lift itself from the ground and confirmed the inventor's assumption that "if a domestic goose can fly, so can a man". It would have been a greater success if he had invented an internal combustion engine.

A Chronic Inventor

Maxim's knowledge of physics and chemistry and his ingenuity in tool-making led to his improving every machine that he used. In all he took out 262 patents. His range of invention included an improved mouse-trap, automatic gas generators, automatic sprinkling apparatus for extinguishing fire, steam and vacuum pumps, engine governors, gas motors, maximite the predecessor of cordite as smokeless gunpowder, an inhaler for bronchites and a merry-go-round. His amazing versatility, ingenuity and skill justified his calling himself a "chronic inventor".

Maxim died at his home at Streatham after a short illness, November 24, 1916.

Holland, John Philip (1840–1914)

JOHN PHILIP HOLLAND, an Irish-American teacher and an inventor of submarine, was born in Liscanor, County Clare, Ireland, February 29, 1840. He was a teacher in Ireland from 1858 to 1872, when he migrated to U.S.A. and became a teacher again in Paterson, N.J.

Motive

As an Irish patriot, he conceived the submarine boat in his youth as a potential weapon to be used against the British navy to secure Irish independence. He had studied the scanty literature on the subject. In 1875 the Fenian Society offered to finance his experiments. The first small craft was completed in 1878 but got buried in the river mud during the test. It was salvaged only in 1927 to be placed in the local museum. But the Fenians did not lose heart. They gave Holland another sum of $23,000 "to build a full-size submarine, which it was hoped, would cross the Atlantic and destroy the English fleet". The submarine was constructed. It was christened *Fenian Ram* and launched in the Hudson River in May 1881. It was 31 feet long, 6 feet beam and 19 tons displacement, with a crew of 3 men. It is kept as a memorial in a city park in Paterson.

Frustration by Officialdom

In 1875, Holland offered his submarine design to the United States Navy; but it was rejected by the officials of the navy as a fantastic scheme of a civilian landsman. From 1888 onwards, Holland tendered at various times plans for a submarine to the American Navy. In 1895 he obtained a contract to build the *Plunger*; but it was thoroughly spoiled, during construction, by the self-willed chief of the naval Bureau of Steam Engineering who ignored his specifications.

Recognition at Last

Holland began to construct another submarine incorporating all the ideas which he was prevented from using in the *Plunger*. It was christened *Holland* and launched in 1898. One of its novel features was its ability to dive to a desired depth. After a number a severe tests, it was purchased by the Navy in 1900. Then Holland received orders for six more submarines for the U.S.A., and for several others for Great Britain, Russia and Japan. He designed two submarines for Japan during the Russo-Japanese War, for which he received in 1910 the "Order of the Rising Sun". In 1904 he devised a respirator for escape from disabled submarines.

Exploitation by Financiers

Though he thus realised the dream of his youth, he was not financially happy. The financiers of the J. P. Holland Torpedo Boat Co., proved to be such money-grubs that they wished to retire him as a figurehead at a salary of $10,000 per annum and they so managed the money market that Holland could not succeed in floating another independent company either.

Holland died at Newark, August 12, 1914.

S. R. Ranganathan.

ASTRONOMICAL NOTES

Planets during March 1940.—Mercury may be glimpsed for the first few days of the month near the western horizon immediately after sunset. It is rapidly getting nearer the Sun, reaching inferior conjunction on March 15. Venus is increasing in brightness (its magnitude will be −3·8 at the end of the month) and will be a conspicuous object in the evening sky, setting nearly three hours after the Sun. On March 8, the planet will be in conjunction with Saturn. Mars is moving eastward in the constellation Aries and will become fainter, as the distance from the earth increases.

Jupiter is getting close to the sun and is not favourably placed for observation. Saturn likewise, will be approaching the Sun, but can still be seen as a first magnitude star in the western evening sky. The ring ellipse is gradually widening, the angular dimensions of the major and minor axes on March 15 being 37″·3 and 10″·2 respectively. Uranus continues to move slowly eastward in the constellation Aries and can be seen close to the fourth magnitude star δ Arietis. A conjunction with the Moon on March 14 will be helpful in locating the planet. Neptune is in opposition to the Sun on March 15; it will be about three degrees west of the star β Virginis and can be observed with a small telescope.

Among lunar occultations of some interest that will be visible in this country, may be mentioned that of δ Tauri (mag. 3·9) at about 7 p.m. on March 15 and that of λ Geminorum (mag. 3·6) a few minutes after midnight on March 19.

Ceres, the first of the minor planets discovered, will be in opposition on March 10. It will be of magnitude 7·0 at the time, and with a binocular, can be seen about two degrees away to the north-east of the third magnitude star δ Leonis.

T. P. B.