news and views

Pluto's satellite

from David W. Hughes

PLUTO the lone outrider of the Solar System is lonely no more. The planet has a satellite. This new discovery was made by J. W. Christy of the United States Naval Observatory, the same observatory that was responsible for the discovery of Phobos and Deimos, the moons of Mars. The discovery was announced in *Circular 3241* of the *International Astronomical Union's Central Bureau for Astronomical Telegrams* published on 7 July. Christy had noticed elongations of the photographic image of Pluto on plates taken with the Naval Observatory's 155-cm diameter astrometric reflector on 13 and 20 April and 12 May of this year. Checking back through previous photographic plates revealed similar elongations on 13, 15, 16, 17 and 19 June in 1970 and on 29 April and 1 May, 1965. The maximum elongation was 0.9 s arc. Analysis of the position angles of the elongation indicates that the satellite is orbiting the planet with a period of 6.3867 days. This is the same as the spin period of Pluto (see Anderson & Fix, *Icarus* **20**, 279; 1973).

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So the two motions have become locked to each other, Pluto's satellite always remaining above the same point on the planet's surface.

The data suggests that the mean distance between Pluto and the satellite is 20,000 km. The mass of Pluto M_P can now be estimated by substituting

$$M_P = 4\pi^2 d^3 / GT^2$$

where d is taken to be the mean satellite-planet distance, T is the satellite's orbital period, G is Newton's constant of gravitation and the satellite is assumed to be much less massive than the planet. Pluto's mass turns out to be 1.56×10^{25} g, a value which lies beautifully within the uncertainty limits of the values given by Cruikshank *et al.* (*Science* **194**, 835; 1976; see *News and Views* **266**, 307; 1977). Pluto is 1/380 the mass of Earth. Cruikshank *et al.* concluded that the composition of Pluto is probably dominated by frozen volatiles, like most of the outer planetary satellites, and thus has a density around 1.5 g cm^{-3}. Combining this value with that obtained above for the mass gives Pluto a diameter of 2,700 km. The surface albedo is about 0.6.

The data obtained by Christy also suggest that the satellite is 2 to 3 magnitudes fainter than Pluto (that is about 10 times less bright). Assuming that the satellite has a similar albedo to Pluto's and that reflected brightness is proportional to the surface area exposed to the radiation gives the satellite a diameter of around 850 km.

The satellite orbit is nearly circular and is inclined at about 105° to the plane of the sky.

The existence of the satellite was confirmed on exposures made with the same telescope on 2 and 5 July and on an exposure made by J. A. Graham using the 400-cm reflector at the Cerro Tololo Interamerican Observatory on 6 July. *IAU Circ. 3241* gives a brief ephemeris and stresses that further observations are desirable.

The satellite has been given the rather unglamorous designation of 1978 P.1, and the world will have to wait for a meeting of an IAU nomenclature committee before it is given a proper name. Might I hazard a suggestion. How about Persephone, the fair goddess whom Pluto set on his throne in Hades and crowned as his queen. □

Influenza A viruses: shaking out our shibboleths

from Francis A. Ennis

THE studies of Nakajima, Desselberger and Palese (this issue of *Nature*, page 334) on the comparison of the recently isolated 'Russian' strains of influenza virus with earlier members of the H1N1 subtype, which circulated between 1946 and 1957, present a challenge to many of our existing ideas on the behaviour of influenza A viruses. Their results confirm earlier findings of close similarity between the surface haemagglutinin (H) and neuraminidase (N) antigens of the Russian strains and strains isolated in 1950 (*WHO Weekly Epidemiological Record* **53**, No. 2, 16; 1978). Palese and his colleagues have now extended the comparison beyond the limits imposed by serological tests by comparing oligonucleotide maps of the genomic RNAs of the virus strains. On the basis of these maps they postulate that the current Russian strains are identical with the viruses which circulated in 1950.

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Is this coincidence, or has the 1950 virus re-emerged in its original state? The authors suggest that the latter alternative is more likely and offer three possible explanations of the persistence of the genetic information unchanged: persistence in man without mutation; passage in an animal reservoir without rapid genetic change; or the possibility that the virus was truly frozen and only recently reintroduced to man. The first two possibilities have been considered by many virologists, but lack supporting evidence, while Chinese and Soviet scientists have denied the third possibility as the origin of the recent epidemics in their countries. I will not attempt to make a premature decision on the origin of the recent strains, which would probably be proved as incorrect as some of our other beliefs regarding the behaviour of influenza A.

Together with other recent experience, the re-emergence of H1N1 has shattered some solidly held conceptions.

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