THE SOLAR PHYSICS OBSERVATORY.

IN last week's NATURE we gave the terms of reference of the departmental committee appointed to consider alternative schemes for transferring this observatory to Fosterdown (Caterham) or to Cambridge.

We are informed that the Treasury has forwarded the report of the committee on this subject to Cambridge, and that it is being considered there; so far we believe no communication has been made to the Solar Physics Committee, the body appointed more than twenty years ago to advise the Government in such matters.

We may summarise now the action taken by the committee and the Board of Education as already recorded in NATURE during the last five years.

(1) In 1906 the Board informed the committee that the land on which the Observatory is situate was required for the Science Museum, and requested them to make inquiries regarding a new site.

(2) The committee formulated the conditions to be fulfilled, and, after inspection of all available Government land in 1907, fixed upon Fosterdown as fully satisfying all the conditions.

(3) The Treasury, in full knowledge of this, proposed Cambridge as an alternative site, although it fulfilled none of the required conditions.

(4) The committee pointed out that this raised questions concerning administration, &c., and asked for more information, and suggested a committee to obtain it, consisting of representatives of the Treasury, the Board of Education, the Solar Physics Observatory, and the Meteorological Office, to consider fully the question of the alternative sites in all its bearing.

(5) Without any communication with the committee, the Treasury requested the War Office to sell the Fosterdown site.

(6) As a result of a memorial to the Prime Minister this proceeding was at once stopped.

(7) The Treasury, thus compelled to hold an inquiry, instead of such a body as that suggested by the committee, with knowledge of the work done in the Solar Physics Observatory and the questions of administration involved, appointed a committee consisting of three fellows of a Cambridge college and the holder of an honorary degree of the University.

(8) The majority of this committee has selected Cambridge as the future site for the observatory.

THE SITES CONTRASTED.

Up to the present time the actual conditions of the two sites as observing stations have not been published, so some trouble has been taken to prepare maps to indicate their relative efficiency.

To illustrate this the accompanying two charts are here reproduced, the first (Fig. 1) representing the Cambridge site and its neighbourhood, and the second (Fig. 2) that at Fosterdown. A study of these two charts will at once demonstrate the respective values of the positions for an observatory to be erected *for all time*.

It is well recognised that the best observations of the sun are made soon after the sun has risen, so that it is essential that the eastern horizon as seen from the observatory should be open and free from a smoky atmosphere. In the plans, lines showing the directions of the sun at sunrise at both the summer and winter solstices have been indicated in order to point out the kind of country (town or fields) over which these observations in the east should be made.

The following comparisons show how the conditions laid down by the Solar Physics Committee are fulfilled or the reverse by the two sites in question :—

"The observatory should be at an elevation of not less than 250 feet, if practicable."

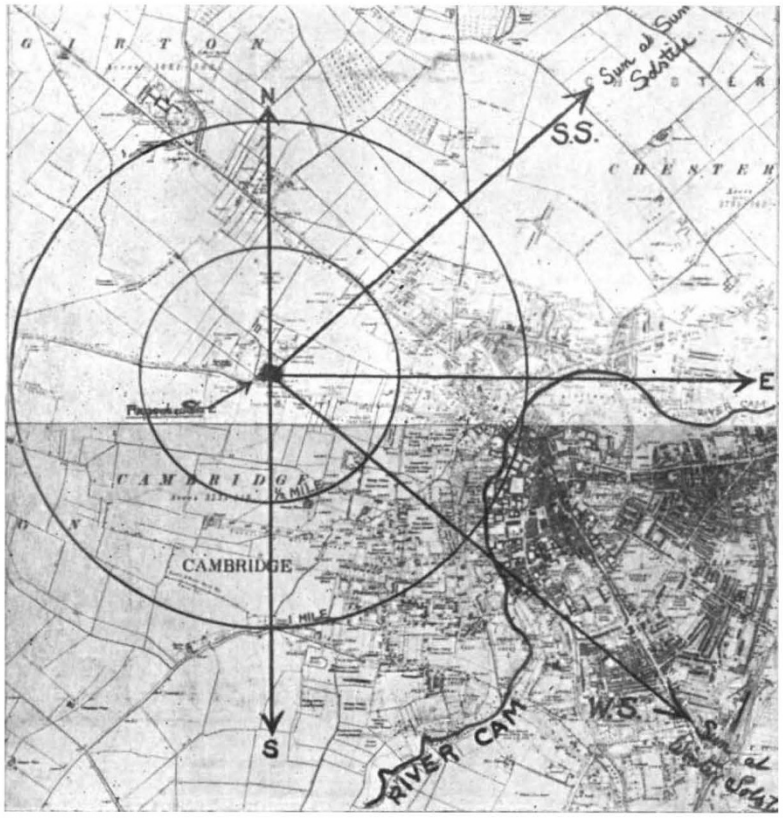

FIG. 1.—Cambridge. The selected site, 70 feet above sea-level, is at the centre of the half-mile and mile circles, and lies 45 feet above the river flats to the eastward. The lines SS and WS represent the directions of sunrise at the summer and winter solstices respectively. Solar observations, which have to be made soon after sunrise, must therefore be made through smoky and misty atmosphere due to the town and river valley respectively.

Cambridge.—75 feet.

Fosterdown.—800 feet.

"In any case it should not be in a smoke area."

Cambridge.—Near a smoke area, namely, the town of Cambridge, and this lies to the east and south-east of the site, and is extending westwards, *i.e.* in the direction of the observatory.

Fosterdown.—No smoke area.

"It should be away from river valley mists and not upon a clay soil (chalk or gravel would be quite satisfactory)."

Cambridge.—River mists and flooded areas by the River Cam—to the east and south-east of the site.

Fosterdown.—No river near the site.

"In the configuration of the ground the important considerations are that the site should not be exposed

to violent winds, and that it should afford as clear horizon as possible, especially to east, south, and west."

Cambridge.—The extension of Cambridge in the direction of the site is increasing, and there is no *natural* guarantee to prevent buildings (which mean smoke) from being erected on any of the sides of the observatory site.

Fosterdown.—The configuration of the site is such that the horizons will be open and clear *for all time.*

It may be further stated that while at Cambridge a main road passes close to the site of the observatory and traffic along it even now shakes the ground, at Fosterdown no such road can be constructed, and therefore no such earth tremors need be feared.

It will therefore be seen that for the work's sake it would be much better to place the observatory in the best position at once, even if it may cost a few hundred pounds more, than to locate it at Cambridge,

At the same time that this report was presented to both Houses of Parliament the third report of the committee appointed to advise the Government on this matter, called the Solar Physics Committee, was also presented. This covers the period 1889–1909 (two previous reports presented in 1882 and 1889 dealt with the period from 1879, when the observatory was founded by the Government).

A perusal of this report enables us to see what work has been done in the past. The report of the departmental committee deals with proposals for its future.

The situation is as follows :—

A Government observatory, more than thirty years old, has to be moved from its present position because the land is wanted for the buildings of the new Science Museum.

When the question of the change of site of the observatory was first brought up a thorough investigation was made by the Solar Physics Committee. They formulated the conditions which had to be secured, and proceeded to search for a suitable site. The conditions which they laid down are given in the departmental committee's report (p. 4)—roughly, the site should be as high as possible to

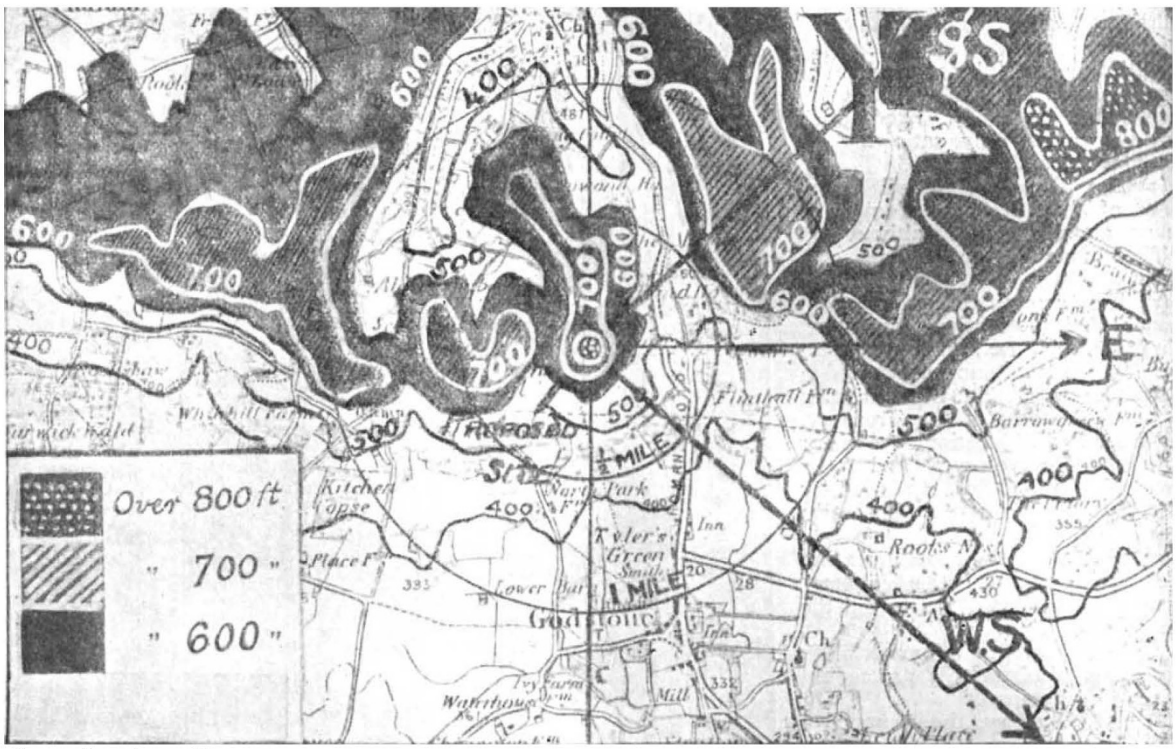

FIG. 2.—Fosterdown. The selected site, 800 feet above sea-level, is at the centre of the half-mile and mile circles, and lies 100 feet above all the neighbouring country with the exception of the small 800-foot area to the north of east, which is on the same level as the site. The lines SS and WS are the directions of sunrise at the summer and winter solstices. The figure shows the open and clear nature of the horizon in all directions.

where at the present time the observing conditions are not good; where year by year they will be getting worse; and where in a short period they will become intolerable for similar reasons which make the present site at Kensington undesirable. The cost of such a removal from Cambridge would entail an additional and unnecessary expense.

"THE TIMES" ON THE SITUATION.

We gave last week two articles from the daily Press—*The Morning Post* and *The Daily Graphic*—giving views as to the committee's report. We now add a letter which appeared in Tuesday's *Times* from an occasional correspondent :—

In your issue of October 27 you published the recommendations of the departmental committee on the Solar Physics Observatory.

secure the least thickness and disturbance of air, and a clear horizon, especially to the east, south, and west; no town smoke or glare at night; proximity to London to facilitate communication with libraries, societies, and men of science.

In choosing a site for a future observatory it was natural that the position should be so selected that in years to come the observing conditions would not be hampered or rendered less efficient by changes in the close surrounding area. When the Solar Physics Committee selected the Fosterdown site they evidently kept this condition well in mind, for an examination of it shows that it is practically impossible for any buildings or roads to be constructed in any direction which will take away from the present efficient observing conditions. Thus the site will probably be as good in 100 years' time as it is now.

Some time ago the Solar Physics Committee was informed that Cambridge had been proposed as an alternative site; the committee hesitated to accept this, pointed out

the necessity for further inquiry, and suggested an inter-departmental committee on which the Treasury, the Board of Education, the Solar Physics Observatory, and the Meteorological Office should be represented.

The committee actually appointed consisted of three persons who are or have been fellows of Trinity College, with the addition of a distinguished honorary graduate of the University of Cambridge. In the terms of reference a condition is assumed that the sum spent in the future upkeep at either place should be approximately the same as that now expended in the present observatory.

Out of the three scientific members of this committee, two, the Astronomer Royal and Dr. Schuster, agreed that the Cambridge site should be preferred, while one, Dr. Glazebrook, the director of the National Physical Laboratory, dissented.

In making a very careful examination of the report of the departmental committee, together with the evidence and appendices, it is really a matter of great difficulty to understand, in the face of the evidence offered, how Messrs. Dyson and Schuster arrived at their conclusion.

The question of site may first be dealt with. The superiority of the Fosterdown site is frankly acknowledged, and evidence is given that some of the present disadvantageous conditions at Cambridge may be much worse in the future. There is no guarantee that the land surrounding the proposed Cambridge site will not be built on, that tram-cars and other heavy traffic will not run along the main road which bounds it. In short, there is no guarantee that this part of the outskirts of Cambridge will not in the near future be an important suburb of Cambridge.

One of the greatest objections to Cambridge is touched on in cavalier fashion. Cambridge, like London, is lighted by electricity; and one of the points in favour of Fosterdown was that town glare at night would be abolished, and that long-exposure photography on the spectra of stars and nebulæ, which is carried on under bad conditions at present at South Kensington, would be rendered more fruitful of results.

As we learn from the solar physics report, this work requires at present the attendance of three assistants on every fine night.

Q. 169.—Is there any interference owing to the town light at the observatory in Cambridge?

Answer.—I do not think anything that would affect solar observations—

is all we can find on this point; and it does not suggest that we are likely to have a continuance of the study of the detailed chemistry of stellar spectra which for many years past has formed part of the routine work of the Solar Physics Observatory, and is not done elsewhere. Town glare naturally does not affect solar observations, because the sun can be observed only by day, while the town is lit only by night. But it does very seriously affect the astrophysical work of the Solar Physics Observatory, which can be carried on only at night. If it is really intended to put an end to a unique investigation of stellar chemistry and physics, the question ought surely to be debated on its merits, and not simply hustled out of sight. There is reason to fear that this is the intention, not only because of the non-recognition of anything beyond solar observation, but also because it is to be gathered from the representative who gave evidence for Cambridge that in the Cambridge view it is not simply a question of transferring the observatory, but of dismissing its staff and putting an end to it as it exists.

Of the ten members of the staff, from Sir Norman Lockyer downwards, not more than two are to be employed (Q. 222), and even none of the existing staff may be of the right "calibre" (Q. 139).

The departmental committee apparently does not accept this (Report, Section 15).

It is understood that the Government desires to relieve itself of the direct control of the Solar Physics Observatory, but that at the same time it acknowledges the value of the work done by that observatory by its willingness to continue the grant at present made for its maintenance. The inducement offered by Cambridge University to transfer control to its hands is that the University undertakes to provide a suitable building for the work, which involves no very serious expenditure. If public money to the amount of 3000*l.* a year is to be handed over to the University on account of certain specified work, then security should be taken that the public shall get value for its money, and that the specified work shall be efficiently carried on. Otherwise the transaction will merely amount to giving the University 3000*l.* a year to spend as it pleases in return for the erection of a building worth 200*l.* or 250*l.* a year.

Now in order that the work shall be carried on efficiently—that is to say, the astrophysical work, which, in spite of its title, is the speciality of the Solar Physics Observatory—it is not enough that a suitable building should be erected, even though it be manned by persons of the "right calibre." It is also necessary that the suitable building should be upon a suitable site, and the only suitable site for an observatory obviously is a site permitting its work of observation and record to be performed in the best conditions attainable. It will not be seriously argued by any responsible person that Cambridge offers the best attainable site for carrying on the astrophysical work of the Solar Physics Observatory. That work involves long exposures of sensitive plates to the light of particular stars. It is necessary that the star should be followed with the utmost accuracy in its diurnal motion, and it is obvious that vibration of the instruments due to heavy traffic in the vicinity cannot conduce to sharpness of definition. If the star has to be photographed through the illuminated haze that hangs over every well-lighted town, another serious difficulty is thrown in the way of the observer, and when spectrographic complications are added the difficulties become indefinitely more formidable.

Thus, while it may be right that the Government should rid itself of direct control of the Solar Physics Observatory, and while it may be right that Cambridge University should assume control, it cannot be right that the University should erect the observatory in Cambridge. For Cambridge is shown by the departmental committee itself to be a bad observing station for this particular work, and to be very likely to become progressively worse. A site can easily be found free from the objections that attach to Cambridge; and if astrophysical work is to be carried on at all with public money, the public have a right to demand that such a site shall be chosen. In placing the observatory at a distance from the University, Cambridge would only be following the practice of other universities, such as those of California and Chicago, which prosecute analogous researches upon the principle that observatories must be placed where the things to be observed can be best observed.

THE ENCYCLOPÆDIA OF SPORT.[1]

AS the third volume commences with hunting and concludes with racing, while it also comprises articles on lawn tennis and polo, it will be obvious that a large portion of its contents does not come within the purview of a journal like NATURE. Nevertheless, there are numerous articles connected with natural history which call for brief mention. As a whole, these articles have been brought well up to date, although in some instances there is a certain amount of repetition, and occasionally discrepancies, when two writers treat of the same subject from different points of view. The illustrations are numerous, and for the most part good (as will be evident from the one here reproduced), but the accompanying legends are in some instances not so full as is desirable. On page 85, for instance, a doe and kid are simply lettered Himalayan Ibex, while there is no indication to show whether the "Caucasian Ibex," figured on the next page, is an example of the western or eastern tur. Misprints seem to be few, although the specific name of the mule-deer is given as *nemionus* in place of *hemionus*, while its alternative

1 "The Encyclopædia of Sport and Games." Edited by the Earl of Suffolk and Berkshire. Vol. iii., Hunting—Racing. Pp. viii + 448. Vol. iv., Rackets to Zebra. Pp. viii+471. (London: W. Heinemann, 1911.) Price 10*s.* 6*d.* net; abroad 12*s.* 6*d.* net.