

THURSDAY, JUNE 26, 1879

HISTORICAL SUN-DARKENINGS

NOT a few persons appear to have been much exercised by a prognostication emanating from an American source, whereby the public are forewarned of an approaching period of sun-darkening to extend over several days. History does record instances in which the sun has been abnormally obscured or its light paled to such an extent that stars have come into view in the daytime, and Erman, Humboldt, and other writers have brought these occasions into prominent notice, the former in connection with the presumed passage of dense meteoric streams between the earth and the sun. The earliest mention of such a phenomenon appears to be in the year B.C. 44, about the time of the death of Julius Cæsar, when we read in Plutarch and Dio Cassius that the sun was paler than usual for a whole year, and gave less heat, the air continuing cold and misty. The darkness for two hours on August 22, A.D. 358, appears to have preceded the great earthquake of Nicomedia. Two years later in all the eastern provinces of the Roman Empire we are told there was "caligo a primo auroræ exortu adusque meridiem," and the stars were seen, the further description being rather applicable to a total solar eclipse; but neither the eclipse of March 4, 360, nor that of August 28, would be visible in those parts. Again, when Alaric appeared before Rome, the darkness was such that stars were seen in the daytime (Schnurrer, "Chronik der Seuchen"). Following the *Tablettes Chronologiques* of the Abbé Lenglet Dufresnoy, Alaric invested Rome A.D. 409, and became master of the city on August 24, 410; there was a visible eclipse of the sun on June 18 of the latter year, therefore while the siege was in progress; but on calculating the circumstances under which it would be seen at Rome, introducing the latest lunar elements, it appears that little more than half the sun's disk would be covered at the greatest phase about 2h. 40m. P.M., and no sensible diminution of sun-light would be occasioned by the eclipse. In 536, 567, and 626 we find mention of long periods of diminished sun-light. Schnurrer records that in 733, a year after the Saracens had been driven back beyond the Pyrenees, consequent on their defeat at Tours, "the sun darkened in an alarming manner on August 19; there appeared to be no eclipse by the moon, but rather an interruption from some meteoric substance." There was an eclipse of the sun, annular but nearly total, on the morning of August 14; it is mentioned in the Saxon Chronicle, which tells us "the sun's disk was like a black shield." The near coincidence of dates suggests in this case a connection between the darkness and the eclipse. In 934, according to a Portuguese historian, the sun lost its ordinary light for several months, and this is followed by the doubtful statement that an opening in the sky seemed to take place, with many flashes of lightning, and the full blaze of sunshine was suddenly restored. In 1091, on September 29, not 21, as given in some of the translations of Humboldt's *Cosmos*, Schnurrer relates that there was a darkening of the sun which lasted three hours, and after which it had a peculiar colour which occasioned great alarm. In another place we read:

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"Fuit eclipsis Solis 11 Kal. Octob. fere tres horas: Sol circa meridiem dire nigrescebat": there was no visible eclipse at this time, and the November eclipse was central only in the southern parts of the earth. A century later, or in June, 1191, according to Schnurrer, the sun was again darkened, with certain attendant effects upon nature: here the cause is easily found; on June 23 there was a total eclipse, in which the moon's shadow traversed the continent of Europe from Holland to the Crimea; the eclipse was total in this country between the coasts of Cumberland and Yorkshire. Erman refers to a sun-darkening on February 12, 1106, which was accompanied by meteors, and we read in the cometographies that on the 4th, or, according to others, on the 5th, of February in this year a star was seen from the third to the ninth hour of the day, which was distant from the sun "only a foot and a half." Matthew Paris and Matthew of Westminster term this star a comet, and we may take it to have been the same which, later in the same month, was observed in China under the sign Pisces, and which at one time was supposed to have been identical with the great comet of 1680; this body, however, would not appear to have been sufficiently near the earth as, even on the assumption of a denser constitution than usual with comets, to account for a diminution of the solar rays, by its intervention. On the last day of February, 1206, according to a Spanish writer, there was complete darkness for six hours. In 1241, "five months after the Mongol battle of Leignitz," the sun was so obscured, and the darkness became so great, that the stars were seen at the ninth hour about Michaelmas. In this case, again, the darkness referred to was undoubtedly due to the total eclipse on October 6, of which Prof. Schiaparelli has collected a full account from the Italian writers. Lastly, in 1547, from April 23-25, Kepler relates on the authority of Gemma, "the sun appeared as though suffused with blood, and many stars were visible at noon-day." Schnurrer thought this phenomenon was what the Germans call an "Hohenrauch," notwithstanding the visibility of stars.

From the above brief summary of what have been considered abnormal sun-darkenings, we see that in several cases the diminution of light has been due to the ordinary effects of a total eclipse, while it is clear that there are no grounds in the historical evidence for any prediction of a period of darkness. The nervous in these matters, and it would really appear that such exist, may take consolation therefrom.

J. R. HIND

SCIENCE AND AGRICULTURE

BRITISH agriculture, in most of its aspects, will come into prominent notice next week. The great show at Kilburn, coming as it does just now at a time of great depression for farming at home, ought to teach us some useful lessons. It should tell us that the days of rule of thumb, the days in which we did as our fathers did are over. New means, new methods, new materials, new economies, new crops, must be associated with wider views of what the world wants and with more precise knowledge of what our little islands can best supply.

If we study soils, manures, crops, live stock, implements, the after-treatment of farm produce, or the instruction of agriculturists and of labourers—in every direction we shall learn how beneficial has been, and may still be,

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the influence of the scientific method upon the agricultural art.

Analysis of soils has not answered the questions put by its means exactly as we expected. But it has frequently shown us why, through excess or defect of some ingredient, certain lands were barren, and it has taught us how cheaply and thoroughly to remedy their sterility. Excess of decaying organic matter, of soluble salts, or the presence of ferrous salts, or of iron pyrites, these have been recognised amongst the curable ills of our soils. What is known as the *coagulation* of clay is now understood, so that we can often bring it about and thus render heavy lands workable at our will. The relations between the fungi inimical to our cultivated plants and the constituents of our soils being known we can now fight more hopefully against blight and mildew. What kind of exhaustion of soil is to be feared and how it can be remedied is now within our knowledge.

The development of the industry of artificial manures has been a very marked feature of the whole period of forty years during which our great Agricultural Society has been in existence. Farmyard manure has been relegated to its true place—no mean one, but one which has no longer the importance once attached to it. As 100 tons of ordinary dung and litter do not contain more than 1 ton (often less) of real manurial substance—potash, nitrogen, phosphorus pentoxide—one hundredweight of guano may frequently replace with advantage the usual dressing of farmyard manure applied to an acre. But while chemistry has searched out the constituents of manures, and recognised and determined the elements of fertility scattered in minerals and guano and waste products throughout the world, and shown how to bring all plant food into available forms, it has had also to carry on a perpetual warfare with the bands of adulterators, perfecting its methods of detecting the falsification of the materials which it has itself introduced; for manures are difficult to test by mere inspection, often being merely “dirts with a strong smell.”

The improvement of existing varieties of plants by artificial selection has been carried to great perfection in many instances—the sugar-beet and wheat being notable examples. The introduction and improvement of new plants, both for cattle food and for the sustenance of man, is a work in which much remains to be done. Especially should attention be directed to those crops upon which lesser, but in many cases more, remunerative industries than mere corn-growing may be founded. Plants yielding products useful in medicine, dyeing, and perfumery, should not be neglected. Some districts on the Continent, such as the neighbourhood of Florence, have been immensely benefited in every way by the introduction of minor crops with their attendant industries; similar successes may be repeated where skill and capital are available, climate and soil being of course taken into account.

Of improvement in the breeds of horses, cattle, sheep, and pigs, nowhere can be found better illustrations than in England: we shall soon see how much our neighbours and friends abroad have gained from our work in this direction. In agricultural machinery and implements the same statement may be made with still greater emphasis: it is indeed curious to note how in every text-book of

agriculture, in every farmer's journal, and rural advertisement published in France, Germany, Italy, and in most other countries both of the Old World and the New, the familiar names of Howard, and Fowler, and Cambridge, and Aveling, meet us on plough, and roller, and harrow, and engine. Perhaps in the after-treatment of some kinds of ordinary farm produce, we have been behind our Continental neighbours and American cousins, but we are beginning to appreciate better the aids that science can render to cheese and butter-making, and to the preparation of mill-products from wheat. The critical study of milk and dairy processes is securing the attention of dairy-farmers in England; while such an invention as Wegmann's porcelain cylinder for milling wheat has revolutionised the old grinding process already.

Of progress in the agricultural education either of farmers or farm-labourers, we have little to boast. Our solitary Agricultural College at Cirencester has been ever and anon paralysed by mismanagement; while its charges are too high, owing to the absence of any endowment, for its instruction to be accessible to the sons of ordinary farmers. Agricultural newspapers are neither as cheap nor always as instructive as they should be; the education in our elementary schools has hardly yet acquired that agricultural bias which in rural districts might be so advantageously given to it. Still the Science and Art Department has begun a good work by instituting its examination in the principles of agriculture, although its syllabus presupposes that the examinees will have been fed on far richer and more varied stores of learning than are yet at their disposal.

This Kilburn Show will then direct our attention to a multiform subject of the greatest national importance at the present crisis. We shall hope to learn much from the exhibits in the eight miles of shedding arranged in due order over more than 100 acres of ground, and to be rewarded with over 13,000*l.* in prizes.

THE ELECTRIC LIGHT

THE Committee of the House of Commons appointed to inquire into the value of the electric light has completed its labours and has issued its report. There is no doubt that the evidence given before it, when published, will be very useful, and that the report itself is a careful digest of the facts elicited, but it is questionable whether the results of the inquiry, or the conclusions of the Committee, will satisfy any one. Our readers will find in it nothing new. Gas engineers will find in it their extermination calmly contemplated. The gas manufacturer is told that he has nothing whatever to do with electricity. Gas, and nothing but gas, is his ware. Though he was incorporated to illuminate a city with the then best known illuminant, he is not to touch a newer illuminant because he will check the development of the fresh source of light, and his present mode of production is quite different to that required for the new commodity. It is as though a wine merchant who had a large sale of sherry were not allowed to sell beer, or a dairyman were not allowed to sell asses' milk because he only kept cows. The enunciation of such a proposition in a Parliamentary Report is sad. Worse than all, municipal