A ten per cent suspension of infective mouse brain in human immune serum is passed through a Seitz filter and the filtrate placed in sterile tubes and dried in the frozen state *in vacuo*. After sealing the tubes, the dried virus will preserve its properties for many months if kept in a refrigerator. When required for use the tube is opened and the dried contents mixed with sterile distilled water. The human immune serum is collected either from patients who have recovered from an attack of yellow fever or from vaccinated persons. The titre of the immune serum is determined by protection tests in mice, which gives a means of estimating the necessary amount to be injected. The patient is inoculated subcutaneously with a dose of 0·5 c.c. per kilo body weight of human immune serum of a titre 1 : 256 to 1 : 512, or 0·3 c.c. per kilo if the titre of the serum is higher, so that the average dose for an adult man is 35 to 45 c.c. A few hours later this is followed by an injection of the dried mouse virus redissolved in distilled water, the dose being approximately 0·003 gm. per kilo body weight.

This method of protection has been applied with success by Dr. Sawyer and his colleagues in New York, and by Dr. G. M. Findlay in London. In every case that has been tested the vaccination has been followed by the development of a high degree of immunity against yellow fever, and with a few doubtful exceptions the symptoms following vaccination have been absent or slight, and no virus has been detected in the blood circulation.

The only objection to the general application of this method is the practical difficulty of obtaining the necessary quantities of human immune serum, since this must be collected either from a patient recovered from yellow fever, or from a vaccinated subject. This objection seems to have been overcome by Pettit and Stefanopoulo[3], who showed that the serum of horses or baboons inoculated repeatedly with yellow fever virus acquires anti-viral properties, and such serum may be used instead of human immune serum for the protection of human subjects. Moreover, these animal sera contain a much higher titre of immune bodies than human convalescent sera, and consequently it is not necessary to use such large doses. This method requires further tests before it can be recommended for general use, but it promises to furnish a safe and practicable means of immunising the population in regions where yellow fever is still endemic.

[1] NATURE, **125**, 19, Jan. 4, 1930.
[2] *J. Exp. Med.*, **55**, p. 945.
[3] *Bull. Acad. Med.*, July 18, 1933.

Solomon's House

FRANCIS BACON left his name and memory to men's charitable speeches and to foreign nations, and the next ages. Safely and, it may be hoped, confidently. Within a year or so, two biographies have been published—Mary Sturt's "Francis Bacon" and Charles Williams's "Bacon" —both inspired by a sane and impartial enthusiasm for their subject, warts and all. Sir Frederick Gowland Hopkins, in his presidential address to the British Association at Leicester, invoked Bacon's vision of Solomon's House "an organisation of the best intellects bent on gathering knowledge for future practical services". A great idea, the president admitted. The modern structure, Sir Frederick suggested, would have functions similar (*mutatis mutandis*) to Bacon's fancy. "A house devoid of politics, concerned rather with synthesising knowledge, with a sustained appraisement of the progress of knowledge, and continuous concern with its bearing upon social readjustments." Not restricted to scientific authorities alone, it would be "an intellectual exchange, where thought would go ahead of immediate problems".

An intellectual exchange! If this implies a talking-shop, a Parliament, it would correspond to nothing conceived by Bacon. "Here therefore," he wrote in a famous passage, "is the first distemper of learning, when men study words and not matter." Bacon had a horror of "frivolous disputations, comfutations, and auricular traditions and impostures". Was the nation richer, he asked, by one poor invention as a result of all the ancient learning? Let a new method be tried; let us bring in "industrious observations; grounded conclusions, and profitable inventions and discoveries".

Solomon's House, as portrayed by Bacon in "New Atlantis", left in manuscript unfinished—"the rest was not Perfected" are its last sad words —was to be the noblest foundation that ever was upon the earth, the 'Lanthorne of this Kingdome', dedicated to the works and study of the creatures of God. It was to seek "the Knowledge of Causes and Secrett Motions of Things; and the Enlarging of the bounds of Human Empire to the Effecting of all Things possible". On its staff were to be merchants of light, depredators, mystery-men, pioneers, compilers, dowry-men or benefactors, lamps, inoculators, interpreters of Nature, novices, and apprentices. Their work was to be practical rather than speculative. Bacon, in an apocalyptic vision, saw the scientific discoveries of a later age—the phonograph, microphone, aeroplane, submarine, synthetic perfumes, high explosives, artificial gems, weather forecasts, microscopical diagnosis, inhalation of gas. There have been in the history of science more remarkable specific predictions of future discoveries, such as the identification of helium on the earth twenty-six years after Norman Lockyer discovered it in the sun. But when we remember the state of scientific knowledge at the beginning of the seventeenth century, Bacon's prevision is amazing.

A Lord Chancellor in office or retired could not be expected to do much of the actual scientific work himself, though the *corpus* of his experimental observations is substantial. But he was eager "to set the machine in motion". On his last journey, from London to Highgate, he thought of an untried experiment on refrigeration. Stepping from his coach, he procured at a cottage the body of a hen and stuffed it with snow. As often happens to scientific researchers, especially into tropical diseases, he became the victim of the incidents of his own experiment. Seized by the cold, he was put to bed in the neighbouring house of Lord Arundel and died in a few days, on Easter Sunday 1626, choking and struggling with bronchitis. He was able to say in his last letter, dictated to his host, that "As for the experiment itself, it succeeded excellently well". It was all that mattered. As a dying gesture, he carried out a successful experiment. Some centuries were to elapse before this simple experiment became the corner-stone of a great industry.

Bacon's life from the time he left Cambridge was a protest against syllogisms, the raw material of the scholastic philosophers, the "babbling sophists", whose aim in life was "to overcome an opponent in argument"—or burn him, as happened to Bruno, or immure him, as happened to Galileo. Bacon held that man's true mission was "to command nature in action". Like a great general, he planned the campaign in the "Advancement of Learning" and the "Novum Organum". First the facts of Nature "free and at large" must be collected. The synthesis, like Tipperary, was a long, long way. Bacon knew he would never write that final chapter; he looked to humanity to continue and even to complete the work, keeping their eyes always on the object and clearing their minds of cant. "The whole of Nature being explored and understood", his biographer, Charles Williams, writes, "the whole of its operations lying open, truth (so far as the nature of things was concerned) being flagrant and ostensible, the final declaration of that philosophy would be achieved".

Bacon aspired after truth, "Immortal, incorruptible, sovereign truth". But if we wish to know why he would set men "finding out the true nature of all things", and create a Solomon's House for this great work, why not look for the reasons in "New Atlantis"? There they are, bell-clear, convincing—"whereby God might have the more glory in the workmanship of them, and men the more fruit in the use of them". T. Ll. H.

Obituary

MAJOR C. K. COCHRAN-PATRICK, D.S.O., M.C.

THE daily Press has recorded the aeroplane disaster at Johannesburg on September 26 which resulted in the deaths of Major C. K. Cochran-Patrick, and his companion, Sir Michael Oppenheimer, a member of a family well known on the Rand. That a pilot of the highest skill, with vast experience of flying in four continents, should crash immediately after taking off from an aerodrome, must be attributed to some peculiar laxity or abnormal circumstance. The loss of a life so valuable is particularly regrettable, since after attaining the highest reputation in the military sphere, it was hoped that Cochran-Patrick would attain to similar eminence in promoting the more scientific development of civil aviation, especially in the realm of air survey wherein his later interests chiefly lay.

After undertaking some pioneer work in Venezuela, Cochran-Patrick went to Burma to photograph from the air the delta of the Irawadi. Here there was much illegal cutting of the valuable teak forest, but in the absence of a proper map of the area it was impossible to assess the extent of the damage or control the depredation. The area was very difficult of access and survey by ordinary methods was next to impossible. The air photographs taken by Cochran-Patrick, in conjunction with trigonometrical surveys of the creeks executed by Lieut.-Col. Lewis of the Survey of India, resulted in the successful mapping of the whole area; even the photographs themselves were of the greatest value to the Forestry Department, since it was then proved conclusively that the several types of vegetation could be differentiated on the prints. Apart from survey itself, a new use was thus found for air photographs. We consider this to have been Cochran-Patrick's most fruitful civil work; moreover, it pointed out conditions under which air survey could be employed with greatest success.

From the Air Survey Co., Cochran-Patrick transferred his services to the Aircraft Operating Co. and carried out surveys for the latter in Rhodesia, Iraq and elsewhere. Perhaps his most interesting job in Rhodesia was the photographic survey of the upper tributaries of the Zambezi River in order to study its hydrology; much useful information was thus gained without the delays and dangers consequent on painful penetration. Further work was accomplished in Northern Rhodesia in areas where mineral development was in progress and land settlement was proposed.

In the intervals between these surveys in the field, Cochran-Patrick was engaged in seeking the improvement and quickening of technical processes. If he did not himself discover a new method of air survey, at any rate he applied himself actively to the development of methods already in existence; improved means of handling large mosaics of photographs and constructing the map therefrom demanded patient research and detailed study of processes. The loss of Cochran-