square kilometre. If, however, we take account, as we are bound to do, of the difference of direction, treating those which flow upwards as positive and those which flow down as negative, the result would show that the mean current in the United Kingdom is about five-thousandths of an ampere per square kilometre. Of course, if we deal with considerable but smaller areas, the precise value obtained depends upon the district chosen, but this does not affect the conclusion to any important extent. Thus, for the reason I have already given, it is probable that our knowledge of the magnetic state of the central districts is better than our information as to the borders, and if we confine ourselves to the centre of the kingdom, we find that the average current is downwards in both cases, and that in 1886 it was apparently a little larger, and in 1891 a little less than one-hundredth of an ampere per square kilometre.

Even these concordant conclusions are rendered more doubtful if the two completely independent sets of results obtained by means of the two surveys for 1886 to 1891, respectively, are reduced to the same date. It is true that the magnitudes of the calculated currents are larger than those shown in the map given above, but on the whole they are so opposed in direction that the comparison compels us to reject the hypothesis of their physical reality.

I therefore feel justified in asserting that no evidence that can be relied upon points to the existence of any flow of electric currents through the surface of the British Isles, whether from below to above or from above to below. The quantities are so minute that if they existed they could barely be measured, and the results are too discordant to command assent.

Since the survey of the United Kingdom was completed, my friend Dr. Van Rijckevorsel has made a minute magnetic survey of Holland. In the case of so small a district it is more difficult to eliminate the effects of local disturbances than when the area to be dealt with is larger, and thus I doubt whether conclusions as to the flow of electrical currents drawn from Holland alone could be regarded as trustworthy. Taking them, however, for what they are worth, they indicate an upward current of about one-tenth of an ampere per square kilometre for that country. All these quantities are less than the currents which Dr. Schmidt's calculations demand. In the neighbourhood of the United Kingdom the flow should, according to his calculations, be upwards and the magnitude about fifteen-hundredths of an ampere per square kilometre. This is approached by the flow in Holland, but is from ten to wenty times greater than the average obtained over large areas in the United Kingdom.

So far, then, the question as to whether such currents really exist appears to be doubtful. The calculations of Schmidt and Bauer lead to the conclusion that when the world as a whole is investigated the answer is affirmative, but all the more accurate investigations which have hitherto been made in small areas combine to prove either that the currents do not exist, or that they are less than Dr. Schmidt's theory demands. This fact, taken by itself, is not conclusive, as Sweden, the United Kingdom, and Holland are all in the west of Europe, and it might well be that this happened to be a district in which the currents were exceptionally small; but, on the other hand, the doubt thus raised is formidable. Dr. von Bezold has recently stated to the Berlin Academy that Dr. Schmidt himself must now be added to the list of doubters; and von Bezold confirms this caution by figures which lead him to the conclusion that in all probability the results obtained from calculations which embrace the whole globe are due rather to the want of accuracy of our knowledge than of the physical reality of currents from earth to air. I should myself be sorry to pronounce a final opinion, but I must confess that I seriously doubt whether the horizontal magnetic force has been determined with adequate accuracy at a sufficient number of places in the vast regions which are covered with the sea to enable us to draw any final conclusion from areas which include them, and I certainly consider that the balance of evidence is at present opposed to the physical reality of the currents. Before we can accept the opposite proposition some evidence must be produced based on surveys as complete as those of England and Holland. Before long we shall probably have full information as to France and Maryland, and it is possible that one or other of these may furnish positive evidence sufficient to outweigh the negative results which have hitherto been obtained.

(*To be continued.*)

A PROPOSED SWEDISH EXPEDITION TO THE ARCTIC REGIONS.

A YEAR since, Dr. A. G. Nathorst, of Stockholm, read a paper before the Swedish Society for Anthropology and Geology, entitled "Återblick på Polarforskningens närvarende Ställning samt Förslag till en Svensk Polarexpedition" (a review of the present position of Polar investigation, with a project for a Swedish Polar expedition), which has since been published in *Ymer* (Årgång 1896, Heft 4, pp. 267–286), the journal of the Society. At the time of reading the paper, there seemed but little probability of a near realisation of the projected scheme; but, during the present year, the King of Sweden and certain wealthy merchants of Stockholm and Gothenburg have generously come forward and provided the funds necessary for carrying it out, and Dr. Nathorst, who will act as the scientific leader of the expedition, is now engaged in preparations for a start next year (1898).

As the result of Nansen's voyage, Dr. Nathorst thinks that there is but little probability of the discovery of fresh land areas in the vicinity of the Pole, and that the aim of future expeditions to the Arctic regions should be a thorough scientific investigation of those lands, of which at present but little is known beyond the fact of their existence. Under this head may be mentioned the west coast of Ellesmere Land and Grinnell Land and the neighbouring islands; also the shores of Jones Sound, in Arctic America. Further, large tracts of the north-eastern and north-western coasts of Greenland remain to be examined, in spite of the admirable work of the Danish, Austrian, and other exploring expeditions. But it is with Spitsbergen and the region east of it that previous Polar explorations on the part of Sweden have been most closely connected; and though no fewer than twelve different Swedish expeditions, led by such men as Torell, Nordenskiöld, Nathorst, de Geer, and others, have visited this region since 1858, and that it has been the field of work for expeditions from other countries as well, the most recent being that under Sir Martin Conway in 1896, it yet offers, in Nathorst's opinion, a rich harvest for scientific investigation.

The west coast of Spitsbergen is now fairly well known, but owing to the ice coming from the east and blockading the eastern coasts of the island, nothing has as as yet been ascertained of their geological structure. The same obstacle has also prevented observations on Stans Foreland (Edge Island), Barentz Land, North East Land, Kung Karls Land, and Ny Island; but it is probable, that given favourable conditions of the ice, a steam vessel would be able to approach sufficiently near these islands to allow of their geology at least to be made out. The exploration of these lands between Spitsbergen and Franz Josef Land is the main object of the expedition; but should this be frustrated by the prevalence of the ice, the research work would be carried on in Spitsbergen itself, and more particularly a study would be made of the raised shell-banks and terraces, evidencing a comparatively recent elevation of the land, and of the remarkable quaternary deposits which show that the climate of the island, for a certain interval after the Ice age, was warmer than at the present time. Promising botanical results might be also expected from an examination of the valleys extending from the heads of the fiords, as, for example, those in Sassen Bay, Kol Bay, and Van Mijens Bay.

A stout vessel of from 350 to 400 tons, and a crew of thirteen men, would, in Nathorst's opinion, be most suitable for the undertaking; and the scientific staff would consist of a geologist, a botanist, two zoologists, one hydrographer and meteorologist, and one for cartography and photography. It is not intended to over-winter in the Arctic regions, but the vessel would be provisioned for a year, in case of accidents. The estimated cost of the expedition is about 4000*l*. It is proposed to reach Spitsbergen in the beginning of June, and work there until the middle of August, when it is hoped the ice will allow Kung Karls Land and the other islands near it to be examined.

THE USE OF KITES IN WEATHER PREDICTION.

THE systematic exploration of the upper air by means of kites is referred to by Prof. Cleveland Abbe in the *Monthly Weather Review*, at the end of a long article upon the experiments made previous to 1893. It is pointed out that at that time the Malay kite and the free balloon were merely