November 25, 1880.

THE PRESIDENT in the Chair.

In pursuance of the Statutes, notice was given from the Chair of the ensuing Anniversary Meeting, and the list of Officers and Council nominated for election was read, as follows:—

President.—William Spottiswoode, M.A., D.C.L., LL.D.

Treasurer.—John Evans, D.C.L., LL.D.

Secretaries.— { Professor George Gabriel Stokes, M.A., D.C.L., LL.D.
Professor Thomas Henry Huxley, LL.D.

Foreign Secretary.—Professor Alexander William Williamson, Ph.D., LL.D.

Other Members of the Council.—William Henry Barlow, Pres. Inst. C.E.; Rev. Professor Thomas George Bonney, M.A., Sec. G.S.; George Busk, F.L.S.; Right Hon. Sir Richard Assheton Cross, G.C.B.; Edward Dunkin, V.P.R.A.S.; Alexander John Ellis, B.A.; Thomas Archer Hirst, Ph.D.; William Huggins, D.C.L., LL.D.; Professor John Marshall, F.R.C.S.; Professor Daniel Oliver, F.L.S.; Professor Alfred Newton, M.A., Pres. C.P.S.; Professor William Odling, M.B., V.P.C.S.; Henry Tibbats Stainton, F.G.S.; Sir James Paget, Bart., D.C.L.; William Henry Perkin, Sec. C.S.; Lieut.-Gen. Richard Strachey, R.E., C.S.I.

Mr. A. J. B. Beresford-Hope was admitted into the Society.

The Right Hon. Sir G. Jessel, Knt., whose certificate had been suspended as required by the Statutes, was balloted for and elected a Fellow of the Society.

The Presents received were laid on the table, and thanks ordered for them.

The following Papers were read:—

I. "On the Chemical Composition of Aleurone-Grains." By S. H. VINES, M.A., D.Sc., Fellow of Christ's College, Cambridge. Communicated by Dr. MICHAEL FOSTER, F.R.S., Prælector of Physiology in Trinity College, Cambridge. Received September 17, 1880.

The following is an account of further researches on this subject; abstracts of results have already been given in "Proc. Roy. Soc.," vol. 28, p. 218, and vol. 30, p. 387.

IV. *The Aleurone-Grains of the Sunflower* (Helianthus annuus).

a. Microscopical Observations.—The sections of the seeds were treated with ether or alcohol, to remove the oil.

The grains became vacuolated on treatment with water.

They dissolve completely in 10 per cent. NaCl solution.

If they have been previously treated with alcohol, they dissolve readily and completely in saturated NaCl solution; but if they have been previously treated with ether they only become vacuolated.

b. Chemical Observations.—The seeds were ground in a hand-mill, and treated with alcohol or ether to remove the oil.

The watery extract of the seeds gives no precipitate on boiling. On concentrating the fluid, and then allowing it to filter into alcohol, a dense precipitate is formed. This substance is readily soluble in distilled water, and its solution gives the xanthoproteic and Millon's reactions, a rose colour with KHO and $CuSO_4$, a precipitate on the addition of HNO_3, and an immediate precipitate on the addition of potassic ferrocyanide after acidification with acetic acid.

The 10 per cent. NaCl extract gives a precipitate on boiling, and on saturation with NaCl.

The saturated NaCl extract gives, when the seeds have previously been treated with alcohol, a dense precipitate on boiling, and on dilution; if the seeds have been previously treated with ether, the amount of the precipitate is much less; boiling produces little more than a turbidity.

These observations, taken together, show that these grains contain: (1) a substance (vegetable peptone or hemialbumose) which is soluble in water; (2) a substance which is soluble in 10 per cent. NaCl solution, precipitable from its solution by saturation with NaCl, and which therefore belongs to the group of myosin-globulins; (3) a substance which is soluble in saturated NaCl solution, whether the grains have been treated with alcohol or ether, and which therefore belongs to the group of the vitellin-globulins; and (4) a substance which, like the crystalloids of Ricinus described in a previous communication, is soluble in saturated NaCl solution only after previous treatment with alcohol.

V. *The Aleurone-Grains of the Brazil-Nut* (Bertholletia excelsa).

a. Microscopical Observations.—Like those of Ricinus, the grains of this plant present no indication of a complex structure when mounted in alcohol; on the addition of water they become transparent, and the crystalloid, as well as the curiously irregular globoid, can be seen.

On treatment with 10 per cent. NaCl solution, the whole grain (excepting, of course, the globoid) dissolves.

Treatment with saturated NaCl solution produces the same result,

and it is not affected by previous treatment of the grains with ether or alcohol.

b. Chemical Observations.—The seeds were crushed in a mortar, and then treated with either alcohol or ether to remove the oil.

The watery extract of the seeds gives a slight precipitate on boiling; the filtrate gives no precipitate on boiling; it gives the reactions of a fluid holding peptones in solution; it also gives a precipitate with HNO_3.

The 10 per cent. NaCl extract gives a dense precipitate on boiling, as well as on dilution, and on saturation with NaCl.

The saturated NaCl extract gives a dense precipitate on boiling and on dilution.

From these observations it appears that these grains consist of vegetable peptone and of globulins, the one belonging to the myosin, the other to the vitellin group.

Weyl has shown ("Zeitschr. f. Physiol. Chem.," Bd. I, 1877) that the crystalloids of these grains consist of pure vitellin; hence the peptone and the myosin must be contained in the ground-substance of the grains.

General Remarks.

The investigation of the aleurone-grains of a number of different species of plants has shown that, with a few exceptions mentioned below, they may be classified under the five types which have been described in this and previous communications. I find, contrary to the opinion of Pfeffer ("Jahrb. f. wiss. Bot." viii, 1872), that all the aleurone-grains which I have examined are soluble to some extent at least in water; they are also all soluble to some extent in 10 per cent. NaCl solution. In the cases which have been described in detail, the grains were found to be completely soluble in this solution, but in others I found that the grains were only partially soluble in it, residue dissolving either in 1 per cent. Na_2CO_3 solution, or in dilute KHO, and therefore consisting of some form of albuminate, which may be regarded as altered globulin.

The proteid substances detected in the grains may be classified as follows:—

I. *Soluble in distilled water:*—
Vegetable peptone (hemialbumose ?).

II. *Insoluble in distilled water:*—
a. Soluble in 10 per cent. NaCl solution. Globulins.
(α.) *Insoluble in saturated* NaCl *solution*,—
Vegetable myosin.
(β.) *Soluble in saturated* NaCl *solution, after treatment with alcohol*,—
Substance of crystalloids of Ricinus, &c.

(γ.) *Soluble in saturated* NaCl *solution after ether or alcohol,*—Vegetable vitellin.

b. Insoluble in 10 per cent. NaCl solution. Albuminates.

(α.) *Soluble in* 1 *per cent.* Na_2CO_3 *solution.*

(β.) *Soluble in dilute* KHO.

I have placed by itself the peculiar proteid which constitutes the crystalloids of Ricinus, and which occurs in the grains of Helianthus, for, although, as I have previously pointed out, it resembles myosin in its properties before treatment with alcohol and vitellin after it, it differs from both these substances in that it is less readily soluble in 10 per cent. NaCl solution.

The following is an arrangement of the species examined according to the solubility of the grains. It must be borne in mind, however, that the observations upon which this arrangement depends are, for the most part, simply microscopical, but the close agreement between the results of microchemical and macrochemical methods in the cases which have been given at length justifies an inference as to the probable composition of a grain from the results of one method only.

Classification of Aleurone-Grains (*Microchemical*).

I. *Soluble in water*:—

Pæonia officinalis (type). Ranunculus acris. Aconitum Napellus. Anemone Pulsatilla. Nigella damascena. Helleborus fœtidus. Amygdalus communis. Prunus cerasus. Pyrus malus. Cynara Scolymus. Scorzonera hispanica. Leontodon Taraxacum. Dipsacus Fullonum. Ipomœa purpurea. Phlox Drummondi. Fœniculum officinale. Impatiens glandulifera. Vitis vinifera.

II. *Completely, and more or less readily, soluble in* 10 *per cent.* NaCl *solution.*

a. Grains without crystalloids.

(α.) *Soluble in saturated* NaCl *solution after treatment with alcohol or ether*:—

Lupinus hirsutus (type). Vicia Faba. Pisum sativum. Phaseolus multiflorus. Allium Cepa. Iris pumila (*var.* atrocœrulea). Colchicum autumnale. Berberis vulgaris. Althæa rosea. Tropæolum majus. Mercurialis annua. Empetrum nigrum. Primula officinalis.

(β.) *Soluble in saturated* NaCl *solution after alcohol, but not after ether*:—

Helianthus annuus (type). Platycodon (Wahlenbergia) grandiflora. Erodium gruinum. Sabal Adansoni. Delphinium car-

diopetalum. Trollius europæa. Actea spicata. Caltha palustris. Aquilegia vulgaris. Campanula rotundifolia. Dianthus Caryophyllus. Brassica rapa. Lepidium sativum. Medicago sativa, Cedrus Deodara. Larix europæa. Ephedra altissima. Cynoglossum officinale. Spinacia oleracea.

b. Grains with crystalloids.

(*α*.) *Crystalloids soluble in saturated* NaCl *solution after treatment with alcohol or ether* :—

Bertholletia excelsa (type). Adonis autumnalis. Æthusa Cynapium. Digitalis purpurea. Cucurbita Pepo.

(*β*.) *Crystalloids soluble in saturated* NaCl *solution after alcohol, but not after ether* :—

Ricinus communis (type). Datura Stramonium. Atropa Belladonna. Elaïs guineensis. Salvia officinalis. Taxus baccata. Pinus Pinea. Cannabis sativa. Linum usitatissimum. Viola elatior. Ruta graveolens. Juglans regia.

III. *Partially soluble in* 10 *per cent.* NaCl *solution.*

a. Entirely soluble in 1 per cent. Na_2CO_3 solution :—

Pulmonaria mollis. Omphalodes longiflora. Borago caucasica. Myosotis palustris. Clarkia pulchella.

b. Entirely soluble in dilute KHO.

(*α*.) *Grains without crystalloids* :—

Anchusa officinalis. Lithospermum officinale. Echium vulgare. Heliotropium peruvianum. Lythrum Salicaria.

(*β*.) *Grains with crystalloids* :—

Cupressus Lawsoniana. Juniperus communis. Euphorbia Lathyris.

II. "On the Ossification of the Terminal Phalanges of the Digits." By F. A. Dixey, B.A. Oxon. Communicated by E. A. Schafer, F.R.S. Received October 5, 1880.

[Plates 1, 2.]

From the Physiological Laboratory of University College, London.

In a preliminary note on the ossification of the terminal phalanges of the digits,* it was stated that the diaphyses of the ungual phalanges differed in their mode of ossification from those of other long bones. The object of the present paper is to give an account of the process of

* *Ante*, vol. 30, p. 550.