

Academics Give New Government a Jolt

AMSTERDAM—Last week, the Netherlands' political parties finally formed a ruling coalition, 3 months after the general elections in May. Any hopes the new government may have had for a political honeymoon were, however, quickly dashed by Dutch academics: One of the government's first proposals—a reform of the Dutch university degree system—was met with howls of protest.

The plan would result in a system based on “bachelor’s” and “master’s” degrees similar to that used in Britain and the United States. The new government argues that this should make it easier for academics to move to jobs in the United States and Britain, and vice versa. But educationalists in the Netherlands view the changes as a cover for hefty cuts in government funding of higher education. The reason: Under the new system, students would reach master’s level 18 months sooner than at present, thereby saving the government a considerable amount in student scholarships. “This is a very serious blow for higher education,” says Pieter de Meijer, rector of the University of Amsterdam, about the proposed cuts.

The current system of degrees was introduced in 1982. In principle, Dutch students work for 4 years to obtain the “doctorandus” degree, roughly equivalent to the Anglo-Saxon master’s. But in reality, they typically take five-and-a-half years to obtain a doctorandus, and they are eligible for scholarships for the first 5 years. (If the student’s academic results fall below a certain level in any particular year, however, this grant is converted into a loan.)

The new coalition government now wants to replace the doctorandus with a 3-year bachelor’s degree, after which only the best students would be allowed to go on to a 1- or 2-year master’s degree. The proposed reforms would also change the student grants system by starting all students out with a loan, which could be converted into a grant if their academic results were above a certain level. No grants would be available for master’s-degree students—they would either have to find their own funds or rely on loans. The government estimates that these changes would save 1 billion guilders (\$580 million) by 1998, and it is planning further cuts of 500 million guilders in the direct funding of universities.

Dutch universities, most of which have barely recovered from the structural reforms of 1982, have reacted angrily to the plans, maintaining that Anglo-Saxon degrees are not suited to the Dutch university system. “Undergraduate studies are much more intensive in England compared to what is usual

here, and then, of course, universities in Great Britain are so selective in accepting students at the onset,” says de Meijer. (In the Netherlands, any student who graduates from high school has a right to attend a university.) Jan Veldhuis, president of Utrecht University, believes the government is looking in the wrong direction. “We should look to Scandinavia, France, and Germany; we represent a continental tradition where government plays an entirely different role in education.”

Veldhuis, who contends that the main purpose of the proposal is to obscure the government’s “disgraceful economizing” on education, doubts that the plan could be implemented before the year 2000. And the smoke screen, he adds, seems to be working: “The press has given quite a bit of attention to the proposed degree reforms but

much less to the financial onslaught on higher education,” says Veldhuis. “Research will suffer, and that has not been mentioned in the proposals from the coalition,” says de Meijer.

The educational reforms are mostly the brain child of Aad Nuis, the newly appointed deputy minister of education, culture, and science. He says that the plans have been under discussion for some time, but admits that their publication has come as a shock to educationalists. “We are bringing the discussion out into the open...now we are going to talk with the institutions of higher education.” His boss, the minister for education, culture, and science, Jo Ritzen, may have a tough job on his hands, however. Dutch students’ unions are already planning a wave of protests when the term starts in September.

—Alexander Hellemans

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ARCHAEOLOGY

Checkmate for Chess Historians

For the past 40 years, historians of chess have been troubled by a lingering controversy that threatened to overturn the accepted explanation for the origins of the game. Chess is widely believed to have been invented in the Orient in the sixth century and brought to Europe a few centuries later. But that established wisdom was thrown into doubt by a set of chess pieces that turned up in a third-century Roman grave at Venafrò in southern Italy. Now, to the relief of chess historians, the doubts have been put to rest: At the International Radiocarbon Conference in Glasgow, Scotland, last week, physicist Claudio Tuniz of the Australian Nuclear Science and Technology Organization announced that the controversial Venafrò chess pieces have been given a radiocarbon date-stamp of about the tenth century. How they came to be in a Roman grave remains a mystery, however.

The 18 carved pieces of animal bone were discovered in 1932 at Venafrò in a box with human remains and other items during excavations for a well. “Because enough [pieces] were found together, it was obvious that they were chess pieces,” explains histo-



Pieces of the puzzle. Venafrò chess pieces, now dated to the tenth century. The pictures show what are believed to be three bishops, three knights, and five pawns (top), and four rooks (bottom).

rian Richard Eales of the University of Kent in the United Kingdom. Their importance was not recognized until 1939, however, when Italian archaeologist Olga Elia used them to support her conjecture that the game had first-century origins. She was backed by archaeologist Heinrich Fuhrmann, who believed that the Roman game “latrunculi” was in fact chess.

The chess community became aware of the issue in 1953, when chess historian Adriano Chicco pointed out in an academic paper that the pieces were similar to other seventh- and ninth-century pieces that were

typically Islamic. Chicco accepted the archaeological evidence that the Venafrò pieces were much older, however, and suggested that they had been brought back from the Orient by a traveling Roman warrior. That theory at least preserved the Oriental origins of the game, but it still generated uproar among chess scholars. The majority view is that the game originated as "chaturanga" in India in the sixth century, with the first documentary evidence for chess being played coming from Persia in the same period. Chess then spread westwards with the Moorish invaders of Spain in the eighth century and the Islamic conquerors of Sicily shortly after.

As far as chess scholars were concerned, there were two possibilities for the Venafrò find: Either they were not chess pieces, or they were not as old as they seemed. Radiocarbon dating of the chess pieces was discussed, but was considered too destructive: At that time the technique would have required hundreds of grams of bone, which would have meant destroying most of the Venafrò pieces. The unresolved controversy remained in the background until 1987, when Chicco's former pupil, chess historian Alessandro Sanvito of Milan, Italy, began a new study of the pieces. By this time a new radiocarbon dating technique was available that required only a few grams of material.

Radiocarbon dating relies on the fact that the tissue of living things contains a fixed ratio of carbon-12, carbon-13, and radioactive carbon-14. But when an organism dies, the ratio of the isotopes changes as carbon-14 decays, so the age of dead organic matter can be calculated from the isotope ratio. In October of last year, approximately 2 grams of bone from the heaviest, 40-gram, chess piece was released for analysis by Italy's Ministry of Cultural Heritage. Samples were sent for dating to two independent accelerator mass spectrometry labs: one near Sydney, Australia, and one in Naples, Italy. The labs came up with almost identical results: The pieces date from the period AD 885 to 1017, with 68% probability.

"The chess scholars are happy that the scientific test has proved without any doubt the date of the tenth century," reports chess historian Gianfelice Ferlito of Morosolo-Casciogo, Italy. Now, however, they have a whole new set of questions: How did the pieces end up in the Roman grave? Were they fashioned by a local artisan or brought by Saracen invaders who left southern Italy in the tenth century? But at least chess historians will not have to rewrite the whole basis of their discipline.

—Claire O'Brien

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U.S. RESEARCH SPENDING

Accounting Tricks Boost NSF Budget

It's a rookie year of which even Babe Ruth would have been proud. Last week, a House-Senate conference committee awarded the National Science Foundation (NSF), with its rookie director Neal Lane, a whopping 12.5% boost in its 1995 budget. The \$378-million increase, which brings NSF's budget to nearly \$3.4 billion, more than doubles the president's requested increase for the agency and stands in sharp contrast to the overall federal budget for discretionary spending, which was frozen for 1995.

The conference committee's bill—which reconciles versions passed separately by the House and Senate earlier this summer—is expected to pass both houses of Congress without further debate. It adds \$145 million, for a total of \$250 million, to renovate university research facilities and buy large equipment; \$117 million to NSF's \$2.1-billion research account; \$36 million to what NSF now spends on education programs, for a total of \$606 million; and \$21 million to complete the United States' half-share of the \$176-million, 8-meter Gemini telescopes to be built in Hawaii and Chile.

Why has NSF been so successful in a year when most agencies are happy to keep up with inflation? One answer is that Senator Barbara Mikulski (D-MD), chair of the appropriations subcommittee that controls NSF's budget, has rewarded Lane for meeting her demands to demonstrate that the agency's programs meet important national needs. Senate report language earlier this summer complimented Lane for preparing strategic plans in several areas (*Science*, 22 July, p. 469). But a more important reason is that Congress has boosted NSF's budget in a strategic way that will not immediately require cuts in other areas—but that could come back to haunt the agency in the future.

Mikulski's subcommittee kept within its total spending limits by carefully focusing increases on areas such as facilities modernization, large equipment, and education programs, in which a relatively small proportion of the money appropriated for 1995 will actually be spent in that year. In addition, the subcommittee stipulated that \$132 million of the academic facilities account will not be made available until the last month of the fiscal year, ensuring that an even larger proportion of the money won't be spent until fiscal year 1996, which begins on 1 October 1995. In contrast, a larger proportion of the money in NSF's research account will be spent in fiscal year 1995, so the subcommittee was able to give research only a modest increase.

Other agencies have benefited from similar budgetary maneuvers in the past, but the results are usually less dramatic for science. The National Institutes of Health, for example, has only a tiny infrastructure program and a much smaller education account. Many members, however, view delayed obligations as an accounting trick that could boomerang. The money will eventually get spent, and this could cause problems in future years when the delayed commitments must be accommodated within the agency's appropriation for that year. "It's a gimmick we try to avoid," says one House appropriations staffer on another committee. "We did it once, to the tune of \$4 billion, and it took us 3 years to get caught up."

In an era of flat budgets, analysts say that NSF's research account—the one watched most closely by scientists—is in particular jeopardy because of its higher outlay rate. For now, however, Lane is happy to accept congratulations for a spectacular rookie year.

—Jeffrey Mervis

NSF'S BUDGET FOR 1995 (\$ MILLIONS)

Account	Current	FY '95 request	House-Senate conference	% change over '94
Research	2164	2349	2280	+5.4
Education	570	586	606	+6.3
Academic facilities	105	55	250	+138
Major projects	52	70	126	+142
Other programs	127	140	134	+5.5
TOTAL	3018	3200	396	+12.5