aggressive trade laws and other international pressures can damage the progress that was made. Therefore, it is important we continue down the path of successful recovery because the overall prospects for our steel industry can affect our future economic and national security.

As a member of the Congressional Steel Caucus, I am deeply committed to making sure the metals industries stay competitive and for these reasons, I support to this bill and urge my colleagues to do the same.

Mr. LIPINSKI. Mr. Speaker, we have no more speakers. I yield back the balance of my time.

Mrs. BIGGERT. Mr. Speaker, I have no further requests for time, and I yield back the balance of my time.

The SPEAKER pro tempore (Mr. FORBES). The question is on the motion offered by the gentlewoman from Illinois (Mrs. BIGGERT) that the House suspend the rules and pass the bill, H.R. 1158, as amended.

The question was taken; and (two-thirds having voted in favor thereof) the rules were suspended and the bill, as amended, was passed.

A motion to reconsider was laid on the table.

HIGH-PERFORMANCE COMPUTING REVITALIZATION ACT OF 2005

Mrs. BIGGERT. Mr. Speaker, I move to suspend the rules and pass the bill (H.R. 28) to amend the High-Performance Computing Act of 1991, as amended.

The Clerk read as follows:

H.R. 28

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the ''High-Performance Computing Revitalization Act of 2005''.

SEC. 2. FINDINGS.

Section 2 of the High-Performance Computing Act of 1991 (15 U.S.C. 5501) is amended by adding at the end the following new paragraph:

''(10) Commercial application of the results of Federal investment in basic and computing science is consistent with longstanding United States technology transfer policy and is a critical national priority, particularly with regard to cybersecurity and other homeland security applications, because of the urgent needs of commercial, academic, and individual users as well as the Federal and State Governments.''.

SEC. 3. DEFINITIONS.

Section 4 of the High-Performance Computing Act of 1991 (15 U.S.C. 5503) is amended—

(1) in paragraph (2), by inserting ''and multidisciplinary teams of researchers'' after ''high-performance computing resources'';

(2) in paragraph (3)—

(A) by striking ''scientific workstations,'';

(B) by striking ''(including vector supercomputers and large scale parallel systems)'';

(C) by striking ''and applications'' and inserting ''applications''; and

(D) by inserting '', and the management of large data sets'' after ''systems software'';

(3) in paragraph (4), by striking ''packet switched''; and

(4) by amending paragraphs (5) and (6) to read as follows:

''(5) 'Program' means the High-Performance Computing Research and Development Program described in section 101; and

''(6) 'Program Component Areas' means the major subject areas under which are grouped related individual projects and activities carried out under the Program.''.

SEC. 4. HIGH-PERFORMANCE COMPUTING RESEARCH AND DEVELOPMENT PROGRAM.

Title I of the High-Performance Computing Act of 1991 (15 U.S.C. 5511 et seq.) is amended—

*(1) in the title heading, by striking ''**AND THE NATIONAL RESEARCH AND EDUCATION NETWORK**'' and inserting ''**RESEARCH AND DEVELOPMENT**'';*

(2) in section 101—

*(A) the section heading, by striking ''**NATIONAL HIGH-PERFORMANCE COMPUTING**'' and inserting ''**HIGH-PERFORMANCE COMPUTING RESEARCH AND DEVELOPMENT**'';*

(B) in subsection (a)—

(i) in the subsection heading, by striking ''NATIONAL HIGH-PERFORMANCE COMPUTING'' and inserting ''HIGH-PERFORMANCE COMPUTING RESEARCH AND DEVELOPMENT'';

(ii) by striking paragraphs (1) and (2) and inserting the following: ''(1) The President shall implement a High-Performance Computing Research and Development Program, which shall—

''(A) provide for long-term basic and applied research on high-performance computing;

''(B) provide for research and development on, and demonstration of, technologies to advance the capacity and capabilities of high-performance computing and networking systems;

''(C) provide for sustained access by the research community in the United States to high-performance computing systems that are among the most advanced in the world in terms of performance in solving scientific and engineering problems, including provision for technical support for users of such systems;

''(D) provide for efforts to increase software availability, productivity, capability, security, portability, and reliability;

''(E) provide for high-performance networks, including experimental testbed networks, to enable research and development on, and demonstration of, advanced applications enabled by such networks;

''(F) provide for computational science and engineering research on mathematical modeling and algorithms for applications in all fields of science and engineering;

''(G) provide for the technical support of, and research and development on, high-performance computing systems and software required to address Grand Challenges;

''(H) provide for educating and training additional undergraduate and graduate students in software engineering, computer science, computer and network security, applied mathematics, library and information science, and computational science; and

''(I) provide for improving the security of computing and networking systems, including Federal systems, including research required to establish security standards and practices for these systems.'';

(iii) by redesignating paragraphs (3) and (4) as paragraphs (2) and (3), respectively;

(iv) in paragraph (2), as so redesignated by clause (iii) of this subparagraph—

(I) by striking subparagraph (B);

(II) by redesignating subparagraphs (A) and (C) as subparagraphs (D) and (F), respectively;

(III) by inserting before subparagraph (D), as so redesignated by subclause (II) of this clause, the following new subparagraphs:

''(A) establish the goals and priorities for Federal high-performance computing research, development, networking, and other activities;

''(B) establish Program Component Areas that implement the goals established under subparagraph (A), and identify the Grand Challenges that the Program should address;

''(C) provide for interagency coordination of Federal high-performance computing research, development, networking, and other activities undertaken pursuant to the Program;''; and

(IV) by inserting after subparagraph (D), as so redesignated by subclause (II) of this clause, the following new subparagraph:

''(E) develop and maintain a research, development, and deployment roadmap for the provision of high-performance computing systems under paragraph (1)(C); and''; and

(v) in paragraph (3), as so redesignated by clause (iii) of this subparagraph—

(I) by striking ''paragraph (3)(A)'' and inserting ''paragraph (2)(D)'';

(II) by amending subparagraph (A) to read as follows:

''(A) provide a detailed description of the Program Component Areas, including a description of any changes in the definition of or activities under the Program Component Areas from the preceding report, and the reasons for such changes, and a description of Grand Challenges supported under the Program;'';

(III) in subparagraph (C), by striking ''specific activities'' and all that follows through ''the Network'' and inserting ''each Program Component Area'';

(IV) in subparagraph (D), by inserting ''and for each Program Component Area'' after ''participating in the Program'';

(V) in subparagraph (D), by striking ''applies;'' and inserting ''applies; and'';

(VI) by striking subparagraph (E) and redesignating subparagraph (F) as subparagraph (E); and

(VII) in subparagraph (E), as so redesignated by subclause (VI) of this clause, by inserting ''and the extent to which the Program incorporates the recommendations of the advisory committee established under subsection (b)'' after ''for the Program'';

(C) in subsection (b)—

(i) by redesignating paragraphs (1) through (5) as subparagraphs (A) through (E), respectively;

(ii) by inserting ''(1)'' after ''ADVISORY COMMITTEE.—'';

(iii) in paragraph (1)(C), as so redesignated by clauses (i) and (ii) of this subparagraph, by inserting '', including funding levels for the Program Component Areas'' after ''of the Program'';

(iv) in paragraph (1)(D), as so redesignated by clauses (i) and (ii) of this subparagraph, by striking ''computing'' and inserting ''high-performance computing and networking''; and

(v) by adding at the end the following new paragraph:

''(2) In addition to the duties outlined in paragraph (1), the advisory committee shall conduct periodic evaluations of the funding, management, coordination, implementation, and activities of the Program, and shall report not less frequently than once every two fiscal years to the Committee on Science of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate on its findings and recommendations. The first report shall be due within one year after the date of enactment of this paragraph.''; and

(D) in subsection (c)(1)(A), by striking ''Program or'' and inserting ''Program Component Areas or''; and

(3) by striking sections 102 and 103.

SEC. 5. AGENCY ACTIVITIES.

Title II of the High-Performance Computing Act of 1991 (15 U.S.C. 5521 et seq.) is amended—

(1) by amending subsection (a) of section 201 to read as follows:

''(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the National Science Foundation shall—

''(1) support research and development to generate fundamental scientific and technical knowledge with the potential of advancing high-performance computing and networking systems and their applications;

''(2) provide computing and networking infrastructure support to the research community in the United States, including the provision of high-performance computing systems that are among the most advanced in the world in terms of performance in solving scientific and engineering problems, and including support for advanced software and applications development, for all science and engineering disciplines; and

''(3) support basic research and education in all aspects of high-performance computing and networking.'';

(2) by amending subsection (a) of section 202 to read as follows:

''(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the National Aeronautics and Space Administration shall conduct basic and applied research in high-performance computing and networking, with emphasis on—

''(1) computational fluid dynamics, computational thermal dynamics, and computational aerodynamics;

''(2) scientific data dissemination and tools to enable data to be fully analyzed and combined from multiple sources and sensors;

''(3) remote exploration and experimentation; and

''(4) tools for collaboration in system design, analysis, and testing.'';

(3) in section 203—

(A) by striking subsections (a) through (d) and inserting the following:

''(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Secretary of Energy shall—

''(1) conduct and support basic and applied research in high-performance computing and networking to support fundamental research in science and engineering disciplines related to energy applications; and

''(2) provide computing and networking infrastructure support, including the provision of high-performance computing systems that are among the most advanced in the world in terms of performance in solving scientific and engineering problems, and including support for advanced software and applications development, for science and engineering disciplines related to energy applications.''; and

(B) by redesignating subsection (e) as subsection (b);

(4) by amending subsection (a) of section 204 to read as follows:

''(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I—

''(1) the National Institute of Standards and Technology shall—

''(A) conduct basic and applied metrology research needed to support high-performance computing and networking systems;

''(B) develop benchmark tests and standards for high-performance computing and networking systems and software;

''(C) develop and propose voluntary standards and guidelines, and develop measurement techniques and test methods, for the interoperability of high-performance computing systems in networks and for common user interfaces to high-performance computing and networking systems; and

''(D) work with industry and others to develop, and facilitate the implementation of, high-performance computing applications to solve science and engineering problems that are relevant to industry; and

''(2) the National Oceanic and Atmospheric Administration shall conduct basic and applied research on high-performance computing applications, with emphasis on—

''(A) improving weather forecasting and climate prediction;

''(B) collection, analysis, and dissemination of environmental information; and

''(C) development of more accurate models of the ocean-atmosphere system.''; and

(5) by amending subsection (a) of section 205 to read as follows:

''(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I, the Environmental Protection Agency shall conduct basic and applied research directed toward advancement and dissemination of computational techniques and software tools for high-performance computing systems with an emphasis on modeling to—

''(1) develop robust decision support tools;

''(2) predict pollutant transport and the effects of pollutants on humans and on ecosystems; and

''(3) better understand atmospheric dynamics and chemistry.''.

The SPEAKER pro tempore. Pursuant to the rule, the gentlewoman from Illinois (Mrs. BIGGERT) and the gentleman from Tennessee (Mr. DAVIS) each will control 20 minutes.

The Chair recognizes the gentlewoman from Illinois (Mrs. BIGGERT).

GENERAL LEAVE

Mrs. BIGGERT. Mr. Speaker, I ask unanimous consent that all Members may have 5 legislative days within which to revise and extend their remarks and include extraneous material on H.R. 28, as amended, the bill now under consideration.

The SPEAKER pro tempore. Is there objection to the request of the gentlewoman from Illinois?

There was no objection.

Mrs. BIGGERT. Mr. Speaker, I yield myself such time as I may consume. Mr. Speaker, when we think of how computers affect our lives, we probably think of the work we do on our office desktop machines or maybe the Internet surfing we do in our spare time. We do not normally think of the enormous contribution that supercomputers, also called high-performance computers, make to the world around us.

A recent report by the Council on Competitiveness outlined how high-performance computers currently are used in various industries. The report concluded that ''there is great potential for increased productivity, innovation and competitive advancement across the private sector'' as more industries learn how to take advantage of supercomputing technologies.

This is not at all surprising. At a Science Committee hearing last year, we learned that supercomputers allow companies to anticipate how new products will behave in different environments using simulations that are called ''virtual prototyping.''

For instance, the automotive industry uses high-performance computers to reduce costs and improve quality and safety during the vehicle design process. Pharmaceutical companies simulate chemical interactions to design new drugs. These approaches help companies increase the speed to market for new products.

High-performance computers also are central to maintaining U.S. leadership in many scientific fields. Computational science complements theory and experimentation in fields such as plasma physics and fusion, astrophysics, nuclear physics and genomics.

However, in June 2002, a new Japanese supercomputer, the Earth Simulator, was named the fastest in the world, a title it held through November 2004. Some experts claim that Japan was able to produce the Earth Simulator, a computer far ahead of American machines, because the U.S. had taken an overly cautious or conventional approach to computing R&D. In hindsight, we see that caution meant lost opportunities. Japan's Earth Simulator is an example of a road not taken.

But the U.S. is coming back. Last fall, American machines took the two top spots on the list of fastest supercomputers, pushing the Earth Simulator to third. I commend IBM and Silicon Graphics, Inc. for producing these amazing new machines.

The bill we are considering on the House floor today, H.R. 28, the High-performance Computing Revitalization Act of 2005, will ensure that America remains a leader in the development and use of supercomputers.

To achieve this aim, the bill does four things. First, it requires that Federal agencies provide the U.S. research community access to the most advanced high-performance computing systems and technical support for their users.

Second, there is more to computing than building big machines. That is why the bill requires Federal agencies to support all aspects of the high-performance computing for scientific and engineering applications.

Third, the bill requires the White House Office of Science and Technology Policy to direct an interagency planning process to develop and maintain a road map for the provision of high-performance computing resources for the U.S. research community.

The original legislation that the bill amends, the High-performance Computing Act of 1991, gave rise to an interagency planning process that has lost the vitality it once had. This provision will help ensure a robust planning process so that our national high-

performance computing effort is not allowed to lag in the future.

Finally, the bill clarifies the mission of each of the Federal agencies that have a role in developing or using high-performance computing.

Mr. Speaker, this bill was the subject of a full committee hearing in May of 2004. At that hearing, Dr. John Marburger, director of the White House Office of Science and Technology Policy, communicated the administration's support for this bill. The bill is also consistent with a report written by the High End Computing Revitalization Task Force and released by OSTP on the day of the hearing.

More recently, the President's Information Technology Advisory Committee, known as PITAC, on April 14 approved the recommendations for a report on computational science they will issue shortly. Designed to ensure U.S. preeminence and competitiveness in the computational science, these recommendations include sustained access for the research community to the highest end supercomputers, devotion of resources to software development and data management, and creation of a multidecade road map for computational science and the fields that require it. In other words, the actions this report recommends are exactly what today's bill requires the Federal Government to do.

The Nation's experts on PITAC, Dr. Marburger, and the Bush administration all recognize that we cannot imagine the kinds of problems that the supercomputers of tomorrow will be able to solve, but we can imagine the kinds of problems we will have if we fail to provide researchers in the United States with the computing resources they need to remain world-class.

This bill will guide Federal agencies in providing needed support to high-performance computing and its user communities. Our Nation's scientific enterprise and our economy will be stronger for it. I urge my colleagues to support this bill.

Mr. Speaker, I reserve the balance of my time.

Mr. DAVIS of Tennessee. Mr. Speaker, I yield myself such time as I may consume.

First of all, I would like to commend my colleague, the gentlewoman from Illinois (Mrs. BIGGERT), for her constant work on the Science Committee and these particular areas for the work that she has done over the last several years and her consistent leadership in support of the high-end computing.

I also thank my colleagues in the House for passing the previous version of this bill in the 108th Congress, and hopefully the Senate will pass this bill also in a timely manner.

H.R. 28 aims to restore U.S. world leadership in the area of high-performance computing. Supercomputing is a large national effort spread out over seven Federal agencies. This resolution seeks to better coordinate those agencies' efforts and to improve both short-term and long-term planning.

The Oak Ridge National Laboratory near my district is a center of national leadership and high-performance computing. Oak Ridge is the Department of Energy's largest science and energy laboratory. This lab is involved in many innovative research projects, including renewable energy, materials science, national security, and bioscience.

I am proud that the Oak Ridge National Lab near my district stands to become the home of the world's most powerful supercomputer.

I envision thousands of scientists traveling to Oak Ridge to use the computing facilities. The discoveries they make will change how we diagnose and cure diseases, heat and cool our homes, travel from place to place, and defend our liberties in time of warfare.

H.R. 28 will strengthen and streamline our national efforts in the areas of high-performance computing. I commend this bill and recommend this bill to my colleagues and ask for their support.

Mr. Speaker, I reserve the balance of my time.

Mrs. BIGGERT. Mr. Speaker, I yield such time as he may consume to the distinguished chairman of the Science Committee, the gentleman from New York (Mr. BOEHLERT).

(Mr. BOEHLERT asked and was given permission to revise and extend his remarks.)

Mr. BOEHLERT. Mr. Speaker, this is very important legislation. It deals with the competitiveness of the United States of America in the global marketplace. This is something that too many take for granted that we are going to continue to be preeminent in the competitive world. We are not going to be preeminent in the competitive world if we do not invest wisely, if we do not direct our resources in the proper way, because the competition is all over the place. It is not just one State against another. It is the United States against the world. We are ahead. That is a position I like. I like to be ahead of the parade.

But I will tell you, when we look back, we see a lot of people following closely behind. So it is critically important that we do things like investing in high-performance computing. And among other things, this bill directs the director of the Office of Science and Technology Policy, that is the science advisor to the President of the United States, to develop and maintain a research development and deployment road map for the provision of high-performance computing systems for use by the research community in the United States of America.

□ 1430

Now, that is a very important assignment. And we want Dr. Marburger down at the White House to know that those of us in the legislative branch are determined to give the resources necessary, the direction necessary to enable him to go forward, confident that he has the support, the bipartisan support of the Congress of the United States. So I commend this bill to my colleagues. I commend this bill to the other side of the Capitol, our colleagues in the United States Senate.

This is important business and let us get on with it. I thank my chairwoman, the gentlewoman from Illinois (Mrs. BIGGERT) for the outstanding leadership she has provided and I thank my colleagues for their indulgence.

Mr. DAVIS of Tennessee. Mr. Speaker, I yield such time as he may consume to the gentleman from California (Mr. SHERMAN).

Mr. SHERMAN. Mr. Speaker, I thank the gentleman for yielding me time.

Mr. Speaker, I believe I am the only one to come to this floor to oppose this bill. I will try to yield back at least a few minutes to the gentleman and hopefully they will be available should my comments result in comments of others that need rebuttal.

I support science. It is important to America. It is important to my district. But as we look at what we can accomplish, we also have to examine what we should try to accomplish. While we expand the tools of the human race, we must also look at the pitfalls.

This is an issue that I have been talking about for a long time. I first brought it to the floor 5 years ago and that is best illustrated by the fact that roughly 50,000 years ago was the last time that a new level of intelligence came to this planet. It was our ancestors, who said hello to Neanderthal, the only other intelligence on the planet that we were aware of at the time. It did not work out so well for the Neanderthal.

Today we are as a species looking at two exciting new technologies, each which is likely to create an entity, a life form, with a higher level of intelligence than human beings; and, in fact, a higher level by a differential that exceeds whatever differential there was between human beings and Neanderthals. One of these technologies is genetic engineering. And if this was a genetic engineering bill, I would not get to speak on it as long because there would be more members to speak against it, worried about the societal implications. But genetic engineering raises questions that should also be raised by computer engineering, because the kind of high-technology, high-performance computer which is the subject of the bill is an important step towards the development of an artificial life form that will exceed human intelligence.

We had hearings 2 years ago in the Committee on Science where the consensus of experts and I did not invite any of these experts, senior committee members did, (chiefly the chairman) they testified that we are roughly 25 years away from a computer that exceeds human intelligence.

Now, I do not know whether it is 25 years or whether it is a bit longer or a bit less, but should we go headlong into developing the next intelligent species on this planet without even including, in the slightest, in our legislation something to say ''let us examine whether this is something we want to do, and whether we want to have any controls.''

The truth is, Mr. Speaker, we do not know whether we are creating Data from ''Star Trek, The Next Generation,'' or whether we are creating Hal from ''2001: A Space Odyssey.'' We know that the future will look like science fiction. We just do not know which science fiction book or movie.

Last year when the Committee on Science considered this same bill as H.R. 4218, the gentleman from New York (Mr. BOEHLERT) and I reached an agreement on an amendment that would provide for looking at the societal implications of future advances in information technology. That amendment was included in the bill that passed this House. Specifically, it directed the National Science Foundation to support research into the implications of computers, both hardware and software, that were capable of mimicking human ability to learn to reason and to make decisions. Likewise, the nanotechnology bill which passed both houses, and is now law, provided for even more extensive review into the societal implications, including explicitly the implications of developing levels of intelligence that exceeds those of human beings. But H.R. 28 strips out the provisions that were included in prior legislation. This draft says we will do nothing to look at the societal, the ethical, the environmental implications of what we are doing, and we will rush headlong into trying to do it without the slightest thought of whether we should do it.

My amendment in committee was defeated 17–19 on what was unfortunately, and inexplicably a party-line vote. My amendment put forward just a few weeks ago was identical to the compromise language the chairman and I reached in the 108th Congress.

Now, the importance of understanding how artificial intelligence will be achieved through information technology, how it will impact society—that importance has not decreased since last year. The amendment should be included before this bill leaves this House.

Now, I know there are those who say it is okay to create a computer that exceeds human intelligence and that is self-aware because it will not have hands and will not be able to act except through human beings. Trust me, there are those amongst us who would sell hands to the devil for a good stock tip. If you create Pandora's box, it will be opened.

Now, H.R. 28 deals with the creation of high-performance computers; and as I said and want to say again, the testimony before our committee was that we are 25 years, and this is not one crackpot, this was a consensus; the range was 20 to 30 years between now and when we develop a computer that exceeds human intelligence. And it is not just me. The DARPA, the Defense Advanced Research Project Agency, has on its Web page the statement that its mission, supported by this bill, is to develop a computer which will ''learn from its experience, be aware of itself, and be able to reflect on its own behavior.''

So part of our government is engaged in trying to create maybe Hal, maybe Data, while here in the Congress we pretend that it is impossible, that it is not an issue worthy of reflection. DARPA is going to create a reflective computer, but we do not have a reflective Congress.

Now, I understand that H.R. 28 is an important bill to set goals and priorities in high-performance computer research development with a number of different agencies, including DARPA and its subsidiary agencies. What I do not understand is why there is such resistance to studying the implications of this research. We cannot and should not plunge ahead without a provision to study these implications.

Join me in rejecting this bill on suspension. A bill with this level of implications should not be considered under a suspension of the rules. Send this bill back to the Committee on Science. Have the Committee on Science create a balanced program. Overwhelmingly, this bill should deal with supporting the technology, marching forward, achieving all of the goals that the preceding speakers have indicated. But then let us also put in the bill just a little language to say that we ought to look at the implications: Whether it is likely that this technology will create an entity more intelligent than human beings? Whether that entity is likely to be self-aware? How we could either cause or prevent such self-awareness? What are the societal and ethical implications of having a slave entity reflective, intelligent, and commanded to do what we instruct, without so much as the minimum wage?

So let us pass this bill next month, after the Committee on Science can provide some balance to it.

Mrs. BIGGERT. Mr. Speaker, I yield myself such time as I may consume.

Mr. Speaker, as I mentioned earlier the Committee on Science held a hearing on the high-performance computer in May of last year. And at that time my colleague, the gentleman from California (Mr. SHERMAN) asked the experts who testified at that hearing whether there was any danger of computers approaching the cognitive abilities of humans. And the witnesses gave a resounding no in answer to that question.

More specifically, my colleague wanted to know how close we were to a machine that has reached a level of intelligence where it would be entitled to the minimum wage. Dr. Jack Marburger, the President's Science Advisor responded, ''Not very. We are quite far from that in terms of number of components measured in neurons; for example, the interconnectivity of the human brain far exceeds anything that we can currently build or foresee in the foreseeable future with computer hardware.''

Dr. Rick Stevens, a renowned computer scientist from Argonne National Laboratory, responded to the same question saying, ''My personal view is that I would be much more concerned with near-term issues associated with large-scale computing or the use of large-scale data systems to collect information. Right now, if you had to estimate what is the most intelligent device we can build, it is roughly between a worm and an insect in terms of what it can do.''

I think it is exceedingly inappropriate for this bill to impose a requirement on our Federal agencies to focus on the societal implications of hypothetical human-mimicking computers. Doing so would suggest that we as a body fundamentally misunderstand the nature and focus of high-performance computing research.

In addition, as Dr. Stevens pointed out at our hearing last year, information technology has societal implications for privacy, for workplace collaboration and for many other areas. Our Federal agencies should focus any resources for societal studies on these real and immediate needs.

Finally, NSF already has the ability to conduct research generally into social, economic, and work-force implications of information technology. We should allow the research community, via the peer review process, and the agency to determine if this sort of research becomes necessary. This should not be a mandate in this bill.

Mr. Speaker, I reserve the balance of my time.

Mr. DAVIS of Tennessee. Mr. Speaker, how much time is remaining?

The SPEAKER pro tempore (Mr. FORBES). The gentleman from Tennessee (Mr. DAVIS) has 9 minutes remaining.

Mr. DAVIS of Tennessee. Mr. Speaker, I yield 2 minutes to the gentleman from California (Mr. SHERMAN).

Mr. SHERMAN. Mr. Speaker, I thank the gentleman for his additional generosity. I wish to respond to the comments of the gentlewoman.

Mr. Speaker, I will submit for the RECORD the section of DARPA's mission statement that I referred to previously where DARPA itself indicates that its mission, using the funds provided by this Congress, is to create a computer that is self-aware and able to reflect on its own behavior.

Mr. Speaker, we have thrown around terms as to what is close and what is not. It just comes down to whether 25 years, 30 years, is something close enough for us to be concerned about, or should we be concerned about only the immediate future? I would point out

that we are not going to have self-aware computers for at least 10, maybe 15 or 20 congressional elections. And so if that is how we measure time, self-aware computers are a long way away. But when we approve construction projects and roads, we do not build bridges that are going to collapse in 25 or 30 years, and we assume that human beings will be the only intelligent species using those bridges.

If we are concerned when we build infrastructure for things 20, 30, 50, 100 years down the road, then we should be even more concerned with this bill. And we should not pass this bill in this form and say, well, we will worry about these issues when they come up in some subsequent decade.

□ 1445

In addition, it is put forward that we will just have the scientists and the research community figure out how to deal with these issues. That is perhaps the problem, because if we provide the support exclusively to the hardware and software scientists and nothing to those who will consider the societal implications, the ethical implications, the philosophical implications—then no one will be looking at those issues, then we will not have done our job to provide a balanced, scientific research bill. That is why I am voting ''no.''

The material I referred to previously is as follows:

DARPA STRATEGIC PLAN: SECTION 3.7: COGNITIVE COMPUTING (RELEASED FEBRUARY 2005)

Many elements of the information technology revolution that have vastly improved the effectiveness of the U.S. forces and transformed American society (e.g., time-sharing, personal computers, and the Internet) were given their impetus by J.C.R. Licklider, a visionary scientist at DARPA some 40 years ago. Licklider's vision was of people and computers working symbiotically. He envisioned computers seamlessly adapting to people as partners that would handle routine information processing tasks, thus freeing the people to focus on what they do best—think analytically and creatively—and greatly extend their cognitive powers. As we move to an increasingly network-centric military, the vision of intelligent, cooperative computing systems responsible for their own maintenance is more relevant than ever.

Despite the enormous progress in information technology over the years, information technology still falls well short of Licklider's vision. While computing systems are critical to U.S. national defense, they remain exceedingly complex, expensive to create, insecure, frequently incompatible, and prone to failure. And, they still require the user to adapt to them, rather than the other way around. Computers have grown ever faster, but they remain fundamentally unintelligent and difficult to use. Something dramatically different is needed.

In response, DARPA is revisiting Licklider's vision as its inspiration for the strategic thrust, ''Cognitive Computing.'' Cognitive computers can be thought of as systems that know what they're doing. Cognidtive computing systems ''reason'' about their environments (including other systems), their goals, and their own capabilities. They will ''learn'' both from experience and by being taught. They will be capable of natural interactions with users, and will be able to ''explain'' their reasoning in natural terms. They will be robust in the face of surprises and avoid the brittleness and fragility of expert systems.

The benefits from this cognitive computing thrust will be profound. The increasing complexity of military systems means that the level of expertise needed to maintain them is also increasing—as are the staffing requirements for virtually every military function that uses computing and communications technology. By creating systems that know what they are doing, and that can configure, maintain, and adapt themselves, we will be able to drastically reduce the staff needed for operations centers, forward command posts, and even in support of small dismounted units and special operations teams. Cognitive computing technology will also help us to deal with the increasing tempo of operations and the complexity of plans, such as Air Tasking Orders and joint hostage rescue operations plans, by allowing computers to tap into the accumulated knowledge of past experience on behalf of their human partners.

Along these lines, DARPA's Personalized Assistant that Learns (PAL) program will create intelligent personalized assistants for many tasks, such as a commander's assistant, an intelligence analyst's assistant, or a decision-maker's executive assistant. These assistants will interact with their human partners by accepting direct, naturally expressed guidance to learn their partner's preferences and procedures. Then, they will be able to anticipate the human's needs and prepare materials to be ready just in time for them. These new and unprecedented artificial helpers should reduce military staffing needs in many key places and will help ensure decisions are made in a timely fashion and with the best possible preparation.

To meet these challenges and seize these opportunities, DARPA has structured its work in cognitive computing to catalyze innovative work in single cognitive systems. collaborative teams of cognitive systems, and collective cognition from large numbers of small non-cognitive elements. Each area will demonstrate the power of merging reasoning, learning, perception, and communication technologies. These areas will be supported and complemented by broad-based technology efforts in the hardware, software, and integration techniques needed.

The strategic thrust of cognitive computing is a template shaping DARPA's core technology foundation work in information technology.

Mrs. BIGGERT. Mr. Speaker, I reserve the balance of my time.

Mr. DAVIS of Tennessee. Mr. Speaker, I yield myself such time as I may consume.

I certainly understand the gentleman from California's (Mr. SHERMAN) efforts in an attempt to amend the bill in the committee process. As the gentlewoman from Illinois (Mrs. BIGGERT) has explained, however, there are other areas today in the policy of NSF that literally would look into the particular issues that he has raised with his amendment.

As a result of that, both the ranking member and the chairman agreed that this legislation is what we need to be considering today. So I strongly support this bill. I think that it is good for America. I think it is good perhaps even for the world; but, certainly, it is good in the areas where research and science is a major part of offering opportunities and options for those of us who live in this country.

So on that effort, I again make my comments of being sorry that the gentleman from California's (Mr. SHERMAN) efforts were not successful in the committee. Actually, last year, we did consider that amendment, and it actually passed the House floor; but I recommend strongly to the Members of the House passage of this bill, strongly support this bill.

Mr. Speaker, I yield back the remainder of my time.

Mrs. BIGGERT. Mr. Speaker, I yield myself such time as I may consume.

I would agree with the gentleman from Tennessee that we really do have the means to conduct research generally and to the social, economic and workforce implication of information technology, and NSF has that ability; and I think that that is all that is necessary. We do not want a mandate in this bill.

In closing, Mr. Speaker, I want to recognize the bill's chief cosponsor, the gentleman from Tennessee (Mr. DAVIS), and thank him for all the great work that he has done on this bill. It is a very important bill to his district, to my district, and to all of the Nation.

I would also like to thank the other cosponsor of this important legislation, including the gentleman from New York (Mr. BOEHLERT), the distinguished chairman of the Committee on Science; along with the gentleman from Tennessee (Mr. GORDON), the ranking member; the gentleman from South Carolina (Mr. INGLIS); the gentlewoman from Oregon (Ms. HOOLEY); and the gentleman from Illinois (Mr. JOHNSON), and I thank them all for their support.

With that, I would also like to thank my colleagues in this body for supporting an identical bill to this one in the 108th Congress; and, finally, I would like to extend my thanks to the Committee on Science staff, majority and minority, for their hard work to bring this bill to the floor today.

As I said earlier, we must commit to providing sustained support for high-performance computers at our Federal civil science agencies. H.R. 28 represents just such a commitment. Our Nation's scientific enterprise and our economy will be the stronger for it. I would urge my colleagues to support the bill.

Mr. Speaker, I yield back the balance of my time.

The SPEAKER pro tempore (Mr. FORBES). The question is on the motion offered by the gentlewoman from Illinois (Mrs. BIGGERT) that the House suspend the rules and pass the bill, H.R. 28, as amended.

The question was taken; and (two-thirds having voted in favor thereof) the rules were suspended and the bill, as amended, was passed.

A motion to reconsider was laid on the table.