

The dilemma of influenza

Fred Hoyle and Chandra Wickramasinghe

With the many major advances in medical and biological sciences that have taken place in recent years, it would seem remarkable that we are still unable to come to grips with the problem of influenza. In spite of our ability to produce detailed sequences of bacterial and viral genomes, the emergence of new epidemic or pandemic strains of the influenza virus is still shrouded in mystery. To resolve this mystery we may need to turn to space.

There is a great deal of evidence to show that catching influenza is due far more to where we are than to the people we have been in contact with over the last few days. For instance, studies have found that spouses of people suffering from the disease and their families are no more at risk from the disease than members of the population at large¹⁻⁴. An example of such evidence is displayed in Figure 1. The histogram shows the distribution of influenza-like illnesses within families in a general practice on days following the diagnosis of an initial case⁵. The absence of a well-defined secondary peak on day 2 or 3 (the incubation time) after the index case is a clear indication of the lack of horizontal transmission of a virus.

Variations of immunity cannot explain such facts particularly in the case of new and virulent strains of the virus. Where person-to-person contact is greatest within the context of families, detailed statistics have consistently shown that

nothing significant seems to happen. This experience is repeated year after year with every influenza season.

A study in schools that we made during the bad winter epidemic of 1977-78 showed unexpectedly large differences in the incidence of the disease between pupils who boarded in different houses at the same school. This data showed that it was the particular location of the house that pupils were domiciled that mattered, not whether contacts at meal times and in school classes happened to be incubating the virus. There was no evidence at all that one pupil caught influenza from another. It was the place where a pupil spent time that mattered above all else^{5,6}.

Another point of significance is that the spread of influenza takes no account of modern modes of travel. The spread is still the same as it was before the advent of modern air travel. The spread over the earth still takes months, which would be difficult to explain on the basis of spread

through contact with an incubation period of only a few days. It is still the same as it was a century ago.

The lethal wave of influenza in 1918-19 said to have killed more than the murderous assaults of the First World War, was first detected on the *same day* in Boston and Bombay⁷. Yet in spreading within the United States it took three weeks to go from Boston to New York. And of the influenza epidemic of 1948 an Italian doctor⁸ reported of the then remote island Sardinia:

'We were able to verify the appearance of influenza in shepherds who were living for a long time alone, in solitary open country far from any inhabited centre. This occurred at just the same time as influenza appeared in the nearest inhabited centres.'

In January 1919, Governor Riggs⁹ of Alaska reported to a committee of the US Senate that influenza had spread all over an area with the size of Europe and with only a small thinly spread population of about fifty thousand. This was despite conditions for human travel being worse than anybody could remember. 'The territory has to be reached by dog team. You have the short days, the hard, cold weather, and you only make 20 to 30 miles a day. The conditions are such as have never happened before in the history of the territory. . . .'

Influenza is known to appear in winter, with January and February usually being the worst months for residents in northern temperate latitudes, six months later in the southern hemisphere. Why? Because in temperate latitudes it is in the winter months that air from the earth's stratosphere comes down to the ground level, and it is because exceptionally cold air from the stratosphere came down on Alaska in the winter of 1918-19 that conditions for travel there were the worst in living memory.

Air brought down from the stratosphere carrying either the virus itself or a

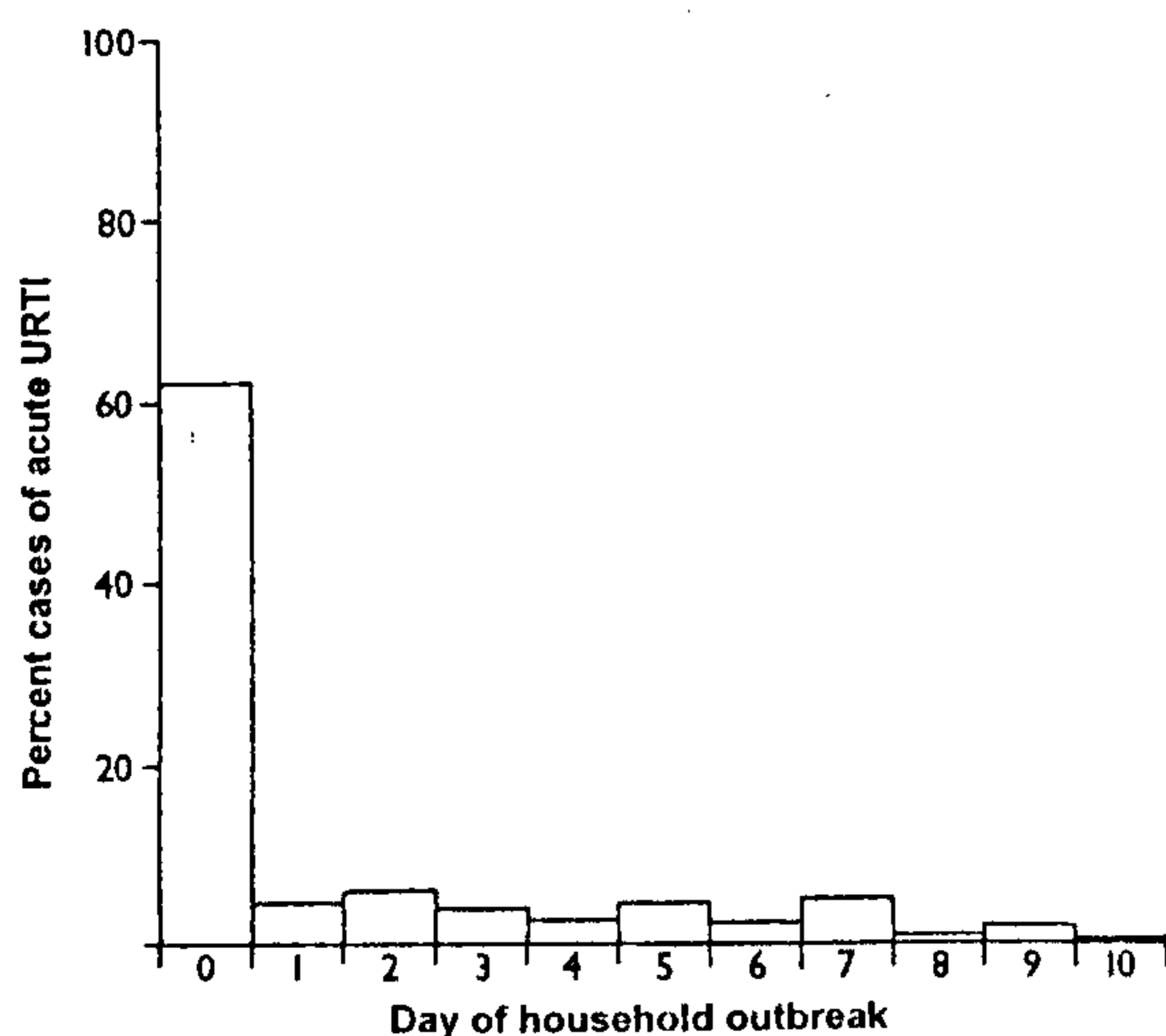


Figure 1. Distribution of cases of acute upper respiratory infections during an influenza epidemic in 1984-85 in families where there was at least one diagnosed case on day '0'. Data are from the records of a general practice in Newport supplied by John Watkins.

trigger for it reaches ground-level patchily. Occasionally it can arrive at the same time at widely separated places like Boston and Bombay, not requiring any human to go from one place to the other. The patches of virus appear to have a very fine scale like smoke caught up in swirls of turbulent air. Even to the extent of hitting one school house and missing another as we found in our 1978 study^{5,6}. An idea such as this may have been seen as wildly outrageous in 1978, but now it should be less so with the modern trend to accept that life could be distributed on a vast cosmic scale, and moreover that terrestrial life may have been brought to earth by comets.

The best defence against influenza is to stay put where you are if you can! Provided you have the luck to avoid a virulent patch you should be safe. But if you move uneasily from place to place sooner or later you will move into an infective patch, and within a couple of days you are likely to succumb. Doctors administering to patients in a bad patch will be run off their feet, while those in a place that is not hit might wonder what all the fuss is about.

We believe the advice to stay put in a safe place is better than a so-called influenza jab. All this can do at best is to give you protection against last year's variety of influenza. It will not give you protection against a new variety, and all the 'bad' forms of influenza are new.

Our expectation is that sooner or later a really bad situation, possibly similar to that in 1918-19, will arise. This seems inevitable so long as the government advisors in countries like the UK continue to prefer medical dogma to taking a closer look at the facts. The facts suggest to the point of certainty that what we get from the high atmosphere via comets, be it a virus or a genetic trigger, is significantly more dangerous than anything we may catch from other people.

A possible connection between peaks of sunspot activity and the times of influenza epidemics was first suggested by Hope-Simpson¹⁰ on the basis of data over the limited time span 1920-1970. To take things a step further, we plot in Figure 2 the curve of sunspot numbers throughout the past century¹¹. Sunspot numbers give a measure of high-energy activity at the sun's surface, the peak numbers corresponding with frequent solar flares and the emissions of charged particles that reach the earth. Such activity on the sun is known to result in geomagnetic storms,

ionospheric disturbances that interfere with radio communications, and most spectacularly the production of bright auroral displays, the latter being caused by the streaming of charged particles from the sun moving along magnetic field lines that connect the sun and the earth.

Peaks of solar activity will undoubtedly assist in the descent of charged molecular aggregates (including viruses) from the stratosphere to the ground level. Thus according to our present point of view serious influenza epidemics would follow such peaks, provided the culprit molecular aggregates were recently dispersed in the stratosphere from cometary meteor streams. With a more or less regular occurrence of such meteor show-

ers the limiting condition may then be seen as the intensity of solar activity, leading naturally to coincidences between the timings of pandemics or major epidemics and sunspot peaks.

From the end of last September solar activity reached several high peaks, the details of which¹¹ are shown in Figure 3. The expectation is that sunspot cycle no. 23 will peak sometime in the middle of the present year. In view of the correspondences in Figure 1 it would be unwise to remain sanguine that we will miss a major pandemic, even if by luck we escape its worst effects in the coming season. In our opinion, the facts relating to influenza clearly vindicate the validity of its etymological derivation from the

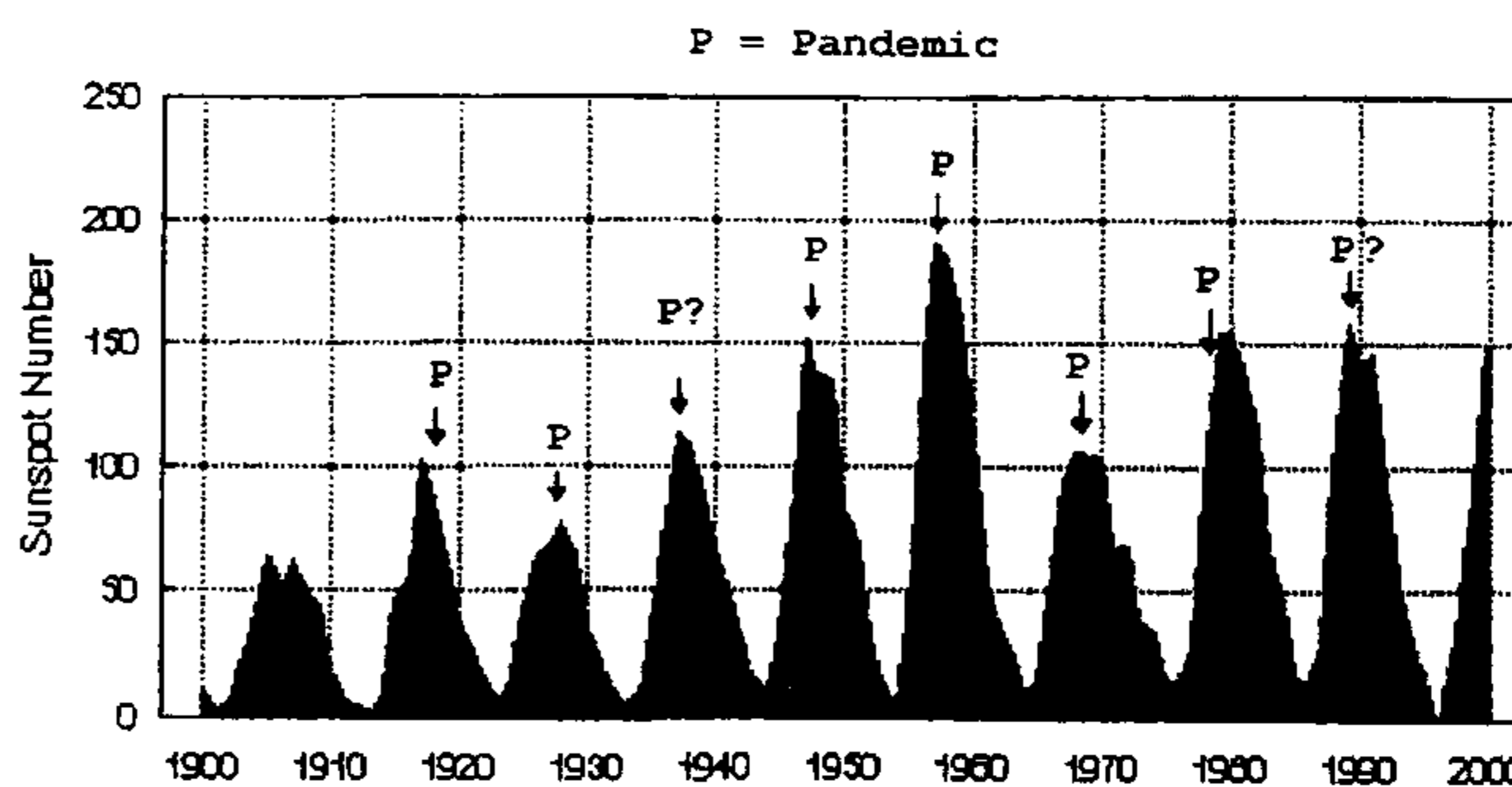


Figure 2. Mean sunspot numbers compared with timings of major world wide pandemics (P) of influenza. Note in particular 1918: 'Spanish Flu' (H1N1) caused 500,000 deaths in USA; 1957-58: 'Asian Flu' (H2N2) caused 70,000 deaths in USA; 'Hong Kong flu' (H3N2) caused 34,000 deaths in USA; 1977: 'Red flu' (H1N1) caused 30,000 deaths in USA. (Data from sunspot archives and Public Health Service records). H1N1, H3N2 and H2N2 refer to types of influenza virus.

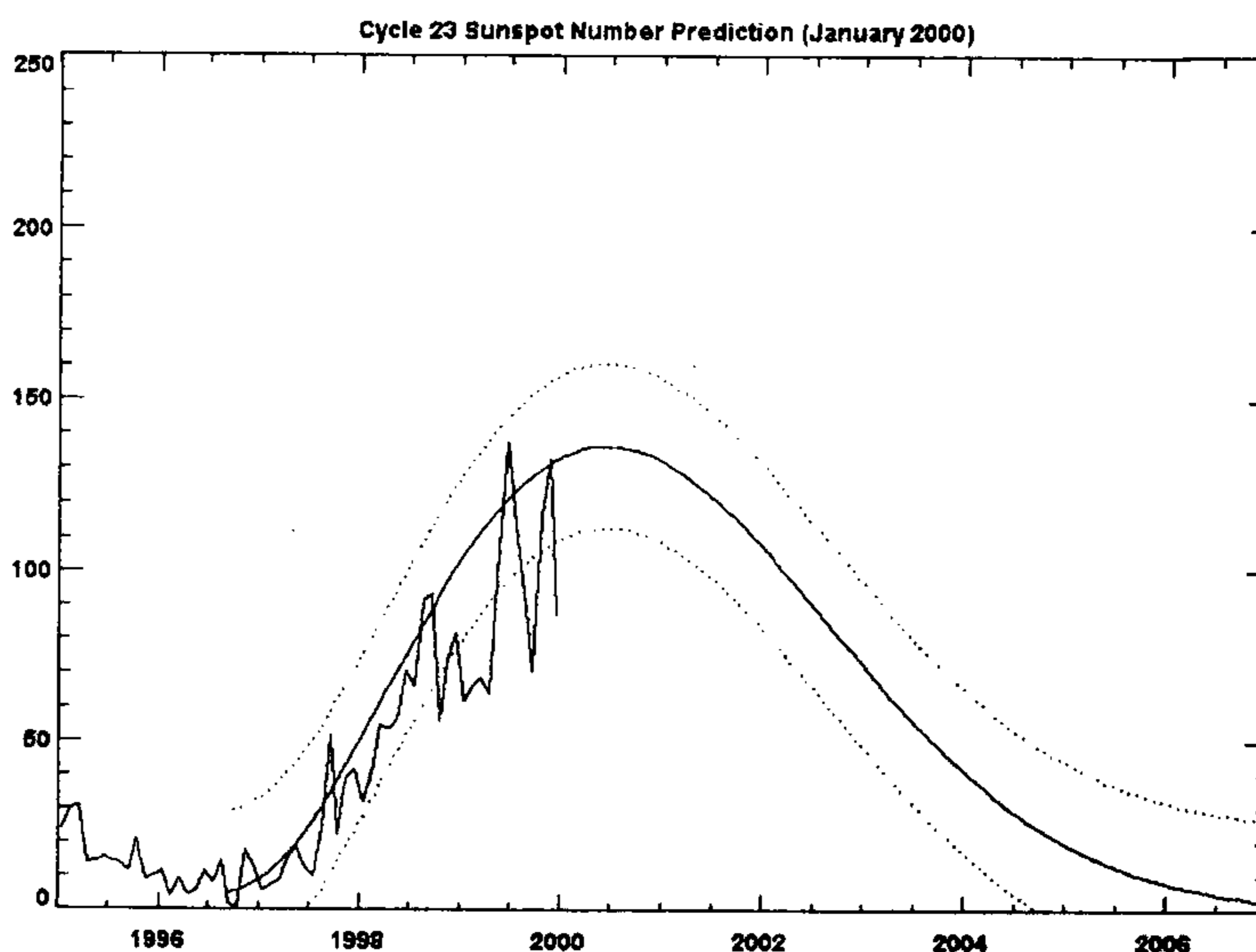


Figure 3. Sunspot cycle no. 23, including theoretical prediction showing peak in the middle of 2000. (Data from internet site [http:// www.sunspotcycle.com](http://www.sunspotcycle.com)).

mediaeval Latin word *influentia* signifying 'influence of the stars'.

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11. Data from internet site <http://www.sunspotcycle.com>.

The authors are in the School of Mathematics, Cardiff University, P.O. Box 926, Cardiff CF2 4YH, UK. (e-mail: Wickramasinghe@cf.ac.uk.)

From the archives



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Presidential address by L. L. Fermor at the Indian Science Congress

... An event of major importance to the development of science in India during the past year was the decision made by a group of scientists during the last session of the Indian Science Congress at Bangalore to publish a scientific journal on the lines of the well-known English weekly journal, *Nature*. A committee was appointed and eventually the publication has been commenced of a monthly journal entitled *Current Science*; the first issue appeared in July 1932. You will all agree that the journal is a success, for

there has been no lack of material suitable for publication and the journal is pleasantly printed on good paper. On one point, however, the Board of Editors have cause for anxiety. The University of Madras and the Indian Institute of Science have made grants towards the maintenance of this journal, and, in addition, there are receipts from the sale of the journal and from advertisements. The total receipts from these sources is not, however, sufficient to meet the total expenditure, and for its continuance the journal will require either additional grants from other bodies, or an increased number of subscribers. These are hard times and it is going to be difficult to secure donations from University bodies. But when I mention that the present year's budget of the journal has been framed on the basis of only 300 subscribers, which is less than one per million inhabitants of the country, and that 200 additional subscribers would square the budget, it will be seen that if Indian Science deserves the dignity of supporting an All-India journal in science, it can

easily secure this dignity by what is really a trivial increase in the number of subscribers; for what are 500 subscribers amongst over 300 million people? No doubt, many of you have been waiting to see what the journal was like before subscribing. Now that you see the result, I hope that as many as possible will send in their subscriptions.

... I have mentioned all this to indicate the extent to which the Indian Science Congress is a dependent body financially, and not yet in a position to provide donations towards laudable scientific enterprises such as *Current Science*, or towards endowing particular researches in the manner undertaken by the British Association for the Advancement of Science in England. *Current Science* will no doubt eventually pay its way; but we could well do with funds for financing special items of research by private workers. We may hope perhaps that eventually donations for this purpose will be forthcoming from generous donors, who may perhaps remember the Indian Science Congress in their wills. ...

Random selections

Surface of extremely energetic cosmic rays

'Violation of the Greisen-Zatsepin-Kuzmin cutoff: A tempest in a (magnetic) teapot? Why cosmic ray energies above 10^{20} eV may not require new physics?'

Glennys R. Farrar and Tsvi Piran
Phys. Rev. Lett., 17 April 2000, **84**, 3527–3530

Extremely energetic (typically 10^{20} eV) particles constitute a part of cosmic rays that continuously bombard the earth's atmosphere. The source of these yet-unidentified particles cannot be associated with any plausible ones on the basis of current theories and remains mysterious. Farrar and Piran find that if one were to assume stronger magnetic fields (tens of microgauss) than the ones based on current estimates (typically nanogauss),

the energetic particles would follow a more circuitous path than that along the line-of-sight from earth. On this basis they conclude that the mysterious source may be M17, 'an active galactic nucleus powered by a billion-sun-sized black hole'. Confirmation of this concept will come if more data reveal certain asymmetry with respect to observations made in the direction of M17.