85th and 105th, and finally that between the 115th and 140th degrees. But the intensity of colour must vary inversely to the breadth of the stripes, and the three stripes left between the red ones be filled with a pretty vivid blue. This hemisphere placed upon a table with its southern pole pointing towards sunset will afford a tolerable portrait of the aspect of the sky as it appeared immediately after sunset, and continued unchanged for more than a quarter of an hour. The stripes were not visible near the horizon, but were very distinct at an altitude of about fifteen degrees, and almost disappeared about the zenith. No cloud was seen during the occurrence of the phenomenon.

These stripes were certainly parallel in reality, and their apparent divergence may be accounted for by perspective. The reddish stripes may owe their colour to sunlight reflected back from the particles scattered in the atmosphere. But why did the celestial vault show so distinct a blue colour in the intervening bands? Yet, probably, this phenomenon is more easily to be explained than the infinite variation of evening colourings that want a valid explanation to this day.

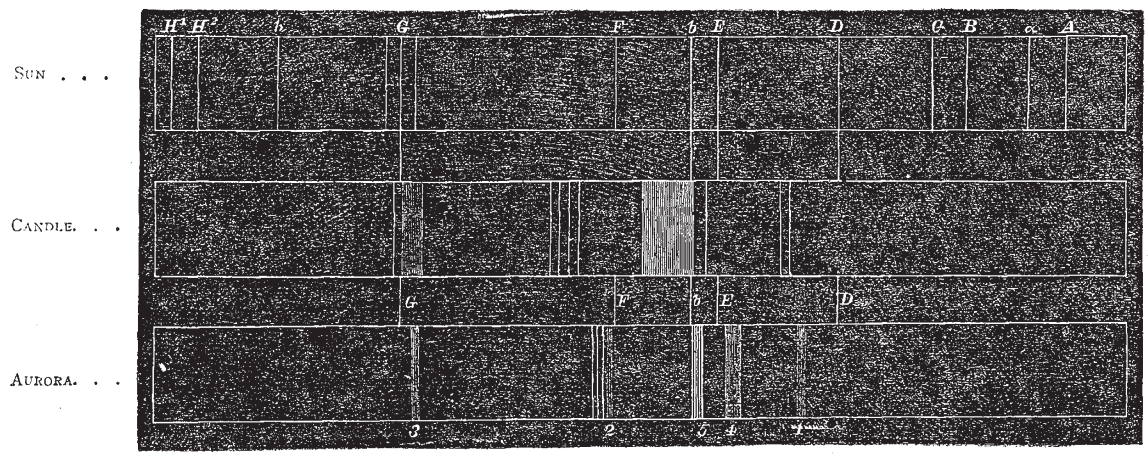
Magdeburg, August 19 A. SPRUNG

THE AURORA

THERE was a very fine display of aurora here on the night of the 21st. It commenced to be visible about 9.30 P.M., reached its maximum about 11, and faded suddenly away about 11.30. In appearance it was of a silvery white, without a trace of that rose colour which characterised the three great displays of last autumn. The main portion of the light was in the north-western quarter of the heavens, and it was sufficiently strong to see large print by. Extending from the north-west and reaching the north-eastern horizon arose three luminous arches concentric with each other, the 1st about 15° altitude, the 2nd about 25° altitude, and the 3rd about 40° altitude. These were connected by radial tongues of light which were ever changing their height. There was another marked and isolated nucleus about and around *a* Lyræ.

At about 10.45 P.M. there were most curious rays shot up from the arches in the north, and concentric with them These shooting arches, if I may call them so, had at the horizon an apparent angle of about 150° to 180°, but as they approached the nucleus in Lyra, they contracted and lost themselves in sheets of white light. On applying the spectroscope I found one bright line visible all over the heavens excepting on the south horizon for an altitude of about 25°. The spectrum obtained on the north-west gave five bright lines, of which I send a drawing.

From want of convenient measuring apparatus I had resource to the method of superposed spectra. The light I chose for comparison was that of a tallow candle, from which I got the bright lines of sodium and carburetted



COMPARISON SPECTRA OF SUN, AURORA, AND CANDLE

hydrogen. The instrument I used was one of Browning's direct vision spectroscopes—an instrument that gives the best results with the minimum amount of light. Of the bright lines, two were strong, one was medium, two were very faint. In the accompanying map I have put the solar spectrum at the top and carried the chief lines down for comparison. In putting numbers to the lines I have been directed by their degrees of intensity.

No. 1 is a sharp, well-formed line, visible with a very narrow slit.

No. 2. A line very slightly more refrangible than F. The side towards D is sharp and well-defined, while on the other side it is nebulous.

No. 3. Slightly less refrangible than G, is a broad ill-defined band only seen with a wide slit.

No. 4. A line near E, woolly at the edges, but rather sharp in the centre. This should be at or near the position of the line 1474 of the solar corona.

No. 5. A faint band coincident with *b*, extending equally on both sides of it.

The barometer stood at 29·574 in.; the thermometer at 61°·3. A gentle wind was blowing from the south-west, and the sky was free from clouds.

Observatory, Dun Echt, Aberdeen LINDSAY

FRUIT CLASSIFICATION *

DR. DICKSON referred to the confessedly unsatisfactory state of fruit-classification, and to the very unnecessary extent of the existing terminology, which is further complicated by a considerable amount of variance among botanists as to the precise application of several of the terms employed. He was of the opinion, which he believed to be a growing one among botanists, that the most convenient method of classification was, in the first place, rigorously to restrict the definition of a "fruit" to the mature or ripe pistil, excluding from that definition the modifications of accessory parts or organs, which, in many cases, are correlative therewith; and, secondly, to base the primary classification upon the general character of the modification undergone by the parts of the pistil in ripening, treating as of minor importance the characters involved in the description of the flower, such as the superior or inferior position of the ovary, &c.

The classification which Dr. Dickson suggests for the consideration of botanists approaches most nearly to that indicated by Schacht in his "Grundriss," of which, indeed, it may be viewed as a modification and expansion. Schacht grouped fruits under three heads— (1) Capsular fruits which dehisce to allow the seeds to escape; (2) splitting fruits or Schizocarps, which

* "Suggestions on Fruit Classification." By Alex. Dickson, M.D., Regius Professor of Botany in the University of Glasgow. Read before the British Association, 1871.

break into pieces which do not allow the escape of the seeds; and (3) fruits which neither dehisce nor fall into indehiscent pieces, including Berries, Drupes, and Achenes. As this last group is very heterogeneous, Dr. Dickson prefers to consider Berries, Drupes, and Achenes severally, as forms of equal value with Capsules or Schizocarps, and therefore would divide fruits into five groups, viz., "Capsules," "Schizocarps," "Achenes," "Berries," and "Drupes," as will be seen in the following table :—

I. Capsule.—Dry, dehiscing, to allow the seeds to escape.	Simple. (Probably the two forms included under this head should be embraced by a single term.)	1.	*Follicle.*—Dehiscing by one suture, usually the ventral: *e.g.*, Aquilegia, Caltha, Magnolia.
		2.	*Legume.*—Dehiscing by both sutures: *e.g.*, Cytisus, Vicia, &c.
	Compound.	3.	(Name wanted) Seeds escaping by longitudinal rupture of the wall of the capsule (dehiscence by valves, teeth, or pores): *e.g.*, Brassica, Viola, Rhododendron, Iris, Lychnis, Papaver, Campanula, &c.
		4.	*Pyxidium.*—Seeds escaping by transverse rupture of the wall of the capsule (dehiscence circumcissile): *e.g.*, from superior ovary, Anagallis, Plantago, Hyoscyamus, &c.; from inferior, Bertholletia, &c.
		5.	*Regma.*—Seeds escaping by rupture along the inner angles of the lobes into which the fruit separates: *e.g.*, Geranium, Euphorbia, &c.
II. Schizocarp.—Dry, breaking up into indehiscent pieces.	Breaking longitudinally into indehiscent cocci.	6.	*Carcerulus.*—Lobes not hanging from forked "Carpophore:" *e.g.*, Tropæolum, Borago, &c.
		7.	*Cremocarp.*—Lobes separating from below, and, for a time, hanging from extremities of forked "carpophore:" *e.g.*, (from superior ovary) Acer, and (from inferior ovary) *Umbelliferæ.*
	Breaking transversely into one-seeded joints.	8.	*Lomentum.*—*e.g.*, Ornithopus, &c.
	Breaking first longitudinally, then transversely	9.	(Name wanted) *e.g.*, Platystemon.
III. Achene.—Dry, indehiscent, not breaking up. (Probably the names applied to the different forms should be abolished and the term Achene applied to all.)	Superior.	10.	*Acheve* (in restricted sense.—Pericarp not adherent to seed: *e.g.*, Ranunculus, Rumex, Ulmus, Fraxinus, &c.
		11.	*Caryopsis.*—Pericarp adhering to seed: *e.g.*, Gramineæ, &c.
	Inferior.	12.	*Cypsela.*—Pericarp not much indurated: *e.g.*, *Compositæ*, *Valerianaceæ*, &c.
		13.	*Glans.*—Pericarp hard: *e.g.*, Quercus, Castanea, Fagus, Corylus, &c.
IV. Berry.—Seeds imbedded in pulp. As a rule indehiscent.	Outer portion of pericarp delicate (thin-skinned).	14.	*Uva*—Superior: *e.g.*, Vitis, Solanum, &c.
		15.	*Bacca* (in restricted sense).—Inferior: *e.g.*, Ribes, Vaccinium, &c.
	Outer portion of pericarp firm, leathery, or hard (thick-skinned).	16.	*Amphisarca.*—Superior: *e.g.*, Adansonia, Passiflora, &c. (Citrus should be included here.)
		17.	*Pepo*—Inferior: *e.g.*, Cucurbita, Cucumis, &c. (Punica should be included here.)
V. Drupe.—Endocarp distinctly defined & more or less indurated. Outer portion of pericarp of variable consistence—fleshy, leathery, or fibrous. As a rule, indehiscent.	One-stoned. (Probably the two forms included under this head should be embraced by a single term.)	18.	*Drupe* (in restricted sense).—Superior: *e.g.*, Prunus, Cocos, &c.
		19.	*Tryma*—Inferior: *e.g.*, Juglans, Viburnum, &c.
	Two or more stoned. (Probably the two forms included under this head should be embraced by a single term.)	20.	(Name wanted) Superior: *e.g.*, Ilex, Empetrum.
		21.	*Pome.*—Inferior: *e.g.*, Pyrus, Crataegus, Sambucus, &c.
	With one pluriocular stone.	22.	(Name wanted) *e.g.*, Cornus.

As the modifications undergone by the fruit in ripening stand in direct relation to the dispersion of the parts by which the plant is disseminated, probably the most philosophical method of classifying fruits would be according to the nature of the parts disseminated. To carry out this principle rigorously, however, would lead to practical difficulties, far outweighing any advantage gained. At the same time, it is evident that the foregoing classification satisfies, in a general way, the conditions of such a method; thus, in capsules and berries, the *seeds*, as a rule, are the ultimate parts disseminated; in Drupes, the *stones;* in Schizocarps, the *mericarps* or *joints*; and in Achenes, the *fruits as wholes*. As refractory exceptions, however, may be mentioned, those cases where the seed *minus* its testa is the part ultimately disseminated, for example, in *Oxalis*, where, on dehiscence of the capsule, the elastic testa becomes ruptured, violently expelling the body of the seed with the tegmen; or in the so-called drupaceous seeds (*e.g.* in *Punica*) which are doubtless devoured by birds, and, after digestion of the pulpy testa, the body of the seed with the hard tegmen is evacuated, and dissemination occurs. Or, again, in such a drupe as the apple, where the induration of the endocarp is slight, we have the fruit behaving as a berry, and dissemination taking place by means of the seeds.

Some botanists may perhaps be surprised to note the omission of the terms *siliqua* and *silicula*, so universally employed to designate the fruits of *cruciferæ*. A little reflection, however, is sufficient to make it evident that, if distinctions so trifling in character, as those which separate these fruits from other valvular capsules, were consistently carried out in practice, the terminology would become altogether intolerable. A similar argument may be adduced in favour of the suggestion made in the foregoing table, as to the propriety of devising some common term which will supersede those of *follicle* and *legume*.

NOTES

We are happy to say that the Eclipse Committee has been perfectly successful in its attempt to send a complete set of instruments to Australia; and a code of instructions is being drawn up in order to ensure similar observations being made at all stations.

It is now announced that the Swedish Government has abandoned the intention of establishing a colony in Spitzbergen for permanent scientific observation, mainly, it appears, in consequence of jealousies on the part of the Russian Government.

The autumn meetings of the Iron and Steel Institute were commenced at Dudley on Tuesday morning, under the presidency of Mr. Henry Bessemer. About 250 members of the Institute were present, and during the course of the proceedings, the secretary announced that forty-seven new members had been elected, amongst whom were the Earl of Dudley, and Sir Antonio Brady, of London. The President, in opening the meeting, described the locality in which it was assembled as one of the most interesting districts this country presented to the iron manufacturers—a district, indeed, in which they might say that the great iron industry took its rise; its very cradle and birthplace. Mr. H. Johnson, mining engineer, read a paper "On the Geological Features of the South Staffordshire Coalfield, in Special Reference to the Future Development of its Mineral Resources." The South Staffordshire coalfield, one of the oldest in Great Britain, he said, was remarkably rich in coal, ironstone, and limestone. The secretary then read a paper by Mr. John Giers, Middlesboro', "On the Ayresome Ironworks, Middlesboro', with Remarks upon the Alteration in the Size of Cleveland Furnaces during the last Ten Years." A paper was read by Mr. Thomas Whitwell, Thornaby Ironworks, Stockton, "On further Results from the Use of Hot Blast Fire, brick Stoves." Mr. T. W. Plum, Shifnal, Salop, read a paper "On the Advantages of increased Height of the Blast Furnaces in the Midland District." The last paper was read by Mr. J. Lowthian Bell, Newcastle, "On Mr. Ferries' Self-coking Furnace." A large party then proceeded by train to Tipton, where the ironworks between that town and Wolverhampton were visited, and a pleasant afternoon was spent in investigating the