whereas in *Holcus biaristatus* the lowermost floret has a long dorsal awn, and the uppermost floret has a long straight rough awn.

An unusual variety of *Holcus mollis* was at the same time exhibited, differing only in the spikelets being much smaller and the panicle more compact (see Plate II.). Dr Parnell concluded the paper by making a few remarks on some of the more closely allied species of grasses. Fig. 1, spikelet; fig. 2, florets; fig. 3, glumes.

2. On the Ultimate Secreting Structure of Animals. By John Goodsir, Esq. Communicated by Professor Syme.

After referring to the labours of those anatomists who had verified Malpighi's doctrine of the follicular nature of gland ducts, the author alluded to Purkinje's hypothesis of the secreting function of the nucleated corpuscles of these organs. In a rapid sketch of the results of inquiries since the appearance of Müller's work "*De Penitiore Structura Glandularum*," and more particularly of the observations of Henle and others on the closed vesicles which are situated at the extremities of certain ducts, Mr Goodsir stated, that no anatomist had hitherto "proved that secretion takes place within the primitive nucleated cell itself, or had pointed out the intimate nature of the changes which go on in a secreting organ during the performance of its function."

Numerous examples were now given of secretions detected in the cavities of nucleated cells of various glands and secreting surfaces. Among these secretions were the ink of the Cephalopoda, and the purple of *Janthina* and *Aplysia*, bile in an extensive series of animals, urine in the mollusk, milk, &c.

The wall is believed by the author to be the part of the cell engaged in the process of secretion. The cavity contains the secreted substance, and the nucleus is the reproductive organ of the cell. A primitive cell engaged in secretion is denominated by the author a primary secreting cell; and each cell of this kind is endowed with its own peculiar property according to the organ in which it is situated. The discovery of the secreting agency of the primitive cell does not remove the principal mystery in which the function has always been involved; but the general fact that the primitive cell is the ultimate secreting structure is of great value in physiology, inasmuch as it connects secretion with growth as phenomena regulated by the same laws; and explains one of the greatest difficulties in the

science, viz., why a secretion flows from a free surface only of a secreting membrane,—*the secretion exists only on the free surface enclosed in the ripe cells which constitute that surface.*

The author then proceeded to the consideration of the origin, the development, and the disappearance of the primary secreting cell—a subject which necessarily involved the description of the various minute arrangements of glands and other secreting organs. After describing the changes which occur in the testicle of *Squalus cornubicus* when the organ is in a state of functional activity, and in the liver of *Carcinus mænas*, it was stated that these were selected as examples of two orders of glands denominated by the author vesicular and follicular.

The changes which occur in the first order consist in the formation and disappearance of closed vesicles or acini.

Each acinus might be, first, a single cell, denominated by the author the primary or *germinal* cell; or, secondly, of two or more cells enclosed in the primary cell, and produced from its nucleus.

The enclosed cells he denominates the secondary cells of the acinus, and in the cavities of these, between their nuclei and cell-walls, the peculiar secretion of the gland is contained. The primary cell with its included group of cells, each full of secretion, is appended to the extremity or side of one of the terminal ducts, and consequently does not communicate with that duct, a diaphragm formed by a portion of the primary cell-wall stretching across the pedicle. When the secretion in the group of included cells is fully elaborated, the diaphragm dissolves or gives way, the cells burst, and the secretion flows along the ducts, the acinus disappearing and making room for a neighbouring acinus, which has in the mean time been advancing in a similar manner. The whole parenchyma of glands of this order is thus, according to these observations, in a constant state of change,—of development, maturity, and atrophy,—this series of changes being directly proportional to the profuseness of the secretion.

In the second order of glands, the follicular, as exemplified in the liver of *Carcinus mænas*, the germinal cell or spot, is situated at the blind extremity of the follicle, and the secreting cells, as they advance along the follicle, become distended with their peculiar secretion.

Among other general conclusions deducible from these observations, it appeared that ducts are to be considered as intercellular passages, into which the secretions formed by cells are cast.

Finally, the author inferred from the whole inquiry, 1. That secretion is a function of the nucleated cell, and takes place within it ; and, 2. That growth and secretion are identical—the same process under different circumstances.

The following gentlemen were duly elected Ordinary Fellows of the Society :—James Millar, Esq. F.R.C. Surg. ; Sir James Forrest, Bart. Lord Provost of Edinburgh ; James Stark, M.D., F.R.C. Phys. ; John Adie, Esq. Optician.

Monday, 4th April 1842.

Sir T. M. BRISBANE, Bart., President, in the Chair.

1. On the Theoretical Investigation of the Absolute Intensity of Interfering Light. By Professor Kelland.

This Memoir is the prosecution of a subject on which the author had previously touched in a paper which is printed in the seventh volume of the Transactions of the Cambridge Philosophical Society. It has for its object the investigation of the quantity of light which is received on a screen of unlimited dimensions, after passing through a certain aperture, or suffering reflexion at two mirrors. The end for which the investigation is undertaken is to ascertain the *constant* which must be introduced in using Huygens's principle. From the fact, that each vibration at the aperture is multiplied by an area, on finding the effect on the screen, it is evidently requisite that a divisor of two dimensions is required to render the vibration at a point on the screen, similarly expressed with that at the aperture. According to the author's investigation, it appears that the divisor is the product of the length of a wave, and the perpendicular distance between the screen and the aperture. Hence, in reference to such questions, the enunciation of Huygens's principle is as follows :—

The vibration, at a given point, caused by a given wave, is found by taking the front of the wave, dividing it into an indefinite number of small parts, considering the agitation of each of these parts as the origin of a wave whose maximum of vibration, on reaching the point, is equal to the quotient of that at the disturbing point, divided by the product of the length of the wave, and the perpendicular from the disturbed point on the front of the wave.