

away from him, and he sees light from the sky reflected from the smooth cuticle on their upper surface. Where the roller has travelled in a direction towards the observer the blades of grass are bent over towards him, so that he sees more of their under surface, which, besides being partially shaded, has not so highly reflecting a cuticle as the upper surface, hence these strips appear, in comparison with the first, darker and of a deeper green.

H. FRANKLIN PARSONS.

Croydon, February 1.

WITH reference to the letters by Messrs. Evershed and Fermor in *NATURE* of January 30, it may be of interest that an amusing description of the appearance of halos around shadows is given by Benvenuto Cellini in his autobiography (book i., chap. cxxviii.). After being released from a well-deserved term of imprisonment, he noticed a halo round the shadow of his head, and interpreted it as a mark of the especial favour of heaven. A rough translation of the passage is as follows:—"Also I must not leave unmentioned a thing, the greatest that has happened to any man, which I tell to the glory of God and of His mysteries, who condescended to make me worthy of it. From that time . . . there remained a splendour (wondrous thing!) on my head, which is evident to all sorts of men to whom I have shown it (who have been very few). This is seen over my shadow in the morning from sunrise until two hours later, and is seen much better when the grass has dew upon it; it is visible again at sunset. I became aware of it in France at Paris, because the air there is so much more free from mist that one sees it more markedly than in Italy, where mists are more frequent."

Doubtless the "pochissimi" to whom he showed it knew him too well to confess that they saw the halo around the shadows of their own heads, not his.

I have often noticed the appearance, especially on short turf, such as that of golf links, when the grass is wet with dew, but it may sometimes be seen on dry grass.

L. DONCASTER.

Museum of Zoology, Cambridge, February 1.

### Flowers in January.

SEVERAL interesting letters have recently appeared in these columns directing attention to the abnormal number of phanerogams in flower at the present time in Gloucestershire and other counties. In Somerset we have a similar increase in the number of plants flowering, as compared with the average January, and this month is not the only winter one in which such an increase has occurred. During the latter part of November I noticed more than eighty indigenous plants in flower, and many of these I considered to be survivals due to the retarding influence of the cold and wet summer followed by the cold and frosty nights of October. For the past two years the paucity of flowers in the early part of October has been particularly noticeable, but how different were the causes! In 1911 the flowering period had been accelerated by the large amount of sunshine, whilst in 1912 it was retarded or altogether eliminated owing to the lack of sunshine. In both years November was a happy month for flowers, in the first year the flowers being largely second blooms, in the last year retarded first blooms.

The acceleration of the life-cycle is also noticeable to a student of the lower forms of vegetation, some mosses, liverworts, and lichens showing a similar advance in the time of spore-production. For instance, amongst the mosses *Encalypta vulgaris* has

well-developed capsules, and amongst the liverworts *Lophocolea cuspidata* is already shedding its spores, these phases of the life-cycle being one to three months earlier than the normal time. No doubt, in the case of these and many other accelerated cryptogams, the wet weather is as potent a factor in the acceleration of the life-cycle as the mildness of the season.

W. WATSON.

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### The Current Winter.

A FEW years ago (in 1908) I expressed in your columns two views about the Greenwich winter, which both appear to gain further support from what is now happening. One is that after a very wet Rothesay summer, the Greenwich winter tends to be mild (*NATURE*, March 12, 1908, p. 438), the other that after an autumn at Greenwich with all three months dry, the Greenwich winter tends to be mild (*NATURE*, December 24, 1908, p. 221). We have both those antecedents in 1912—that is, the Rothesay summer was very wet, and the three months September–November at Greenwich were all dry—and the current winter may now be safely characterised as mild.

ALEX. B. MACDOWALL.

Torquay, January 25.

### MATERIAL FOR THE HISTORY OF MAN AND BEAST.<sup>1</sup>

IT is easy to understand why Weimar was chosen as the meeting-place of the German Anthropological Society in 1912. The surrounding country is rich in remains of man of the Pleistocene and prehistoric periods; the municipal museum contains the fauna and flora of celebrated palæolithic stations such as Taubach, Suessenborn and Ehringsdorf; in this museum, also, can be seen one of the best collections in Europe for illustrating the evolution of prehistoric culture.

The three memoirs reviewed here were prepared to give the members of the Anthropological Society a just conception of the prehistoric treasures preserved at Weimar, but it must not be supposed that they will serve only a passing purpose. Far from it; each memoir is a valuable contribution to the department of knowledge to which it belongs. Dr. Ludwig Pfeiffer, well known to the medical men of Europe as a physician, writes on the evolution of human handiwork from the Pliocene to the present, employing the collections in the Weimar Museum to illustrate his memoir. Dr. Soergel deals with the greater mammals which became extinct during the Pleistocene period. Dr. Moeller, curator of the Weimar Museum, gives an account of the systematic exploration of one of the most remarkable tumuli ever opened. The subject-matter of all three memoirs is thus illustrated by the contents of the Museum of Weimar; Dr. Soergel's paper covers the Pleistocene epoch; Dr. Möller's deals with

<sup>1</sup> Festschrift zur xliii. allgemeinen Versammlung der Deutschen Anthropologischen Gesellschaft, Weimar, 4 bis 8 August, 1912. Erstes Heft. Die steinzeitliche Technik und ihre Beziehungen zur Gegenwart. By Dr. Ludwig Pfeiffer. Pp. vii+340. Price 13 marks.

Zweites Heft. Das Aussterben diluvialer Säugetiere und die Jagd des diluvialen Menschen. By Dr. W. Soergel. Pp. iii+81+3 plates. Price 5 marks.

Drittes Heft. Der Derfflinger Hügel bei Kalbsrieth (Grossherzogtum Sachsen). By Armin Möller. Pp. ii+76+4 plates. Price 5.40 marks. (Jena: Gustav Fischer, 1912.)

mankind in central Germany in post-Pleistocene times; Dr. Pfeiffer's inquiry covers both periods.

The tumulus explored by Dr. Möller (he had great difficulty in obtaining permission to undertake the work) lies about twenty miles north of Weimar, on a slight elevation among the flat fields which border the Unstrut—a tributary of the Saale. Interments were discovered which date from the early part of the Neolithic period down to mediæval times—roughly speaking, from 3-4000 B.C. to 1000 A.D. A section of the tumulus—oval in shape and measuring 30 metres in its longest diameter—revealed within it a small tumulus, covering a single interment, of the early Neolithic period. On the southern margin of the smaller and older tumulus were three intrusive burials—in the contracted posture—also Neolithic in date. At the southern base of the tumulus, at a still later Neolithic date, there had been placed a cyst, or slab tomb, flanked with altar floors. The larger tumulus, which covers the older and smaller one, had been thrown up over a fourth interment, a cyst burial, covered with a cairn of stones, which is ascribed to the close of the Neolithic period.

These four burials of the Neolithic period were accompanied by such evidence that their sequence and date could be determined with a fair degree of accuracy. The Bronze period is represented by only one interment, the body having been entombed within a dug-out canoe. The pre-Christian period was represented by three urn-burials; the tomb of a warrior of the fifth or sixth century marked the Merovingian age; lastly, numerous graves of people buried in early Christian times (ninth and tenth centuries) occurred all over the large tumulus. Dr. Möller's attention was more particularly directed to the pottery and other accompanying evidences of civilisation, which gave him a clue to the dates of the various interments. The skeletal remains of the men, women, and children buried in the tumulus, often reduced to little more than dust, are only incidentally touched upon. It will be thus seen that, in expert hands, tumuli become the most valuable of prehistoric documents.

In Dr. Soergel's memoir a most useful contribution is made to the systematisation of our knowledge of the larger mammals which became extinct towards the end of the Pleistocene period. Every palæontologist has observed that the extinction of these great animals is coincident with the progress and distribution of human races in the Pleistocene period. Indeed, Dr. Steinmann (*Die geologischen Grundlagen der Abstammungslehre*, 1908) came to the conclusion that their extinction took place at the hands of man. Dr. Soergel does not agree with that view; he holds that the frequent changes of climate in the Pleistocene epoch led to a manifestation of a high degree of variability amongst certain of the mammalian genera, and that the forms which became most highly specialised—such as the Irish elk—in contradistinction to the less specialised form—*Cervus dama*—became extinct because of their highly specialised characters. An unprejudiced survey of the evidence inclines

the reviewer to regard Dr. Steinmann's conclusion as the nearer approximation to the truth.

Dr. Pfeiffer's memoir—by far the more important of the three—is an honest attempt to lay archæology, so far as it is concerned in investigating the evolution and history of human handicraft, on a firm foundation. His work is beautifully illustrated, and he has spared no pains to obtain evidence by experiment and by direct observation. The scope of his memoir will be best indicated by giving the titles of its seven chapters: i., the technique employed in fashioning stone implements during the periods of stone; ii., the physical conditions determining the various forms of technique employed; iii., various forms of fashioned stones; iv., the bone implements of the Stone periods; v., wood implements of the Stone periods; vi., the utilisation of the products of the chase; vii., the extinction of the industries of the Stone periods. Dr. Pfeiffer does not touch on the evidence of a high surgical technique amongst the people of the Neolithic period. The ancient skulls with clear signs on them of extensive operations and limb-bones with well-healed fractures show that there were daring and successful surgeons amongst the Europeans of the Neolithic period.

#### THE PASTEURISATION OF MILK.

IN a former article on "Tuberculosis and the Milk Supply" (*NATURE*, November 7, 1912, p. 281), reference was made to pasteurisation as one of the means suggested for the provision of a pure milk supply.

Pasteurisation, as applied to milk, is a process of somewhat indeterminate nature. It denotes the heating of milk to a temperature which may range between 140° F. and 165° F. in "bulk" pasteurisers, in which the milk remains, and is maintained at the temperature employed during the whole period of treatment—some 20-30 minutes—or up to 180° F. in "flash" pasteurisers, in which the milk flows continuously through the apparatus and the period of heating is a brief one. In both cases the milk is immediately run on to coolers. Either method fulfils more or less completely the objects for which pasteurisation is carried out, which are (1) to destroy pathogenic micro-organisms, such as tubercle, typhoid, and diphtheria, that may have gained access to the milk; (2) to reduce the bacterial content of the milk, and, as a consequence, (3) to enhance the keeping qualities of the milk, and to allow its distribution in a merchantable condition. The treatment undoubtedly effects these objects more or less efficiently, but it remains to consider in what manner the after-condition of the milk may be influenced thereby.

By heating milk above a temperature of 165° F. a more or less rapid destruction of the lactic-acid-producing organisms occurs, while the more resistant putrefactive forms largely survive the treatment, and it is owing to this change in the bacterial flora that danger arises should the milk subsequently be kept at temperatures favourable