of the summer half of the Celtic year, marking the victorious close of the sun's contest with the powers of darkness... when the crops were fast coming to maturity," and he suggests that the great festival held on the first of August "at Lyons (ancient *Lugduna*) superseded an older feast held on that day in honour of Lug, and was the Gallo-Roman continuation of the Celtic custom of old days." Gwyl Awst (the Yule of August) is the name by which this same August festival was known in ancient Wales.

He remarks that "the Lugnassad was, so to speak, the Summer Solstice of the Celts, whereas the longest day was then of no special account" (Rhys, Hibbert lectures).

Very interesting accounts of an August festival are given by Mr. Frazer ("Golden Bough") as celebrated by the Creek Indians and also by the Natchez tribe on the Lower Mississippi, when fires were lighted to destroy what was old before the ceremonial renewal of new fire took place by the priests by the friction of two pieces of wood, on the appearance of the first ray of the rising sun.

Among the special marks distinguishing the primitive ritual of heathendom from later customs, Mr. Frazer remarks that there were no temples, but that the celebrations took place by brooks, in woods, barns, harvest-fields, &c.

This interesting fair is clearly a survival from pre-Celtic days, but the interest in the place has unfortunately been much obscured by the alteration of the old name Tan to St. Anne's Hill on all modern maps.

It was a very common and well-known custom of the Church in late times to alter the name of a place to that of a saint, where, finding large gatherings assembled for religious ceremonies, their object was to substitute Christian for heathen ideas. *Caer Anna* in Brittany became St. Anne d'Auray, and Tan Hill became St. Anne's Hill. St. Anne's Day was not fixed for the whole Latin Church until 1584, when Gregory XIII. appointed the feast to be held on July 26 (August 6); the name of St. Anne does not occur in the older church calendars, and her cult is a very late one.

THEREZA STORY-MASKELYNE.

Carbon Dioxide in the Breath.

THE presence of 0.06 per cent. of carbon dioxide in the atmosphere is held, I believe, to render the air unfit for breathing purposes, whereas 0.03 per cent. may be taken as normal. A consideration of the quantity of this gas which must be continually present in the lungs makes such sensitiveness on their part to appear rather extraordinary.

Taking an average expiration as 300 c.c. and the reserve "air" in the lungs as 2000 c.c., and assuming that the atmosphere contains 0.03 per cent. of carbon dioxide and expired air 4 per cent. of carbon dioxide, we have the following figures (a homogeneous mixture in the lungs is imagined for simplicity):—

Just before expiration	Just after expiration	Just after inspiration	
2208	1920	2219.91	c.c. air
92	80	80.09	" CO ₂
2300	2000	2300	" in lungs.

Hence before the next expiration 11.91 c.c. of carbon dioxide must accumulate to make up the original 92 c.c., the corresponding oxygen being absorbed.

Now if conditions remain the same, excepting that the atmospheric carbon dioxide reaches 0.06 per cent., we have

Just before expiration	Just after expiration	Just after inspiration	
2208	1920	2219.82	c.c. air
92	80	80.18	" CO ₂
2300	2000	2300	" in lungs.

Before the next expiration 11.82 c.c. of carbon dioxide are required to make up the original 92 c.c.

Comparing these numbers, 11.91 and 11.82, we find that in the case of a person breathing at the rate of sixteen times a minute, only one more respiration would be re-

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quired every seven minutes to get rid of the extra carbon dioxide due to an increase of 0.03 per cent. in the atmosphere.

One is tempted to wonder, therefore, whether carbon dioxide *per se* in these small quantities can have any appreciable effect. Or, on the other hand, is it possible that this gas in the lungs is in some manner "vitalised," as questioned by Prof. Meldola some time ago (see *NATURE*, 1902, vol. lxxvi., p. 492), and that on reaching the outer world it is in a short time changed into the ordinary and more poisonous form?

F. SOUTHERDEN.

Royal Albert Memorial College, Exeter, April 25.

AMERICAN PALÆOBOTANY.¹

THESE two volumes form the second instalment, under the editorship and to some extent the authorship of Mr. Lester Ward, of a detailed report on the Mesozoic floras of the United States, the first part of which appeared in the twentieth annual report

FIG. 1.—Jurassic Ginkgo leaves from Oregon. (From "Status of the Mesozoic Floras of the United States.")

of the U.S. Geological Survey published in 1900. The second paper deals with Triassic, Jurassic, and Lower Cretaceous floras, and includes observations on the stratigraphical relations of the plant-bearing strata.

The excellent quality of the plates, many of which consist of photographic reproductions of specimens, is in welcome contrast to the unsatisfactory figures

¹ "Status of the Mesozoic Floras of the United States." Second Paper. By Lester F. Ward, with the collaboration of William M. Fontaine, Arthur Bibbins, and G. R. Wieland. Part i. Text. Part ii. Plates. Pp. 616; Plates i-cxix. Monographs of the U.S. Geological Survey, vol. xlviii. (Washington, 1905)

in some of the earlier monographs on American fossil floras. Under the head of Triassic floras an account is given of the results of an expedition into Arizona in 1901, which seems to have been more successful in discovering fossil vertebrates than the remains of vegetation. Reference is made to the "inexhaustible quantity of silicified wood," some specimens of which are included in the genus *Araucarites*, a type widely distributed in Mesozoic strata in many parts of the world. By far the most important part of the report is that by Mr. Fontaine, which deals with the rich Jurassic flora of Oregon. An inspection of the photographs and drawings reveals the interesting but not unexpected fact that the general facies of the vegetation exhibits a striking agreement with that which has been described from the Oolite rocks of East Yorkshire, Siberia, and other Old-world localities. A few species occur which appear to be identical with Wealden plants, while others are reminiscent of the older Rhætic floras. We welcome this exceedingly valuable addition to palæobotanical literature, but it is unfortunate that the author has

FIG. 2.—Unexpanded Frond of *Cycadella utopiensis*, Ward, showing the rachis with two rows of young pinnae and a mass of ramental scales. (From "Status of the Mesozoic Floras of the United States.")

not exercised more self-restraint in his use of recent generic names in cases where there is no proof of close relationship between the Jurassic and existing plants. Fragments of fern fronds are designated species of *Dicksonia* and *Thyrsopteris* on wholly insufficient grounds. So long as palæobotanists continue the practice of labelling fossil species with the names of recent genera merely because of superficial resemblances presented by vegetative organs, their lists of species cannot be accepted as trustworthy contributions towards a fuller knowledge of the plant-distribution of former ages. Ferns and Cycads are well represented, and the abundance and variety of leaves referred to the genus *Ginkgo*—that striking embodiment of the "past in the present"—constitutes a notable feature of the Oregon flora (Fig. 1). The volume also contains an account of Lower Cretaceous floras, together with much information on the plants of the older Potomac formation, and descriptions of additional specimens of silicified Cycadean stems from the Jurassic rocks of Wyoming and

the Potomac beds of Maryland. Mr. Wieland gives a particularly interesting figure of a young frond of a species of *Cycadella* in which the rachis is traversed by a U-shaped vascular band bearing a much closer resemblance to the meristele of a fern petiole than to the conducting strands in the rachis of a Cycad (Fig. 2). The notes which Mr. Wieland has already contributed on the morphology of Mesozoic Cycads have raised a keen desire for further information, and embolden us, who wait with envy and impatience, to urge him to publish with all speed an instalment of his promised monograph.

By the publication of these volumes Mr. Lester Ward has laid his fellow-workers in palæobotany under a further obligation. Although there are various matters of detail which we should venture to criticise if space permitted, there can be no doubt as to the value of this latest contribution from the veteran author and editor.

A. C. SEWARD.

RECREATIONS OF A NATURALIST.¹

THE "naturalist" on the present occasion is Mr. J. E. Harting, from whose pen we have welcomed during the past forty years (*cheu! fugaces*) many volumes on many aspects of sport and natural history. Among his recreations are outings on the moor, the hill, and into the quiet byways of the

FIG. 1.—A Kingfisher hovering. From "Recreations of a Naturalist."

country, with gun or rifle (in their proper season), or with neither with equal enjoyment to him, and, as frequently as fortune favoured, with what it is easy to see he perhaps loves best of all, "a cast of hawks." Another form of "recreation" has been—metaphorically speaking—"finding a hare in the library and hunting it through the preserves of ancient authors until the hunt had a happy termination, or the literary hare escaped to give sport another day."

No doubt the writing of the essays that describe these recreations formed a supplementary one, not improbably combined with "business" as an enhancement to the diversion; for most of the forty essays in the present volume have previously appeared elsewhere, chiefly in the columns of *The Field*. Mr. Harting's library hunts are fewer in number and less engaging than those pursued by him out of doors. Of these one here and there might, perhaps, have been omitted, as somewhat belated, such as the account of "Swan-upping," in which the information is eleven years old, while the "Horse and its Historians" is a review of a work published in 1888,

¹ "Recreations of a Naturalist." By James Edmund Harting, author of a "Handbook of British Birds," &c. With 81 illustrations. Pp. xvi+433. (London: T. Fisher Unwin, 1906.) Price 15s. net.