described by Caporael, has occurred almost exclusively in locales where the inhabitants suffered severe vitamin A deficiency. This is not likely to have been the case in Salem, a village that had ready access to seafood and dairy products rich in vitamin A. Also, say the researchers, the symptoms of the afflicted girls were not precisely those of convulsive ergotism. They suggest instead that "the afflicted girls were enacting the role of demoniacs as that role was commonly understood in their day." The illness of the girls had, in fact, gone undiagnosed for several months before a local physician finally suggested demonic possession. It was only then that the girls began "playing the role" of being possessed and making the witchcraft accusations.

Caporael does not deny the importance of social and psychological phenomena in the witchcraft episode. But, she told SCIENCE NEWS, social cues would not have been enough, especially at the beginning, and she was attempting to deal with the origins of the illness. She also says she is unaware of any solid evidence that vitamin A deficiency is necessarily linked to ergotism. As for the symptoms, she says that statements taken 400 years ago in an archaic form of English could be interpreted in several ways.

Caporael feels that the data presented do not sufficiently refute her hypothesis. But even though she remains convinced, she admits that she has not presented enough data to prove her point beyond a shadow of a doubt. Perhaps the 400-year-old puzzle will remain unsolved. □

Glomar Challenger: Short of a record

For nearly 40 days and nights, the research ship Glomar Challenger floated in place off the Atlantic coast of North Africa, her hull and bulkheads continuously athrob with the churning of the engine that was twisting her long drill string into the sea floor. The hope was to drill the deepest hole ever made in the ocean bottom (SN: 9/4/76, p. 151), breaking the previous record of 1,740 meters set by the Challenger earlier this year off the northwest coast of Spain.

What broke instead was the hole itself, its soft walls repeatedly collapsing to jam the drill pipe until the hole was finally abandoned after 1,624 meters of penetration. The problems of such projects, however, are formidable. The *top* of the hole, for example, was at the *bottom* of 4,200 meters of ocean. The continental-margin sediments at the site offered a mushy mixture of mud and sand to drill bits designed to cut a more resistant medium.

Yet on this 50th leg of the global Deep Sea Drilling Project, thanks to drilling advances developed on previous legs, the Challenger was able to sail away for a crew change, return four days later, and locate and reenter the very same hole. Furthermore, according to Leg 50 chief scientists Yves Lancelot of the French National Center for Ocean Exploration (ONEXO) and Edward Winterer of the Scripps Institution of Oceanography, "with better-designed drilling bits and better means to wall off crumbly parts of the hole, we can expect to reach much deeper."

Though short of a record, the hole was far from unproductive. It yielded sediment strata representing nearly 150 million years of history, including coarse material carried down during the rise of the High Atlas Mountains of adjacent Morocco. Changes in the strata will be analyzed to tell a tale of ponderous changes in the ocean floor as new infalls from the continent molded and folded the older sediments beneath.

Further study is charting the variations in the amount of organic material in the sediments—changing with time and pressure into the mature hydrocarbons that form oil and natural gas deposits. There is too little organic material at the site to qualify it as an economic petroleum reservoir, but the mature state of the material below about 1,200 meters suggests that where organic material is more abundant, the deep parts of the continental margin environment may be a favorable site for petroleum.

Following Leg 50, the Challenger traveled to Puerto Rico for refurbishment, then headed off on Leg 51 up the western Atlantic shelf. Five days later, however, the vessel was back in port, suffering problems with the bow thrusters that help her turn in her own length and hold position for drilling in the shifting seas. This week she was due to sail forth once again. □

Launches: More science in '77

During 1976, only 2 of 18 satellites launched by the National Aeronautics and Space Administration were primarily for scientific purposes. The rest were weather-watchers, talksats and the like, primarily for other federal agencies, other countries and groups such as NATO and Comsat. This year there will be 7 scientific payloads out of 20 launches, with the rest devoted to communications (8), meteorology (3), earth resources (1) and navigation (1). And of the 7, NASA is all or partly responsible for 6.

The major launches of the year will be the two Mariner Jupiter-Saturn spacecraft, planned to visit the two giant planets and possibly one or two more (see p. 10). The first of the long-awaited HEAO High-Energy Astronomy Observatories is scheduled for April liftoff. In October NASA will launch two spacecraft with a single rocket, one probe designed by NASA and the other by the European Space Agency as the first two-thirds of the cooperative International Sun-Earth Explorer series. The two probes—plus a third to be launched in 1978—will study different parts of the sun-earth system. Another NASA/ESA "coop" will be the International Ultraviolet Explorer, devoted to that field of astronomy. The seventh scientific probe is ESA's own, known as GEOS, sent to study the earth's magnetic field.

Communications satellites again dominate the schedule, though not nearly so heavily as last year, when 13 talksats were sent aloft for no fewer than 7 users. This year's entries, all of which are for outside users who will reimburse the space agency for launch costs, include only one "domestic" candidate: FleetSatCom, part of a global Defense Department system. There will be two for the multinational consortium known as Intelsat, one for the North Atlantic Treaty Organization and an experimental probe called OTS (Operational Test Satellite) for ESA. Talksats for foreign customers will include Indonesia's second Palapa, the experimental Siro for Italy and a Japanese communications satellite known on NASA's list simply as CS.

All three of this year's new weather-watchers will be placed in geosynchronous orbits, to look down on broad developing weather patterns from fixed positions over the earth: The second Geosynchronous Operational Environmental Satellite (GOES-B) for the Na-

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NASA 1977 LAUNCH SCHEDULE

Date	Satellite	User
Jan.	NATO-3B	NATO
Mar.	Palapa B	Indonesia
Apr.	HEAO-A	NASA
Apr.	GEOS	ESA
May	GOES B	NOAA
June	OTS	ESA
June	ITOS-E2*	NOAA
June	Transit 19	USN
June	Intelsat 4A-C	Intelsat
July	GMS	Japan
Aug.	Siro	Italy
Aug.	Meteosat	ESA
Aug.	MJS-A	NASA
Sept.	MJS-B	NASA
Sept.	Landsat C	NASA
Sept.	Satcom C*	RCA
Oct.	Intelsat 4A-D	Intelsat
Oct.	ISEE-A, B	NASA/ESA
Oct.	FleetSatCom	USN/USAF
Nov.	CS	Japan
Dec.	OTS*	ESA
Dec.	IUE-A	NASA/ESA
Dec.	Transit 20*	USN

*backup launch possibility in case of prior launch or satellite failure

. . . Launches

tional Oceanic and Atmospheric Administration, Meteosat for ESA and GMS for Japan. Also taking in a world view, though not from geosynchronous orbit, will be Landsat C, the third in NASA's earth-resources series. A minor deluge of favorable comments from users of the first two Landsats helped restore the third one to the schedule after it had once been trimmed from the budget. The remaining probe (except for four backups that will be launched only if their predecessors fail) is Transit 19, latest in the U.S. Navy-Air Force series of orbiting atomic clocks, designed to provide super-accurate timing for navigation, with the cited potential of enabling a jet in flight to establish its position over the globe nearly to within its own length.

By 1980, most of the Scout, Delta, Atlas-Centaur and Titan-Centaur rockets that have been NASA's workhorses will be nearly phased out, with their work taken over by the space shuttle. The shuttle will be limited to too low an orbit to do the jobs unaided, however. Not one of the satellites due to be launched in 1977 could reach its assigned orbit via shuttle alone, and a number of add-on, upper-stage boosters are being developed to provide the extra kick. □