the Society, is understood to have recommenced its hourly observations, and stands only in need of an apparatus for the vertical force (which might be readily supplied from this country), to contribute its full complement to the required data. More than half the stations may therefore be regarded as already provided for, and there are other Russian observatories in the desired latitudes and longitudes which might be completed with instruments for a full participation.

It would be wrong to conclude these imperfect notices without recognizing how greatly the researches have been aided in their progress by the united and unfailing countenance and support of the Royal Society and of the British Association. The Kew Observatory owes its existence and maintenance to funds most liberally supplied from year to year by the British Association; and the cost of the self-recording magnetic instruments, of which the first instalment of the results has formed the early part of this paper, was supplied from funds at the disposal of the Council of the Royal Society. Magnetical science, rapidly as it is advancing, is even yet in its infancy; and it is in their early stages particularly that all branches of natural knowledge stand in need of the fostering aid of societies in which science is valued and cultivated for its own sake.

*November* 22, 1860.

Major-General SABINE, R.A., Treasurer and Vice-President, in the Chair.

John Thomas Quekett, Esq., was admitted into the Society.

In accordance with the Statutes, notice was given of the ensuing Anniversary Meeting, and the list of Council and Officers proposed for election was read as follows:—

*President.*—Sir Benjamin Collins Brodie, Bart., D.C.L.

*Treasurer.*—Major-General Edward Sabine, R.A., D.C.L.

*Secretaries.*— { William Sharpey, M.D., LL.D.
George Gabriel Stokes, Esq., M.A., D.C.L.

*Foreign Secretary.*—William Hallows Miller, Esq., M.A.

*Other Members of the Council.*—John Couch Adams, Esq.; Sir

John Peter Boileau, Bart.; Arthur Cayley, Esq.; William Fairbairn, LL.D.; Hugh Falconer, M.D.; William Farr, M.D., D.C.L.; Thomas Graham, Esq., M.A., D.C.L.; Sir H. Holland, Bart., M.D., D.C.L.; Thomas Henry Huxley, Esq.; Sir J. G. Shaw Lefevre, M.A., D.C.L.; James Paget, Esq.; Joseph Prestwich, Esq.; William Spottiswoode, Esq., M.A.; John Tyndall, Ph.D.; Alex. William Williamson, Ph.D.; Col. Philip Yorke.

The following communications were read:—

I. "On Boric Ethide." By Edward Frankland, Ph.D., F.R.S., and B. Duppa, Esq. (See p. 568.)

II. "On Cyanide of Ethylene and Succinic Acid."—Preliminary Notice. By Maxwell Simpson, Ph.D. (See p. 574.)

III. "Results of Researches on the Electric Function of the Torpedo." By Professor Carlo Matteucci of Pisa. In a Letter to Dr. Sharpey, Sec. R.S. (See p. 576.)

IV. "Natural History of the Purple of the Ancients." By M. Lacaze Duthiers, Professor of Zoology in the Faculty of Sciences of Lille. (See p. 579.)

V. "Contributions towards the History of Azobenzol and Benzidine." By P. W. Hofmann, Ph.D. (See p. 585.)

VI. "On Bromphenylamine and Chlorphenylamine." By E. T. Mills, Esq. (See p. 589.)

VII. "New Compounds produced by the substitution of Nitrogen for Hydrogen." By P. Griess, Esq. (See p. 591.)

VIII. "Contributions towards the History of the Monamines."—No. III. Compound Ammonias by Inverse Substitution. By A. W. Hofmann, LL.D., F.R.S. &c. (See p. 594.)

IX. "Notes of Researches on the Poly-Ammonias."—No. IX. Remarks on *anomalous* Vapour-densities. By A. W. Hofmann, LL.D., F.R.S. &c. (See p. 596.)

X. "Notes of Researches on the Poly-Ammonias."—No. X.

(Abstract.)

The arrangement observed in the divisions and subdivisions of the bronchial tube is that of a panicle. There is everywhere to be distinguished a straight diminishing tube, from which lesser tubes are given off alternately from its sides; these lesser tubes in their turn observe a similar plan of distribution, and the smaller tubes, down to their ultimate terminations, are governed by the same system. There is nowhere to be found either a true dichotomous or a trichotomous division.

The distinction between that part which is bronchial tube and that which is parenchyma, is, in a properly injected lung, marked and very decisive, and can never be mistaken by even the most inex-

perienced person, when a fragment, however small, is examined by the microscope.

When the bronchial tubes have reached their penultimate terminations, the coats which form their perimeters split, as it were, into two layers. The outer of these, which is tougher, thicker, and more fibrous, expands and encloses an ultimate portion of the parenchyma. To these portions of the lung the name of 'leaflets' is given in this treatise. The outer coat of the bronchial tube, by being spread out in the leaflets, becomes continuous with the general parenchyma of the lungs. The inner portion of the tube immediately divides into numerous minute tubes, to which the name of 'pedicels' is now given.

Each of the pedicels goes to a different leaflet, but each leaflet receives several pedicels from different terminal bronchial tubes.

A minute anastomosis is thereby established between the terminations of the different bronchial tubes, through the leaflets. On entering the leaflet, each pedicel splits up into processes which extend to the internal perimeter of the leaflet, and by intersections with similar processes derived from the other pedicels, divide the interior into compartments called 'air-cells.'

Each leaflet is, to a considerable extent, divided from those which surround it by sulci, but it is continuous in structure with them by certain parts of its base, in which it is in contact with them and adherent.

On the surface of the lungs these leaflets give the appearance of bodies of a somewhat quadrilateral shape.

The interior of all the bronchial tubes is marked with 'rugæ,' and these rugæ show the direction of the bundles of longitudinal contractile fibres, which are placed immediately beneath the mucous membrane. These longitudinal fibres are surrounded by circular ones, and it is by the contraction of these latter that the rugæ are formed. When the bronchial tubes have been kept distended, the rugæ are not present; the mucous membrane is then perfectly smooth.

There are no such things as 'alveoli' belonging to the tube.

The bronchial artery supplies the following structures:—

I. The successive layers of cellular tissue, the lymphatic glands, coats of the pulmonary vessels, neurilemma, &c.

II. The fibro-cartilaginous and fibrous portion of the bronchial tubes; some exceedingly minute capillaries, derived from these, ex-

tend into the mucous membrane, but do not in any way anastomose with the proper vascular plexus belonging to this structure.

III. The bronchial artery also freely supplies the walls and processes of the leaflets with arterial blood.

IV. Some small branches arrive at the surface of the lungs, being conducted thither by some minute bronchial tubes, which communicate with longitudinal air-passages to be found in the substance of the pleura. These small arteries anastomose freely with other branches of the same artery in the sub-pleural cellular tissue.

The bronchial artery forms no sort of anastomosis with the pulmonary system in any part of the lungs, and is quite incapable of discharging the function of the latter under any circumstances whatever.

The bronchial *veins* are of two sorts: one forms a very free system of inosculation on the surface of the lungs, the other is always discoverable (in the recent lung) in the loose cellular tissue surrounding the bronchial tubes: they both have *valves*, and consequently cannot be injected in a retrograde direction, but they can both be injected from the bronchial artery. Neither of them can be injected under any circumstances from the pulmonary system. They both have large intercommunicating trunks.

The pulmonary artery accompanies the bronchial tube, dividing precisely as it divides; wherever there is a bronchial tube, however small, there is likewise a corresponding pulmonary artery, and never more than one. It gives off no branches to any collateral structure, and it forms no inosculations either with its own branches or with any other vessels; every portion of it ultimately reaches the leaflets, and there it makes a most minute, uniform and equal reticulation, anastomosing throughout the lung.

The pulmonary *vein* commences by *tufts* in the interior of the leaflets; part of the capillary vessels emerges on to the surface of the leaflet, and commences the formation of minute veins, which immediately dip down through the sulci which divide the leaflets, to reach the interlobular surfaces, where they increase in size, and ultimately come into contact with the under surface of a bronchial tube: the other part of the capillary vessels makes its way from the interior of the leaflet by means of the pedicel, and reaches the mucous membrane, where a most abundant, minute, and exceedingly regular plexus is formed, occupying the whole surface of the mucous membrane.

This plexus in the larger tubes is reinforced by blood-vessels derived from numerous leaflets which surround the bronchial tubes; straight vessels penetrate from these leaflets through the walls of the bronchial tubes, to reach the plexus in the mucous membrane.

On the external surface of the bronchial tubes, numerous radiating vessels collect the blood from the plexus in the mucous membrane, and the trunks of these radiating vessels soon terminate in the veins, already described as coming into contact with the under surface of the bronchial tube.

The vessels which have been alluded to as receiving their tributaries in the interlobular surfaces, collect their blood from all the surrounding lobules; consequently the blood which reaches the vein placed in contact with a particular bronchial tube, is not derived exclusively from the same lobules as those with which that bronchial tube and its accompanying artery are in connexion, but it receives its blood from all parts of the lungs promiscuously.

The pulmonary veins accompanying the bronchial tubes continue to increase in size in proportion as the tubes themselves increase, and finally they terminate in the large veins which enter the left auricle.

XVII. "On the Curvature of the Indian Arc." By the Venerable J. H. Pratt, Archdeacon of Calcutta. Communicated by Prof. Stokes, Sec. R.S. Received Sept. 3, 1860.

(Abstract.)

This communication completes the series of the author's papers on the subject of the Indian Arc. He commences by recapitulating the chief results of his former calculations, and adverting to the attempt which he made in his former papers to explain the difficulty which those calculations brought to light, namely, that the amplitudes of the arcs from Kaliana to Kalianpur and from Kalianpur to Damargida, determined geodetically, were so little in excess as they proved to be of the same amplitudes determined astronomically,—a difficulty which he endeavoured to get over by attributing to the Indian Arc a curvature different from that corresponding to the mean meridian of the earth. In the present communication, introducing the condition that the length of the chord of the arc must be the same in both the ellipses, the local and the mean, drawn through the