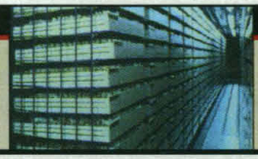

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FRENCH RESEARCH

CNRS Researchers Take Up the Fight Against Allègre's Reforms

PARIS—Ever since taking the post of France's research minister in June 1997, geochemist Claude Allègre has made no secret of his intention to reform the CNRS, France's giant basic research agency. Since the reform bandwagon began rolling 2 months ago, CNRS scientists have been demanding a national debate on the issue, which Allègre has steadfastly refused. Now, researchers have taken matters into their own hands. On 14 December, the CNRS's national committee—made up of more than 800 researchers from all over the country, representing the agency's 40 scientific sections—flocked to Paris to confront the minister's proposals head-on.

Provocateur? Research Minister Claude Allègre.

The gathering, which took place in the city's ornate House of Chemistry, was historic: The national committee has met only four times in full plenary session since its creation in 1945, and this was the first time it met at the request of the researchers themselves. Like many events in French history, the daylong meeting had its share of fireworks. Many scientists heatedly attacked Allègre's plan—which seeks to create closer ties between the CNRS, the universities, and industry—and the research ministry's representative at the meeting was nearly booed off the stage when he attempted to defend the reforms.

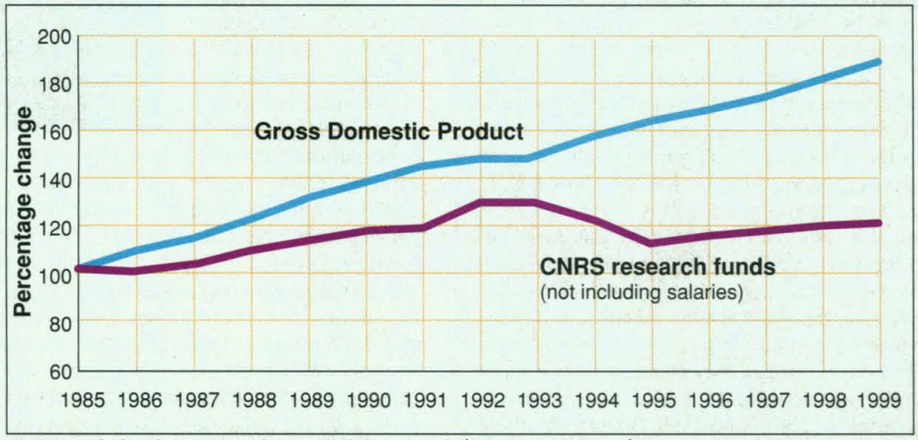
CNRS researchers began mobilizing last October, after physicist Edouard Brézin, president of the CNRS's executive board, unveiled proposed changes in the agency's statutes drafted in collaboration with Allègre and his staff. The changes would require all CNRS labs to associate with partners in universities, industry, or other research agencies (*Science*, 23 October, p. 607). They would also give Brézin and the executive board greater control over CNRS's scientific direction, a move widely seen as an attempt to weaken the authority of physicist Catherine Bréchignac, CNRS's director-general. Indeed, earlier this year, Bréchignac had resisted Allègre's attempts to cut by half the number of scientific sections—and, by implication, diminish the stature of the national committee itself, which plays an important role in recruitment and evaluation of researchers.

Low profile. CNRS Director-General Catherine Bréchignac.

Underlying the protest are years of smoldering dissatisfaction with the conditions for doing research in France, including stagnant research budgets which, in the face of ever rising research costs, have made it more and more difficult for scientists to keep their labs running. But Allègre fanned the flames with what many see as a heavy-handed attempt to use the CNRS to solve the chronic weakness of French university research.

Although 90% of CNRS labs are already associated with universities and other research partners, there is a widespread fear among researchers that forcing the remaining labs to go this route is a first step toward making the CNRS subservient to the universities—a suspicion reinforced by a provision in the revised statutes that would put the agency under the authority of the education ministry as well as the research ministry. (Although these functions are joined in one ministry under the current government, they have often been split under previous governments.) Many researchers believe that the university system—which has no real research strategy of its own—cannot hold up its end of a research partnership. "The last place to put research in France is in the universities," says physicist Harry Bernas, who works in a CNRS unit on the Orsay campus of the University of Paris. "They can't cope with it. The French university system is straight out of Kafka."

Despite the tense atmosphere, Bréchignac opened last Monday's national committee meeting on a conciliatory note. "Our [research] minister, with the brusque manner that we all know … has told us to get moving, and he is right," she said. Although Bréchignac had lately been keeping a low profile after opposing Allègre's earlier reform efforts, she had given her tacit approval for the meeting to take place. But other speakers took a harsher line, warning against tying the CNRS too tightly to the universities. Nobel physics laureate



No-growth funds. Support for CNRS lab research (in constant francs) has remained stagnant despite economic expansion.

CREDITS: (TOP) FACELLY/SIPA PRESS; (MIDDLE) ERIC LEGOUHY/CNRS; (BOTTOM) CNRS

Claude Cohen-Tannoudji compared the centralized but research-weak French university system unfavorably with that of the United States. "To do university research the way it is done in the United States is illusory," he said. "French universities don't have real autonomy and the teaching load is too heavy." And Henri-Edouard Audier, a chemist at the Ecole Polytechnique near Paris, argued that there could be no real partnership between the CNRS and the universities until university professors and instructors were able to contribute equally to the research effort. "The day [their] teaching load is cut in half, there will be no more problems of mobility between [the CNRS] and the universities," Audier said.

Brézin says that researchers' fears that the CNRS will be absorbed into the universities are misplaced. "This idea that a closer approach to the universities will weaken the CNRS is false," he told *Science*. Brézin also criticizes the rebellious attitude many scientists have taken toward Allègre's attempts at reform. "This wish of researchers to be independent of all control is not legitimate."

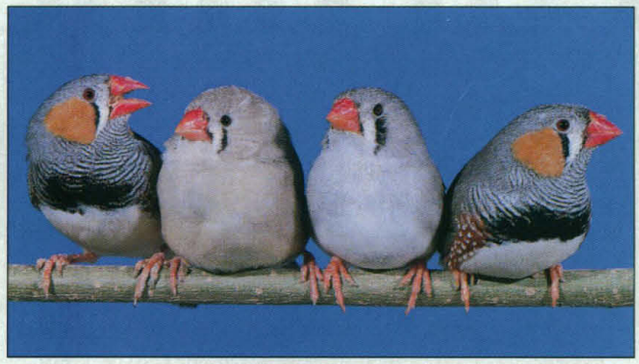
But the simmering resentment at what many researchers see as Allègre's attempts to cram reform down the throats of French scientists burst into open anger during a speech to the meeting by geophysicist Vincent Courtillot, who was formerly Allègre's chief adviser and last week was promoted to be the ministry's director-general for research. Courtillot's speech was interrupted a number of times by boos and catcalls, particularly when he told the delegates that they represented only the CNRS and not French researchers in general. And his critique of the failure of research to pay off in economic terms, capped by the assertion that "the unemployed have created more businesses than have researchers," was met with loud cries of "False! False!"

Indeed, most researchers were very surprised at Courtillot's confrontational tone, and his talk was openly condemned throughout the day as a deliberate "provocation" that came directly from Allègre. But whether or not Allègre's intention was to make French scientists angry, he seems to have succeeded in uniting them as never before. Chemist Pierre Potier, director of a CNRS institute in the Paris suburb of Gif-sur-Yvette—site of one of the largest remaining CNRS installations not linked to a university—summed up the feelings of many researchers. "We agree with the minister that things must move, but not just in any old direction." –MICHAEL BALTER

NEUROBIOLOGY

Birds May Refine Their Songs While Sleeping

Like novice tenors learning an aria, young male songbirds first learn their species' courtship songs by copying the melodies sung by other males; later, each bird adds flourishes that make his rendition unique. Some researchers think that happens "on line," with the birds correcting errors and improving their technique as they sing. But on page 2250, Daniel Margoliash and his colleagues at the University of Chicago argue that at least some song learning and refinement may occur while the birds sleep.



Wide awake and throttled down. Information travels less freely between song-dedicated brain areas in awake zebra finch males (birds with orange cheek patches) than it does in sleeping birds.

Margoliash's team based that conclusion on measurements comparing the activity of song-specific neurons in the brains of waking and sleeping zebra finches. The researchers found that in sleeping birds, auditory signals triggered by a recording of each bird's own song flowed freely between the brain areas that govern singing. But when the birds woke up, it was as if a gate came down to block that flow. Margoliash suggests that during sleep the wide-open gate allows the birds' brains to refine the neural firing patterns that produce the song, an "off-line" learning similar to the memory strengthening that some neuroscientists think may occur during sleep when rats learn mazes and humans learn motor tasks (see *Science*, 29 July 1994, p. 603).

Other birdsong researchers praise the new work, noting that it's the first time anyone has done such a study on naturally sleeping birds. Birdsong pioneer Fernando Nottebohm of Rockefeller University's Field Research Center in Millbrook, New York, calls it "novel and intriguing," and Richard Mooney, who studies bird song learning at Duke University Medical Center, adds that it may provide new clues to human language learning. But both Mooney and Nottebohm say it fails to prove that song refinement takes place during sleep. At this point, Nottebohm says, "there are really no grounds to suggest that anything like 'off-line learning' is taking place" while the birds sleep.

Just as the human brain contains special areas that control speech, birds have brain areas devoted to producing song. Neurons in an area called HVc send signals to a second region, RA, which connects to motor neurons that directly control the singing muscles. Because researchers have found activity in HVc and RA not only when birds sing, but also when they hear their own song played back, some suggested that the neurons self-correct while the bird is singing, modifying their activity to improve the song.

But those results came from anesthetized birds, and Margoliash's team saw a different picture when they recorded from individual HVc and RA neurons while the birds were awake. When those birds heard recordings of their own songs, team member Albert Yu found that HVc neurons responded, but those in RA did not, instead firing in a monotonous pattern. But when the birds naturally drifted off to sleep, the firing patterns in response to the recorded songs shifted to resemble those in the anesthetized animals. At that point, team member Amish Dave found, the RA neurons came alive and began to fire in response to signals from HVc. When the birds awoke, RA returned to its monotonous firing pattern.

The team fingered a molecule that may help cause the blockade: norepinephrine, a neurohormone whose levels fall during

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