the assumption that what is not prohibited is permitted.

Because NBAC members feel that the public is woefully ignorant about genetics, the report will include recommendations for improving the public's understanding in this area, perhaps through a broad new education effort. To get an early start on this, according to one panel member, NBAC plans to include a section in its final report attacking ill-informed notions of "genetic determinism."

One NBAC member, R. Alta Charo, a law professor at the University of Wisconsin, Madison, urged the commission to take the opportunity to close a loophole in current bioethics regulations. Most NBAC members agree that regulations guaranteeing the protection of human subjects in federally sponsored research should be extended to the private sector, and Charo felt that the report was a good occasion to make that recommendation. Other NBAC panelists, including Steven Holtzman of Millennium Pharmaceuticals Inc., in Cambridge, Massachusetts, and Alexander Capron, a bioethicist at the University of Southern California Law Center, argued that such a recommendation would appear out of place in a report on cloning. NBAC members endorsed the recommendation, but did not vote to make it one of the items in the report. It may be issued as an independent NBAC resolution.

Shapiro says the panel had hoped to deliver its recommendations by 27 May, but they will not be ready until 7 June.

–Eliot Marshall

SCIENCE POLICY

A Report Card on European Science

"Doing quite well" in physics; biology "is strong, but there are notable weaknesses"; chemistry "is strong and competitive," although quality is patchy. No, these are not remarks on a school report card. They are European researchers' assessments of how they are doing compared with the rest of the world. These self-appraisals were published last week in a novel report that attempts to highlight the strengths and expose the weaknesses of European science.

The report—prepared by the European Science and Technology Assembly (ESTA), an advisory body to the European Commission, in collaboration with the heads of European research councils—is meant to get the attention of trans-European research funding agencies. It was timed to coincide with preparations for the European Union's (EU's) next 4-year Framework program of research and development. "The report will, to some extent, be a lobbying document," says mathematician Sir Peter Swinnerton-Dyer, the ESTA member who initiated the idea. He hopes it will be used to argue "either that these are our strengths and they must be supported, or that these are our weaknesses and they must be plugged."

The effort, however, has been controversial. Some scientists feared that clearly endorsed statements on strengths and weaknesses would be used unfairly on behalf of or against particular disciplines. To counter this concern, the report carries no official status: It is intended only to present the opinions of scientists in each of the nine* disciplines it covers. Each subject report "reveals the prejudices of that community," says Richard Brook, chair of the United Kingdom's Engineering and Physical Sciences Research Council, who oversaw its compilation. "They're not bad indicators of how the community thinks."

Each discipline was left to choose its own self-assessment strategy and define its own subject spread. "It's clear what's physics—but it's not clear what environmental sciences are," says Brook. Consequently, the assessments differ in scope and detail and are open to criticism about lack of comparability and the omission of some subjects. All disciplines surveyed relevant members of ESTA and Academia Europaea (a European academic honor society), others also consulted widely among their communities, and others referred to bibliometric evidence. Some reports are dispassionate statements; others lobby for remedies.

Nevertheless, several generic themes emerge across many disciplines. Researchers in the environmental sciences, geology, planetary sciences, and biological sciences all stress the need for more emphasis on complex systems. "The very success of reductionist thinking in allowing precise description of phenomena can set holistic thinking in shadow," says Brook in the foreword. An example, highlighted in organismal biology, is the physiology of whole microbial organisms, which lags behind knowledge of their genetic and metabolic pathways. The rigid structure of European university systems also comes in for widespread criticism for hampering the growth of interdisciplinary studies. "The university system in Europe retains an unattractive degree of inflexibility," writes Brook.

Many fields also call for easier access to research resources, including refereed literature, which libraries are increasingly unable to afford; databases; and large-scale, centralized research facilities. And they see a need for greater mobility and collaboration among European researchers, especially in the form of trans-European research networks.

The report is the first in a three-stage process, says Swinnerton-Dyer. The second will determine which gaps are significant, and the third, how to remedy them. ESTA is hoping to bring the assessments to bear directly on policy-making by appointing one or two of its members to advise the EU on the design of each of the specific research programs now being planned for Framework. In the meantime, acknowledging the subject reports' preliminary and somewhat ad hoc nature, Brook has invited comments that could be used to produce more refined successors.

–Judy Redfearn

Judy Redfearn is a writer in Bristol, U.K.

EXAMPLES OF STRENGTHS AND WEAKNESSES IN FOUR DISCIPLINES

Physics
Strengths: Elementary particle physics, astrophysics, and plasma physics.
Gaps and weaknesses: Astroparticle physics, computational physics, and some aspects of optical physics. Lack of coordination has resulted in too many physicists jumping on the high-temperature superconductivity "bandwagon."

Organismal Biology
Strengths: Plant sciences.
Gaps and weaknesses: Lack of integration between modern, reductionist biology and the whole organism; taxonomy; some aspects of ecology; emerging pathogens; and human-machine interfaces for prostheses. European neuroscientists look too much to the United States and should develop their own community.

Biochemistry and Molecular and Cell Biology
Strengths: Europe has a distinguished past and is still performing at world-class level in many areas.
Gaps and weaknesses: The "centre of gravity" has shifted to the United States in recent years "even in areas which Europe has pioneered"; failure to support a "critical mass" of researchers to follow up and amplify previous research successes; and poor interface between molecular and cell biology and medicine, causing Europe to lag behind the United States in research on cancer and immunopathologies.

Chemistry
Strengths: The European chemical industry leads the world; this has a positive impact on the academic discipline.
Gaps and weaknesses: Fuel-cell chemistry, chemistry in confined spaces such as zeolites, high-resolution chemistry, and photovoltaics.

* Environmental sciences; physics; economic and social sciences; organismal biology; biochemistry, molecular biology and cell biology; humanities; chemistry; geology and planetary sciences; and mathematics.