of a Titan rocket at Vandenberg, 6 to 8 seconds after its launch, has created some concern about the safety of the shuttle control center there. Smoking and burning debris from the Titan fell over a wider area than anticipated, according to the subcommittee report, with some of it barely missing the launch control room situated 1400 feet away.* Despite the use of air filters, the control room filled with smoke, and more than 100 people were trapped inside for nearly 6 hours. Although an explosion of the shuttle would be far more powerful than the one that wrecked the Titan, the launch control center at the shuttle complex is only 1200 feet from the pad—200 feet closer than the center at the Titan launch site. (Safety aside, it is so close that some of the computer equipment will be jeopardized by vibrations during routine launches, according to the subcommittee report, and may have to be relocated.)

Aldridge dismisses the weather concerns as "not pertinent. . . . I don't have any doubt we can find four good days a year in California to fly under acceptable conditions." But he acknowledges that an accidental explosion of the shuttle within the first few seconds of flight will probably jeopardize the safety of the 300 people in the launch control center. "We've made acceptable provisions for the safety of the crew inside that launch complex," he says. "Unless there is a failure at a particular time in the launch, then the people in there are going to be very safe."

Sasser believes that the existence of these potential problems offers a good reason to reconsider the use of Vandenberg. But a better reason, he says, is the fact that a West Coast launch pad for the new expendable rockets will be ready in the spring of 1989. "In my view, we should no longer plan to use manned space flight to deliver military payloads into space unless there is no other alternative," he says. Given the likely delays in availability of the shuttle pad, the rockets will provide virtually identical capability at the same time for a much lower cost. Satellites in polar orbit could not be repaired or serviced in space, but this may not be important or economical in the near term.

Under one option outlined by the subcommittee staff, the shuttle complex would be placed in "operational" caretaker status, with a 40% cut in personnel, and a savings over 4 years of $600 million. The first launch would be delayed from 1988 to 1991. Under another option, the site would be placed in "facility" caretaker status, with a two-thirds reduction in staff, and savings of $1.2 billion over the next 5 years. No launch would occur until late 1993. A third option, favored by Sasser, is virtually to shut the facility down through the mid-1990's, saving $1.6 billion over the next 5 years alone. "I like to think of it as placing the facility in 'strategic reserve,' " Sasser says.

Aldridge replies that "all of the options are under consideration." The issue will become clearer in late July, he adds, when tests are completed on the exhaust ducts. Also, more data will be available on the difficulty and expense of redesigning some classified military payloads so that they can fit on the new expendable rockets instead of the shuttle.

Sasser, for one, is skeptical that these costs will amount to much, especially "in the overall context of a new $2- to $3-billion orbiter and $400 million a year to keep the Vandenberg facility operating." He is anxious to let the Air Force take the first step and make its own decision, but if it falls short of a shutdown, he will offer legislation to force the Administration's hand. ■

R. JEFFREY SMITH

*Eighty percent of the debris apparently fell within 1500 feet, with another 10% falling within 2100 feet. A chunk of solid rocket fuel bounced off the roof.

U.K. Astronomers Split On Observatory's Fate

A decision to move Britain's oldest observatory to the University of Cambridge has created deep divisions in the scientific community

FEW issues in recent years have created such bitter divisions within the British scientific community as a simmering debate over the future of the 300-year-old Royal Greenwich Observatory (RGO), currently based in the picturesque Herstmonceux Castle in the heart of the Sussex countryside, 40 miles to the south of London.

On 18 June, the Science and Engineering Research Council (SERC), which has been responsible for operating the observatory since the mid-1960's, decided that the facility should be transferred to the University of Cambridge. This was one of three options—the other two being a move to the University of Manchester, or a merger with the Royal Observatory Edinburgh—that had been short-listed at a meeting of the council in March (*Science*, 4 April, p. 19).

This will be the RGO's second move in the past half-century. Just after World War II, it was shifted from its original location at Greenwich in London to a site in the countryside that promised better viewing conditions. There was no escape from British weather, however. And since the early 1970's its role as an observatory has been wound down as new telescopes have been built at more favorable sites abroad—in particular at La Palma in the Canary Islands, off the coast of Spain.

As a result, RGO's responsibilities have shifted gradually toward one of managing the La Palma Observatory and coordinating the efforts of research astronomers distributed throughout 35 British universities and polytechnics. The SERC has argued that, because of this shift, the RGO should now be more directly linked to its "customer" community, hence the move to a university.

Then there is the question of money. Optical astronomy has fared relatively well in Britain in recent years, with commitments being made to new facilities on La Palma before the current budget restrictions came fully into force. But the future looks far less optimistic; indeed, many penny-conscious government officials are thought to consider the upkeep of Herstmonceux Castle an unnecessary public expense.

All the reasons put forward by the SERC for moving the RGO have been vigorously contested. Various members of the Royal Astronomical Society, for example, joined a coalition of local politicians and staff union representatives to argue that any attempt to merge the RGO with another institution, such as a university, could destroy both its unique identity and its role in stimulating

public interest in astronomy. (Herstmonceux Castle attracts 50,000 visitors a year.)

The same critics have also contested the SERC's claim that the RGO needs better links with the university sector, pointing out that a close relationship has been established with the nearby University of Sussex over a number of years, and that the council recently refused funds needed to strengthen this link. "Their criticisms of what we have been doing were always very vague," said Roger Taylor, professor of astronomy at Sussex. "We do feel somewhat hurt by the charge that we apparently failed to do things we had never been asked to do."

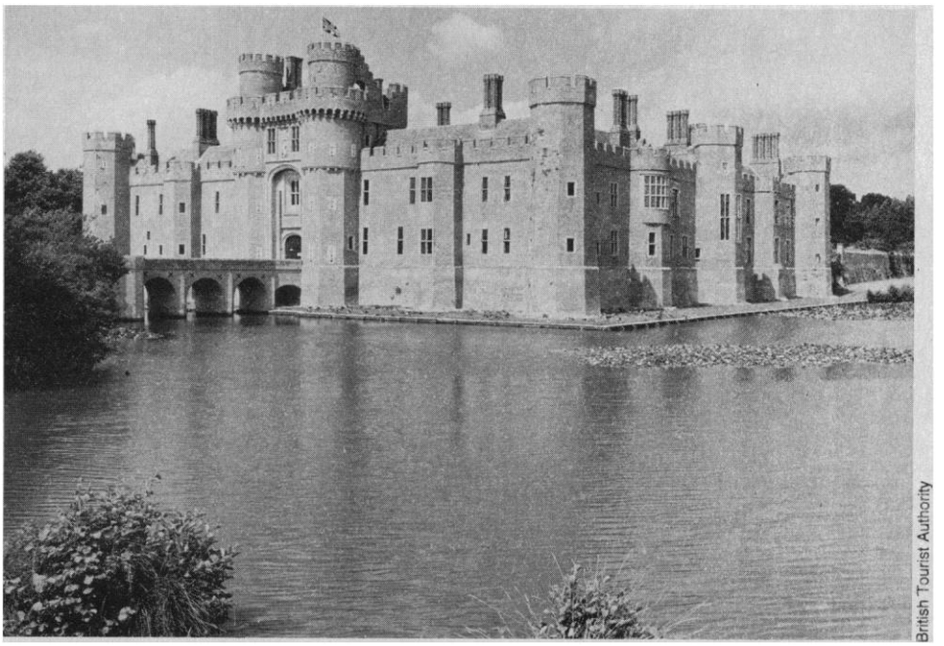
As for the financial question, staff members are still contesting the SERC's long-term plan to reduce the number of staff working at the RGO from 190 to 130 over the next 5 years. "We have fought tooth and nail to say that there will not be enough manpower," says computer scientist Roger Wood, a former director of the Staff Association. "One of the most unsatisfactory things from the staff point of view is that we still have not been given proper reasons for being required to move," he says.

The complexity of the situation has resulted in the council spending several years struggling to arrive at an acceptable solution to the fate of the RGO. Achieving this was one of the first tasks that the new SERC chairman, William Mitchell, set himself when he took up the post last year, and his determination was soon reflected in the March announcement that the RGO would definitely be moving.

The three candidate sites were selected from a list of submissions received from universities throughout the country offering to host the RGO. Yet even after the move was announced, the council received over 150 letters, many of them expressing opposition.

SERC spokesman Geoffrey Heaford said last week that the decision to select Cambridge had been based on both scientific and economic criteria. The second of these refers to the council's (and, apparently, the government's) desire that the move should be entirely financed out of the proceeds of the sale of Herstmonceux Castle.

A third factor, said Heaford, was that Cambridge was more attractive than the other two contenders to current RGO staff—the attractions include both the university's academic reputation and the city's growing success as a center of small, high-technology industries (*Science*, 29 March 1985, p. 1560). This will increase the chances of keeping technical teams together, which would minimize the disruption to current programs, in particular work on the 4.2-meter William Herschel telescope due to start operation at La Palma next year as the world's third largest optical telescope.



Herstmonceux Castle. *The current location of the Royal Greenwich Observatory.*

Cambridge already has one of the strongest groups of both theoretical and experimental astronomers in Britain, and had been considered by many to be the principal contender as a new home for the RGO. Indeed, many of those who have been contesting the decision to close Herstmonceux Castle had also indicated that, if the closure were to take place, then Cambridge would be their first choice as an alternative.

Sir Martin Rees, professor of astronomy at Cambridge, says that the arrival of the RGO will be a "tremendous boost" to the university's efforts. With a planned 100 Ph.D. students working at any one time, "we will have a concentration of research effort that will be able to rival comparable groups elsewhere, such as at the Harvard-Smithsonian Observatory."

Neverthless, the SERC's decision, which still has to be endorsed by the British government, continues to raise several major questions, some with implications wider than the discipline itself. Will the resulting concentration on a single center of excellence, for example, even though helping to maintain Britain's position at an international level, undermine efforts to boost astronomical research in other, perhaps less prestigious, universities? Will the move really save as much money as the SERC is predicting? And will it reinforce the growing split in Britain between the relatively prosperous, high-technology areas in the South of the country and their depressed counterparts of the North?

Sir Francis Graham Smith, director of Manchester University's Nuffield Radio Astronomy Laboratories and one of the driving forces behind Manchester's determined efforts to attract the observatory, is less enthusiastic than Rees about the move to Cambridge. Although admitting that "the decison [to locate the RGO in a university setting] rather than attach it to the Edinburgh observatory has a lot of sense in it," he contends that "the idea of concentrating activities in a place which is out on one limb is dangerous." Smith argues that Manchester is more accessible to scientists from other British universities and research centers.

Rees responds by arguing that the RGO's move will have been "a failure" if a good working relationship is not established with other universities. Also that it is well placed for maintaining close contact with astronomers in Holland, who share responsibility for operating the La Palma telescopes.

Formally, the SERC's decision to move the RGO to Cambridge will need the approval of both the Department of Education and Science and the Treasury before going ahead. Some of those who continue to oppose the move hope that the latter in particular will ask some searching questions about the financial aspects, pointing out that no figures of the cost of the move have yet been published.

A meeting of RGO staff on 23 June decided by what was described as "a vast majority" to continue their opposition to the SERC's plans to move the observatory. The SERC's critics are now taking their case to the Minister of Education and Science, Kenneth Baker. It is a rearguard action, but the fight is not over. ■ **DAVID DICKSON**