amines, some of which cause cancer. Detergent manufacturers seem confident that these fears will prove unfounded, but they agree that much more research needs to be done on the effects of NTA before it becomes widely used.

In any case, NTA is not being produced in sufficient quantities to substitute fully for the two billion pounds of phosphates at present used yearly in detergents. The two major producers of NTA in the country, Monsanto Company and Grace's Hampshire Chemical Unit, only manufacture about one hundred and fifty million pounds a year. By 1971 Monsanto expects to be producing only 350 million pounds a year. P and G, the company most heavily committed to NTA, expects to replace NTA for phosphates in nearly a third of its detergent production by 1972 while Lever Brothers, another major producer, said recently that "the question here is that we are still awaiting federal research on the safety of NTA if it is used in large quantities by industry as a replacement".

Whatever the final answer is on NTA it will be very difficult for any legislation banning phosphate detergents to be effective by 1972, no matter how politically expedient such a ban would be in an election year. In any case detergents are not the only villains in this piece. While it certainly simplifies things for the government when it can blame one industry for the problems caused by many, simply eliminating detergent phosphates still leaves many sources of phosphates to ruin the lakes. A far more effective though more expensive solution is adequate sewage treatment; by treating all wastes before they are discharged back into the water supply, all such problems would be solved at their source. Unfortunately, this would be another toll on the taxpayer, something that Governor Rockefeller is well aware will not win him votes on election day, even in a supposedly ecological era.

LUNAR SCIENCE

NASA Aims for Putrid Marsh

by our Astronomy Correspondent

LAST week the National Aeronautics and Space Administration announced that the destination of the Apollo 15 mission next July will be the Hadley rille (26° 52' N, 3° 00' E), which meanders through a flat region with the unfortunate name Palus Putredinis (Marsh of Putridity). This leaves only the two final sites to be decided before the American exploration of the Moon ends for the foreseeable future in June 1972. Of these two sites the first (Apollo 16) is expected to be Descartes (10° 10' S, 16° 35' E), a highland area marked by signs of volcanic activity, although this is dependent on good photographs of the area being taken during the Apollo 14 flight to Fra Mauro which is due to be launched on January 31. In spite of the tight schedule of modifications to Apollo 14 that are being made as a result of the Apollo 13 accident, Dr Rocco A. Petrone, the Apollo programme director, sees no problem in meeting the January 31 deadline.

Following the cancellation last month of a further two Apollo flights, which among other things is expected to free between \$600 million and \$900 million for the controversial space shuttle programme, the selection of landing sites has become even more important. The Hadley site should provide samples of the Mare Imbrium material and of the Apennine mountains, but

it is disappointing that material which would give clues to the origin of the rille will not necessarily be forthcoming. The rille is 600 feet deep, and as far as the planning goes at present the astronauts are not expected to do more than scramble a few feet down the side. Even that depends on the slope—the steepest that can be tackled is probably 20°—and on the state of the ground.

NASA sees no problem in landing considerably further from the lunar equator than the previous sites or in the approach to the landing site which will be over the 8,000 feet high Apennine mountains. Apollo 15 is the first of the J missions which have an enhanced scientific potentiality chiefly because of the addition of a simple vehicle to the payload. Two of the three traverses planned for the mission will use the vehicle, taking the astronauts up to 8 km away from the lunar module along the edge of the rille and to the foothills of the Apennines. Apollo 15 will also carry an improved laser reflector with 300 instead of 100 corner reflectors so that it can be used by smaller observatories, and a seismometer which may throw more light on the positive gravity anomaly in Mare Imbrium. And this will be the first flight of a package of instruments which fit into bay 1 of the service module. The package includes a mass spectrometer, X-ray, gamma ray and alpha particle spectrometers, a laser altimeter, cameras for accurate mapping of the Moon, and a small satellite to be released into lunar orbit, chiefly to map the gravity field but also for particle and magnetic field measurements. The presence of the cameras in part of the spacecraft that is discarded before the return to Earth implies that there will have to be a spacewalk by one of the astronauts during the flight home to retrieve the film.

Awards for Heart Research

Sir George Pickering, Master of Pembroke College at the University of Oxford, and Dr Irvine H. Page, of the Cleveland Clinic Foundation, were named on September 23 as the joint winners of this year's \$50,000 Stouffer Prize for Research in Heart Disease. It is to be awarded in recognition of their contribution to the understanding of arteriosclerosis (hardening of the arteries) and hypertension (high blood pressure). This is the fifth year that the award has been given.

Sir George was professor of medicine at the University of London and director of the Medical Clinic at St Mary's Hospital from 1939 to 1956. Until 1969, he held the chair of medicine at the University of Oxford, once held by Sir William Osler. Dr Page has studied the heart and circulation since 1937 when he became director of the Lilly Laboratory for Clinical Research at the Indianapolis City Hospital. He joined the Cleveland Clinical Foundation in 1945 and became president of the American Heart Association in 1946.

Their work has led to many of the therapies that have been so effective in recent years in the treatment of hypertension, the most prevalent of all cardiovascular diseases.