GLOSSARY

[Obsolete terms are enclosed in brackets. The name and date refer to the first use of the word; subsequent changes of meaning are indicated in the definition.]

Achro'matin (see **Chromatin**), the non-staining substance of the nucleus, as opposed to chromatin; comprising the ground-substance and the linin-network. (FLEMMING, 1879.)

A'crosome (ἄκρον, apex, σῶμα, body), the apical body situated at the anterior end of head of spermatozoön. (LENHOSSÉK, 1897.)

[**Akaryo'ta**] (see **Karyota**), non-nucleated cells. (FLEMMING, 1882.)

Ale'cithal (ἀ-priv.; λέκιθος, the yolk of an egg), having little or no yolk (applied to eggs). (BALFOUR, 1880.)

Alloplasma'tic (ἄλλος, different). Applied to active substances formed by differentiation from the protoplasm proper, *e.g.* the substance of cilia, of nerve-fibrillæ, and of muscle-fibrillæ. Alloplasmatic organs are opposed to "protoplasmatic," which arise only by division of preëxisting bodies of the same kind. (A. MEYER, 1896.)

Amito'sis (see **Mitosis**), direct or amitotic nuclear division; mass-division of the nuclear substance without the formation of chromosomes and amphiaster. (FLEMMING, 1882.)

Am'phiaster (ἀμφί, on both sides; ἀστήρ, a star), the achromatic figure formed in mitotic cell-division, consisting of two asters connected by a spindle. (FOL, 1877.)

Amphipy'renin (see **Pyrenin**), the substance of the nuclear membrane. (SCHWARZ, 1887.)

Amy'loplasts (ἄμυλον, starch; πλαστός, πλάσσειν, form), the colourless starch-forming plastids of plant-cells. (ERRERA, 1882.)

An'aphase (ἀνά, back or again), the later period of mitosis during the divergence of the daughter-chromosomes. (STRASBURGER, 1884.)

Aniso'tropy (see **Isotropy**), having a predetermined axis or axes (as applied to the egg). (PFLÜGER, 1883.)

Antherozo'id, the same as **Spermatozoïd**.

Anti'podal cone, the cone of astral rays opposite to the spindle-fibres. (VAN BENEDEN, 1883.)

Archiam'phiaster (ἀρχι = first, + amphiaster), the amphiaster by which the first or second polar body is formed. (WHITMAN, 1878.)

Ar'choplasma or **Archoplasm** (ἄρχων, a ruler) (sometimes written *archiplasm*), the substance from which the attraction-sphere, the astral rays, and the spindle-fibres are developed, and of which they consist. (BOVERI, 1888.)

Arrhe'noid (ἄρρην, male). The sperm-aster or attraction-sphere formed during the fertilization of the ovum. (HENKING, 1890.)

As'ter (ἀστήρ, a star). 1. The star-shaped structure surrounding the centrosome. (FOL, 1877.) [2. The star-shaped group of chromosomes during mitosis (see **Karyaster**). (FLEMMING, 1892.)]

[**As'trocœle**] (ἀστήρ, a star; κοῖλος, hollow), a term somewhat vaguely applied to the space in which the centrosome lies. (FOL, 1891.)

As'trosphere (see **Centrosphere**). 1. The central mass of the aster, exclusive of the rays, in which the centrosome lies. Equivalent to the "attraction-sphere" of Van Beneden. (FOL, 1891; STRASBURGER, 1892.) 2. The entire aster exclusive of the centrosome. Equivalent to the "astral sphere" of Mark. (BOVERI, 1895.)

Attraction-sphere (see **Centrosphere**), the central mass of the aster from which the rays proceed. Also the mass of "archoplasm," derived from the aster, by which the centrosome is surrounded in the resting cell. (VAN BENEDEN, 1883.)

[**Au'toblast**] (*αὐτός*, self), applied by Altmann to bacteria and other minute organisms, conceived as independent solitary "bioblasts." (1890.)

Axial filament, the central filament, probably contractile, of the spermatozoön-flagellum. (EIMER, 1874.)

Basichro'matin (see **Chromatin**), the same as chromatin in the usual sense. That portion of the nuclear network stained by basic tar-colours. (HEIDENHAIN, 1894.)

Bi'oblast (*βίος*, life; *βλαστός*, a germ), a term applied by Altmann to the hypothetical ultimate vital unit (equivalent to *plasome*), and identified by him as the "granulum."

Bi'ogen (*βίος*, life; *-γενής*, producing), equivalent to *plasome*, etc. (VERWORN, 1895.)

Bi'ophores (*βίος*, life; *-φόρος*, bearing), the ultimate supra-molecular vital units. Equivalent to the *pangens* of De Vries, the *plasomes* of Wiesner, etc. (WEISMANN, 1893.)

Bi'oplasm (*βίος*, *πλάσμα*). The active "living, forming germinal material," as opposed to "formed material." Nearly equivalent to protoplasm in the wider sense. (BEALE, 1870.)

Bi'oplast, equivalent to cell. (BEALE, 1870.)

Bi'valent, applied to chromatin-rods representing two chromosomes joined end to end. (HÄCKER, 1892.)

Ble'pharoplast (*βλεφαρίς*, eye-lash or cilium). The centrosome-like bodies in plant-spermatids in connection with which the cilia of the spermatozoids are formed. (WEBBER, 1897.)

Cell-plate (see **Mid-body**), the equatorial thickening of the spindle-fibres from which the partition-wall arises during the division of plant-cells. (STRASBURGER, 1875.)

Cell-sap, the more liquid ground-substance of the nucleus. [KÖLLIKER, 1865; more precisely defined by R. HERTWIG, 1876.]

Central spindle, the primary spindle by which the centrosomes are connected, as opposed to the contractile mantle-fibres surrounding it. (HERMANN, 1891.)

Cen'triole, a term applied by Boveri to a minute body or bodies ("Central-korn") within the centrosome. In some cases not to be distinguished from the centrosome. (BOVERI, 1895.)

Centrodes'mus (*κέντρον*, centre; *δεσμός*, a band), the primary connection between the centrosomes, formed by a substance from which arises the central spindle. (HEIDENHAIN, 1894.)

Centrodeu'toplasm, the granular material of the testis-cells which may contribute to the formation of the Nebenkern or to that of the idiozome. (ERLANGER, 1897.)

Centrole'cithal (*κέντρον*, centre; *λέκιθος*, yolk), that type of ovum in which the deutoplasm is mainly accumulated in the centre. (BALFOUR, 1880.)

Cen'troplasm (*κέντρον*, centre; *πλάσμα*), the protoplasm forming the attraction-sphere or central region of the aster; the substance of the centrosphere. (ERLANGER, 1895.)

Cen'trosome (*κέντρον*, centre; *σῶμα*, body), a body found at the centre of the aster or attraction-sphere, regarded by some observers as the active centre of cell-division and in this sense as the dynamic centre of the cell. Under its influence arise the asters and spindle (amphiaster) of the mitotic figure. (BOVERI, 1888.)

Cen'trosphere, used in this work as equivalent to the "astrosphere" of Strasburger; the central mass of the aster from which the rays proceed and within which lies the centrosome. The attraction-sphere. [STRASBURGER, 1892; applied by him to the "astrosphere" and centrosome taken together.]

Chloroplas'tids (*χλωρός*, green; *πλαστός*, form), the green plastids or chlorophyll-bodies of plant and animal cells. (SCHIMPER, 1883.)

Chro'matin (*χρῶμα*, colour), the deeply staining substance of the nuclear network and of the chromosomes, consisting of nuclein. (FLEMMING, 1879.)

Chro'matophore (*χρῶμα*, colour; *-φόρος*, bearing), a general term applied to the coloured plastids of plant and animal cells, including chloroplastids and chromoplastids. (SCHAARSCHMIDT, 1880; SCHMITZ, 1882.)

Chro'matoplasm (*χρῶμα*, colour; *πλάσμα*, anything formed or moulded), the substance of the chromoplastids and other plastids. (STRASBURGER, 1882.)

Chro'miole, the smallest chromatin-granules which by their aggregation form the larger chromomeres of which the chromosomes are composed. (EISEN, 1899.)

Chro'momere (*χρῶμα*, colour; *μέρος*, a part), one of the chromatin-granules of which the chromosomes are made up. Identified by WEISMANN as the "id." See **Chromiole**. (FOL, 1891.)

Chromoplas'tids (*χρῶμα*, colour; *πλαστός*, form), the coloured plastids or pigment-bodies other than the chloroplasts, in plant-cells. (SCHIMPER, 1883.)

Chro'moplasts, net-knots or chromatin-nucleoli; also used by some authors as equivalent to **Chromoplastid**. (EISEN, 1899.)

Chro'mosomes (*χρῶμα*, colour; *σῶμα*, body), the deeply staining bodies into which the chromatic nuclear network resolves itself during mitotic cell-division. (WALDEYER, 1888.)

Cleavage-nucleus, the nucleus of the fertilized egg, resulting from the union of egg-nucleus and sperm-nucleus. (O. HERTWIG, 1875.)

Cortical zone, the outer zone of the centrosphere. (VAN BENEDEN, 1887.)

Cyano'philous (*κύανος*, blue; *φιλεῖν*, to love), having an especial affinity for blue or green dyes. (AUERBACH.)

Cy'taster (*κύτος*, hollow (a cell); *ἀστήρ*, star), the same as **Aster**, 1. See **Karyaster**. (FLEMMING, 1882.)

[**Cy'toblast**] (*κύτος*, hollow (a cell); *βλαστός*, germ). 1. The cell-nucleus. (SCHLEIDEN, 1838.) 2. One of the hypothetical ultimate vital units (bioblasts or "granula") of which the cell is built up. (ALTMANN, 1890.) 3. A naked cell or "protoblast." (KÖLLIKER.)

[**Cytoblaste'ma**] (see **Cytoblast**), the formative material from which cells were supposed to arise by "free cell-formation." (SCHLEIDEN, 1838.)

[**Cytochyle'ma**] (*κύτος*, hollow (a cell); *χυλός* juice), the ground-substance of the cytoplasm as opposed to that of the nucleus. (STRASBURGER, 1882.)

Cy'tode (*κύτος*, hollow (a cell); *εἶδος*, form), a non-nucleated cell. (HÄCKEL, 1866.)

Cytodie'resis (*κύτος*, hollow (a cell); *διαίρεσις*, division), the same as **Mitosis**. (HENNEGUY, 1882.)

Cytohy'aloplasma (*κύτος*, hollow (a cell); *ὕαλος*, glass; *πλάσμα*, anything formed), the substance of the cytoreticulum in which are embedded the microsomes; opposed to nucleohyaloplasma. (STRASBURGER, 1882.)

Cy'tolymph (*κύτος*, hollow (a cell); *lympha*, clear water), the cytoplasmic ground-substance. (HÄCKEL, 1891.)

Cytomi'crosomes (see **Microsome**), microsomes of the cytoplasm; opposed to nucleomicrosomes. (STRASBURGER, 1882.)

Cytomi'tome (*κύτος*, hollow (a cell); *μίτωμα*, from *μίτος*, thread), the cytoplasmic as opposed to the nuclear thread-work. (FLEMMING, 1882.)

Cy'toplasm (*κύτος*, *πλάσμα*). 1. The protoplasmic ground-substance as opposed to the granules. (KÖLLIKER, 1863.) 2. Equivalent to protoplasm. (KÖLLIKER, 1867.) 3. The substance of the cell-body as opposed to that of the nucleus. (STRASBURGER, 1882.)

Cytoretic'ulum, the same as **Cytomitome**. (STRASBURGER, 1882.)

Cy'tosome (*κύτος*, hollow (a cell); *σῶμα*, body). 1. The cell-body or cytoplasmic mass as opposed to the nucleus. (HÄCKEL, 1891.) 2. A term used as parallel to chromosome to denote deeply staining definitely organized cytoplasmic filaments or other cytoplasmic structures composed of "cytochromatin." (PRENANT, 1898.)

Der'matoplasm (*δέρμα*, skin), the living protoplasm asserted to form a part of the cell-membrane in plants. (WIESNER, 1886.)

Der'matosomes (*δέρμα*, skin; *σῶμα*, body), the plasomes which form the cell-membrane. (WIESNER, 1886.)

Determinant, a hypothetical unit formed as an aggregation of biophores, determining the development of a single cell or independently variable group of cells. (WEISMANN, 1891.)

[**Deuthy'alosome**] (*δεύτ(ερος)*, second; see **Hyalosome**), the nucleus remaining in the egg after formation of the first polar body. (VAN BENEDEN, 1883.)

Deu'toplasm (*δεύτ(ερος)*, second; *πλάσμα*, anything formed), yolk, lifeless food-matters deposited in the cytoplasm of the egg; opposed to "protoplasm." (VAN BENEDEN, 1870.)

Diakine'sis (*διά*, through), the segmented-spireme-stage, following the synapsis, in the primary oöcyte or spermatocyte, during which the chromosomes persist for a considerable period in the form of double rods. (HÄCKER, 1897.)

Directive bodies, the polar bodies. (FR. MÜLLER, 1848.)

Directive sphere, the attraction-sphere. (GUIGNARD, 1891.)

Dispermy, the entrance of two spermatozoa into the egg.

Dispi'reme (see **Spireme**), that stage of mitosis in which each daughter-nucleus has given rise to a spireme. (FLEMMING, 1882.)

Dy'aster (*δυάς*, two; see **Aster**, 2), the double group of chromosomes during the anaphases of cell-division. (FLEMMING, 1882.)

Ectosphere (*ἐκτός*, outside), the outer or cortical zone of the attraction-sphere. (ZIEGLER, 1899.)

Egg-nucleus, the nucleus of the egg after formation of the polar bodies and before its union with the sperm-nucleus. Equivalent to the "female pronucleus" of VAN BENEDEN. (O. HERTWIG, 1875.)

Enchyle'ma (*ἐν*, in; *χυλός*, juice). 1. The more fluid portion of protoplasm, consisting of "hyaloplasma." (HANSTEIN, 1880.) 2. The ground-substance (cytolymph) of cytoplasm as opposed to the reticulum. (CARNOY, 1883.)

Endoplast, the cell-nucleus. (HUXLEY, 1853.)

Ener'gid, the cell-nucleus together with the cytoplasm lying within its sphere of influence. (SACHS, 1892.)

Entosphere, (*ἐντός*, inside), the inner or medullary zone of the attraction-sphere. (ZIEGLER, 1899.)

Equatorial plate, the group of chromosomes lying at the equator of the spindle during mitosis. (VAN BENEDEN, 1875.)

Ergastic (*ἐργάζομαι*, to work). Applied to relatively passive substances "formed anew through activity of the protoplasm." Equivalent to metaplasmic. *Cf.* alloplasmatic. (A. MEYER, 1896.)

Ergastoplasm (ἐργάζομαι, to work). Nearly equivalent to the "kinoplasm" of Strasburger and the "ergoplasm" of Davidoff. The more active protoplasmic substance from which fibrillar formations arise. (GARNIER, 1897.)

Ergoplasm (ἔργον, work). The active protoplasm of the egg (in tunicates), mainly derived from the achromatic part of the germinal vesicle, and giving rise in part or wholly to the polar spindle. Analogous to archoplasm and kinoplasm. (DAVIDOFF, 1889.)

Erythro'philous (ἐρυθρός, red; φιγεῖν, to love), having an especial affinity for red dyes. (AUERBACH.)

Ga'mete (γαμέτη, wife; γαμέτης, husband), one of two conjugating cells. Usually applied to the unicellular forms.

Gem'mule (see **Pangen**), one of the ultimate supra-molecular germs of the cell assumed by Darwin. (DARWIN, 1868.)

[**Ge'noblasts**] (γένος, sex; βλαστός, germ), a term applied by Minot to the mature germ-cells. The female genoblast (egg or "thelyblast") unites with the male (spermatozoön or "arsenoblast") to form an hermaphrodite or indifferent cell. (MINOT, 1877.)

Germinal spot, the nucleolus of the germinal vesicle. (WAGNER, 1836.)

Germinal vesicle, the nucleus of the egg before formation of the polar bodies. (PURKINJE, 1825.)

Germ-plasm, the same as idioplasm. (WEISMANN.)

Heterokine'sis (ἕτερος, different), qualitative nuclear division; a hypothetical mode of mitosis assumed to separate chromatins of different quality; opposed to homoökinesis or equation-division. (WEISMANN, 1892.)

Heterole'cithal (ἕτερος, different; λέκιθος, yolk), having unequally distributed deutoplasm (includes telolecithal and centrolecithal). (MARK, 1892.)

Heterotyp'ical mitosis (ἕτερος, different; see **Mitosis**), that mode of mitotic division in which the daughter-chromosomes remain united by their ends to form rings. (FLEMMING, 1887.)

[**Holoschi'sis**] (ὅλος, whole; σχίζειν, to split), direct nuclear division. Amitosis. (FLEMMING, 1882.)

Homole'cithal (ὁμός, the same, uniform; λέκιθος, yolk), equivalent to alecithal. Having little deutoplasm, equally distributed, or none. (MARK, 1892.)

Homoökine'sis or **Homæokine'sis** (ὁμός, the same), equation-division, separating equivalent chromatins; opposed to heterokinesis. (WEISMANN, 1892.)

Homœotyp'ical mitosis (ὅμοιος, like; see **Mitosis**), a form of mitosis occurring in the secondary spermatocytes of the salamander, differing from the usual type only in the shortness of the chromosomes and the irregular arrangement of the daughter-chromosomes. (FLEMMING, 1887.)

Hy'aloplasma (ὕαλος, glass; πλάσμα, anything formed). 1. The ground-substance of the cell as distinguished from the granules or microsomes. [HANSTEIN, 1880.] 2. The achromatic substance of the nucleus in which the chromatin-particles are embedded. (STRASBURGER, 1882.) 3. The ground-substance as distinguished from the reticulum or "spongioplasm." (LEYDIG, 1885.) 4. The exoplasm or peripheral protoplasmic zone in plant-cells. (PFEFFER.)

Hy'alosomes (ὕαλος, glass; σῶμα, body), nucleolar-like bodies but slightly stained by either nuclear or plasma stains. (LUKJANOW, 1888.)

[**Hy'groplasma**] (ὑγρός, wet; πλάσμα, something formed), the more liquid part of protoplasm as opposed to the firmer stereoplasm. (NÄGELI, 1884.)

Id, the hypothetical structural unit resulting from the successive aggregation of biophores and determinants. Identified by Weismann as the chromomere, or chromatin-granule. (WEISMANN, 1891.)

Idant, the hypothetical unit resulting from the successive aggregation of biophores,

determinants, and Ids. Identified by Weismann as the chromosome. (WEISMANN, 1891.)

Id'ioblasts (ἴδιος, one's own; βλαστός, germ), the hypothetical ultimate units of the cell; the same as biophores. (O. HERTWIG, 1893.)

Id'ioplasm (ἴδιος, one's own; πλάσμα, a thing formed), equivalent to the germplasm of Weismann. The substance, now generally identified with chromatin, which by its inherent organization involves the characteristics of the species. The physical basis of inheritance. (NÄGELI, 1884.)

Id'iosome (ἴδιος, one's own; σῶμα, body), the same as idioblast or plasome. (WHITMAN, 1893.)

Idiozome (ἴδιος, specially formed; ζῶμα, girdle). The sphere, often called attraction-sphere and usually enclosing the centrosomes, found in the spermatids of animals. (MEVES, 1897.)

Interfilar substance, the ground-substance of protoplasm as opposed to the thread-work. (FLEMMING, 1882.)

Interzonal fibres ("Filaments reunissants" of Van Beneden. "Verbindungsfasern" of Flemming and others). Those spindle-fibres that stretch between the two groups of daughter-chromosomes during the anaphase. Equivalent in some cases to the central spindle. (MARK, 1881.)

Iso'tropy (ἴσος, equal; τροπή, a turning), the absence of predetermined axes (as applied to the egg). (PFLUGER, 1883.)

[**Ka'ryaster**] (κάρυον, nut, nucleus; see **Aster**, 2), the star-shaped group of chromosomes in mitosis. Opposed to cytaster. (FLEMMING, 1882.)

Karyenchy'ma (κάρυον, nut, nucleus; ἐν, in; χυμός, juice), the "nuclear sap." (FLEMMING, 1882.)

Karyokine'sis (κάρυον, nut, nucleus; κίνησις, change, movement), the same as mitosis. (SCHLEICHER, 1878.)

[**Karyoly'ma**], the "karyolytic" (mitotic) figure. (AUERBACH, 1876.)

Ka'ryolymph. The nuclear sap. (HÄCKEL, 1891.)

[**Karyo'lysis**] (κάρυον, nut, nucleus; λύσις, dissolution), the supposed dissolution of the nucleus during cell-division. (AUERBACH, 1874.)

[**Karyoly'tic figure**] (see **Karyolysis**), a term applied by Auerbach to the mitotic figure in living cells. Believed by him to result from the dissolution of the nucleus. (AUERBACH, 1874.)

Karyomi'crosome (see **Microsome**), the same as nucleo-microsome.

Karyomi'tome (κάρυον, nut, nucleus; μίτωμα, from μίτος, a thread), the nuclear as opposed to the cytoplasmic thread-work. (FLEMMING, 1882.)

Karyomito'sis (κάρυον, nut, nucleus; see **Mitosis**), mitosis. (FLEMMING, 1882.)

Ka'ryon (κάρυον, nut, nucleus), the cell-nucleus. (HÄCKEL, 1891.)

Ka'ryoplasm (κάρυον, nut, nucleus; πλάσμα, a thing formed), nucleoplasm. The nuclear as opposed to the cytoplasmic substance. (FLEMMING, 1882.)

Ka'ryosome (κάρυον, nut, nucleus; σῶμα, body). 1. Nucleoli of the "net-knot" type, staining with nuclear dyes, as opposed to plasmosomes or true nucleoli. (OGATA, 1883.) 2. The same as chromosome. (PLATNER, 1886.) 3. Caryosome. The cell-nucleus. (WATASÉ, 1894.)

[**Karyo'ta**] (κάρυον, nut, nucleus), nucleated cells. (FLEMMING, 1882.)

Karyothe'ca (κάρυον, nut, nucleus; θήκη, case, box), the nuclear membrane. (HÄCKEL, 1891.)

Ki'noplasm (κινεῖν, to move; πλάσμα, a thing formed), nearly equivalent to archoplasm, but used in a broader sense to denote in general the more active elements of protoplasm from which arise fibrillæ, the substance of cilia, and (in plants) the peripheral "Hautschicht" from which the membrane is

formed; opposed to the "trophoplasm" or nutritive plasm. (STRASBURGER, 1892.)

[**Lanthanin**] (*λανθάνειν*, to conceal), equivalent to oxychromatin. (HEIDENHAIN, 1892.)

Leucoplas'tids (*λευκός*, white; *πλαστός*, form), the colourless plastids of plant-cells from which arise the starch-formers (amyloplastids), chloroplastids, and chromoplastids. (SCHIMPER, 1883.)

Li'nin (**linum**, a linen thread), the substance of the "achromatic" nuclear reticulum. (SCHWARZ, 1887.)

Lininoplast, the true nucleolus or plasmosome. (EISEN, 1899.)

Macrocentrosome, a term applied to the "centrosome" in Boveri's sense, *i.e.* to the larger body in which lies the central granule. (ZIEGLER, 1898.) Probably synonymous with entosphere.

Maturation, the final stages in the development of the germ-cells. More specifically, the process by which the reduction of the number of chromosomes is effected.

Metakine'sis (see **Metaphase**) (*μετά*, beyond (*i.e.* further); *κίνησις*, movement), the middle stage of mitosis, when the chromosomes are grouped in the equatorial plate. (FLEMMING, 1882.)

Metanu'cleus, a term applied to the nucleolus after its extrusion from the germinal vesicle. (HÄCKER, 1892.)

Met'aphase, the middle stage of mitosis during which occurs the splitting of the chromosomes in the equatorial plate. (STRASBURGER, 1884.)

Met'aplasm (*μετά*, after, beyond; *πλάσμα*, a thing formed), a term collectively applied to the lifeless inclusions (deutoplasm, starch, etc.) in protoplasm as opposed to the living substance. (HANSTEIN, 1868.)

Micel'la, one of the ultimate supra-molecular units of the cell. (NÄGELI, 1884.)

Microcentrosome, equivalent to the central granule or centriole of Boveri. (ZIEGLER, 1898.)

Microcen'trum, the centrosome or group of centrosomes united by a "primary centrodesmus," forming the centre of the astral system. (HEIDENHAIN, 1894.)

Mi'cropyle (*μικρός*, small; *πύλη*, orifice), the aperture in the egg-membrane through which the spermatozoön enters. [First applied by TURPIN, in 1806, to the opening through which the pollen-tube enters the ovule. *t.* ROBERT BROWN.]

Mi'crosome (*μικρός*, small; *σῶμα*, body), the granules as opposed to the ground-substance of protoplasm. (HANSTEIN, 1880.)

Microsphere, the central region of the aster (centrosphere) at the centre of which lie the centrosomes. (KOSTANECKI and SIEDLECKI, 1896.)

Middle-piece, that portion of the spermatozoön lying behind the nucleus at the base of the flagellum. (SCHWEIGGER-SEIDEL, 1865.)

Mid-body ("Zwischenkörper"), a body or group of granules, probably comparable with the cell-plate in plants, formed in the equatorial region of the spindle during the anaphases of mitosis. (FLEMMING, 1890.)

Mi'tome (*μίτωμα*, from *μίτος*, a thread), the reticulum or thread-work as opposed to the ground-substance of protoplasm. (FLEMMING, 1882.)

[**Mitoschi'sis** (*μίτος*, thread; *σχίζειν*, to split), indirect nuclear division; mitosis. (FLEMMING, 1882.)

Mito'sis (*μίτος*, a thread), indirect nuclear division typically involving: *a*, the formation of an amphiaster; *b*, conversion of the chromatin into a thread (spireme); *c*, segmentation of the thread into chromosomes; *d*, splitting of the chromosomes. (FLEMMING, 1882.)

Mi'tosome (*μίτος*, a thread; *σῶμα*, body), a body derived from the spindle-fibres

of the secondary spermatocytes, giving rise, according to PLATNER, to the middle-piece and the tail-envelope of the spermatozoön. Equivalent to the Nebenkern of La Valette St. George. (PLATNER, 1889.)

Nebenkern (Paranucleus), a name originally applied by Bütschli (1871) to an extranuclear body in the spermatid; afterwards shown by La Valette St. George and Platner to arise from the spindle-fibres of the secondary spermatocyte. Since applied to many forms of cytoplasmic bodies (yolk-nucleus, etc.) of the most diverse nature.

Nuclear plate. 1. The equatorial plate. (STRASBURGER, 1875.) 2. The partition-wall which sometimes divides the nucleus in amitosis.

Nuclein, the chemical basis of chromatin; a compound of nucleinic acid and albumin or albumin radicles. (MIESCHER, 1871.)

Nucleinic or **nucleic acid**, a complex organic acid, rich in phosphorus, and an essential constituent of chromatin.

Nucleo-albumin, a nuclein having a relatively high percentage of albumin. Distinguished from nucleo-proteids by containing paranucleinic acid which yields no xanthin-bodies.

[Nucleochyle'ma] (χυλός, juice), the ground-substance of the nucleus as opposed to that of the cytoplasm. (STRASBURGER, 1882.)

Nucleohy'aloplasma (see **Hyaloplasm**), the achromatic substance (linin) in which the chromatin-granules are suspended. (STRASBURGER, 1882.)

Nucleomi'crosomes (see **Microsome**), the nuclear (chromatin) granules as opposed to those of the cytoplasm. (STRASBURGER, 1882.)

Nu'cleoplasm. 1. The reticular substance of the (egg-) nucleus. (VAN BENEDEN, 1875.) 2. The substance of the nucleus as opposed to that of the cell-body or cytoplasm. (STRASBURGER, 1882.)

Nucleo-pro'teid, a nuclein having a relatively high percentage of albumin. May be split into albumin and true nucleinic acid, the latter yielding xanthin-bodies.

Œde'matin (*οἴδημα*, a swelling), the granules or microsomes of the nuclear ground-substance. (REINKE, 1893.)

O'öcyte (Ovocyte) (ᾠόν, egg; κύτος, hollow (a cell)), the ultimate ovarian egg before formation of the polar bodies. The primary oöcyte divides to form the first polar body and the secondary oöcyte. The latter divides to form the second polar body and the mature egg. (BOVERI, 1891.)

Oögen'esis, Ovogenesis (ᾠόν, egg; γένεσις, origin), the genesis of the egg after its origin by division from the mother-cell. Often used more specifically to denote the process of reduction in the female.

Oögo'nium, Ovogonium (ᾠόν, egg; γονή, generation). 1. The primordial mother-cell from which arises the egg and its follicle. (PFLÜGER.) 2. The descendants of the primordial germ-cell which ultimately give rise to the oöcytes or ovarian eggs. (BOVERI, 1891.)

Oökine'sis (ᾠόν, egg; κίνησις, movement), the mitotic phenomena of the egg during maturation and fertilization. (WHITMAN, 1887.)

O'vocentre, the egg-centrosome during fertilization. (FOL, 1891.)

Oxychro'matin (ὀξύς, acid; see **Chromatin**), that portion of the nuclear substance stained by acid tar-colours. Equivalent to "linin" in the usual sense. (HEIDENHAIN, 1894.)

Pangen'esis (πᾶς (παν-), all; γένεσις, production), the theory of gemmules, according to which hereditary traits are carried by invisible germs thrown off by the individual cells of the body. (DARWIN, 1868.)

Pangens (πᾶς (παν-), all; -γενής, producing), the hypothetical ultimate supra-molecular units of the idioplasm, and of the cell generally. Equivalent to gemmules, micellæ, idioblasts, biophores, etc. (DE VRIES, 1889.)

Parachro'matin (see **Chromatin**), the achromatic nuclear substance (linin of Schwarz) from which the spindle-fibres arise. (PFITZNER, 1883.)

Parali'nin (see **Linin**), the nuclear ground-substance or nuclear sap. (SCHWARZ, 1887.)

Parami'tome (see **Mitome**), the ground-substance or interfilar substance of protoplasm, opposed to mitome. (FLEMMING, 1892.)

Paranu'clein (see **Nuclein**), the substance of true nucleoli or plasmosomes. Pyrenin of Schwarz. (O. HERTWIG, 1878.) Applied by Kossel to "nucleins" derived from the cytoplasm. These are compounds of albumin and paranucleic acid which yields no xanthin-bodies.

Paranucleus (see **Nebenkern**).

Par'aplasm (*παρά*, beside; *πλάσμα*, something formed), the less active portion of the cell-substance. Originally applied by Kupffer to the cortical region of the cell (exoplasm), but now often applied to the ground-substance. (KUPFFER, 1875.)

Per'iplast (*περί*, around; *πλαστός*, form). 1. The peripheral part of the cell, including those parts outside the nucleus or "endoplast." (HUXLEY, 1853.) 2. A term somewhat vaguely applied to the attraction-sphere. The term *daughter-periplast* is applied to the centrosome. (VEJDOVSKÝ, 1888.)

Perisphere (*περί*, around), a term applied to the outer region of the attraction-sphere in nerve-cells, and opposed to an inner "centrosphere." (LENHOSSÉK, 1895.)

Plasmocytes (*πλάσμα*, *κύτος*), colourless blood-corpuscles supposed to be free attraction-spheres. (EISEN, 1897.)

Plasmosphere, the same as **Perisphere**.

Plas'mosome (*πλάσμα*, something formed (*i.e.* protoplasmic); *σῶμα*, body), the true nucleus, distinguished by its affinity for acid tar-colours and other "plasma-stains." (OGATA, 1883.)

Pla'some (*πλάσμα*, a thing formed; *σῶμα*, body), the ultimate supra-molecular vital unit. See **Biophore**, **Pangen**. (WIESNER, 1890.)

Plas'tid (*πλαστός*, form). 1. A cell, whether nucleated or non-nucleated. (HÄCKEL, 1866.) 2. A general term applied to permanent cell-organs (chloroplasts, etc.) other than the nucleus and centrosome. (SCHIMPER, 1883.)

Plas'tidule, the ultimate supra-molecular vital unit. (ELSSBERG, 1874; HÄCKEL, 1876.)

Plas'tin, a term of vague meaning applied to a substance related to the nucleo-proteids and nucleo-albumins constituting the linin-network (Zacharias) and the cytoreticulum (Carnoy). (REINKE and RODEWALD, 1881.)

Pluri'valent (*plus*, more; *valere*, to be worth), applied to chromatin-rods that have the value of more than one chromosome *sensu strictu*. (HÄCKER, 1892.)

Polar bodies (**Polar globules**), two minute cells segmented off from the ovum before union of the germ-nuclei. (Disc. by CARUS, 1824; so named by ROBIN, 1862.)

Polar corpuscle, the centrosome. (VAN BENEDEN, 1876.)

Polar rays (**Polradien**), a term sometimes applied to all of the astral rays as opposed to the spindle-fibres, sometimes to the group of astral rays opposite to the spindle-fibres.

Pole-plates (**End-plates**), the achromatic spheres or masses at the poles of the spindle in the mitosis of Protozoa, probably representing the attraction-spheres. (R. HERTWIG, 1877.)

Polyspermy, the entrance into the ovum of more than one spermatozoön.

[**Prochro'matin**] (see **Chromatin**), the substance of true nucleoli, or plasmosomes. Equivalent to paranuclein of O. Hertwig. (PFITZNER, 1883.)

Pronuclei, the germ-nuclei during fertilization; *i.e.* the egg-nucleus (female pronucleus) after formation of the polar bodies, and the sperm-nucleus (male pronucleus) after entrance of the spermatozoön into the egg. (VAN BENEDEN, 1875.)

[**Prothy'alosome**] (see **Hyalosome**), an area in the germinal vesicle (of *Ascaris*) by which the germinal spot is surrounded, and which is concerned in formation of the first polar body. (VAN BENEDEN, 1883.)

Pro'toblast (πρῶτος, first; βλαστός, a germ). 1. A naked cell, devoid of a membrane. (KÖLLIKER.) 2. A blastomere of the segmenting egg which is the parent-cell of a definite part or organ. (WILSON, 1892.)

Pro'toplasm (πρῶτος, first; πλάσμα, a thing formed or moulded). The active or "living" cell-substance. By all earlier and some present writers applied only to the substance of the cell-body (equivalent to Strasburger's cytoplasm). By many later writers applied to the entire active substance of the cell (karyoplasm plus cytoplasm). (PURKINJE, 1840; H. VON MOHL, 1846.)

Pro'toplast (πρῶτος, first; πλάστος, formed). 1. The protoplasmic body of the cell, including nucleus and cytoplasm, regarded as a unit. Nearly equivalent to the energid of Sachs. (HANSTEIN, 1880.) 2. Used by some authors synonymously with plastid.

[**Pseudochro'matin**] (see **Chromatin**), the same as prochromatin. (PFITZNER, 1886.)

Pseudonu'clein (see **Nuclein**), the same as the paranuclein of Kossel. (HAMMARSTEN, 1894.)

Pseudo-reduction, the preliminary halving of the number of chromatin-rods as a prelude to the formation of the tetrads and to the actual reduction in the number of chromosomes in maturation. (RÜCKERT, 1894.)

Pyre'nin (πυρήν, the stone of a fruit; *i.e.* relating to the nucleus), the substance of true nucleoli. Equivalent to the paranuclein of Hertwig. (SCHWARZ, 1887.)

Pyre'noid (πυρήν, the stone of a fruit; like a nucleus), colourless plastids (leucoplastids), occurring in the chromatophores of lower plants, forming centres for the formation of starch. (SCHMITZ, 1883.)

Reduction, the halving of the number of chromosomes in the germ-nuclei during maturation.

Sarcode (σαρξ, flesh). The protoplasm of unicellular animals. (DU JARDIN, 1835.)

Sertoli-cells, the large, digitate, supporting, and nutritive cells of the mammalian testis to which the developing spermatozoa are attached. (Equivalent to "spermatoblast" as originally used by VON EBNER, 1871.)

Sper'matid (σπέρμα, seed), the final cells which are converted without further division into spermatozoa; they arise by division of the secondary spermatocytes or "Samenmütterzellen." (LA VALETE ST. GEORGE, 1886.)

Sper'matoblasts (σπέρμα, seed; βλαστός, germ), a word of vague meaning, originally applied to the supporting cell or Sertoli-cell, from which a group of spermatozoa was supposed to arise. By various later writers used synonymously with spermatid. (VON EBNER, 1871.)

Sper'matocyst (σπέρμα, seed; κύστις, bladder), originally applied to a group of sperm-producing cells ("spermatocytes"), arising by division from an "Ursamenzelle" or "spermatogonium." (LA VALETTE ST. GEORGE, 1876.)

Sper'matocyte (σπέρμα, seed; κύτος, hollow (a cell)), the cells arising from the spermatogonia. The *primary spermatocyte* arises by growth of one of the last generation of spermatogonia. By its division are formed two *secondary spermatocytes*, each of which gives rise to two spermatids (ultimately spermatozoa). (LA VALETTE ST. GEORGE, 1876.)

[**Spermatogem'ma**] (*σπέρμα*, seed; *gemma*, bud), nearly equivalent to spermatocyst. Differs in the absence of a surrounding membrane. [In mammals, LA VALETTE ST. GEORGE, 1878.]

Spermatogen'esis (*σπέρμα*, seed; *γένεσις*, origin), the phenomena involved in the formation of the spermatozoön. Often used more specifically to denote the process of reduction in the male.

Spermatogo'nium ("Ursamenzelle") (*σπέρμα*, seed; *γονή*, generation), the descendants of the primordial germ-cells in the male. Each ultimate spermatogonium typically gives rise to four spermatozoa. (LA VALETTE ST. GEORGE, 1876.)

Spermatome'rites (*σπέρμα*, seed; *μέρος*, a part), the chromatin-granules into which the sperm-nucleus resolves itself after entrance of the spermatozoön. (In *Petromyzon*, BÖHM, 1887.)

Sper'matosome (*σπέρμα*, seed; *σῶμα*, body), the same as spermatozoön. (LA VALETTE ST. GEORGE, 1878.)

Spermatozo'ïd (see **Spermatozoön**), the ciliated paternal germ-cells in plants. The word was first used by von Siebold as synonymous with spermatozoön.

Spermatozo'ön (*σπέρμα*, seed; *ζῷον*, animal), the paternal germ-cell of animals. (LEEUWENHOEK, 1677.)

Sperm-nucleus, the nucleus of the spermatozoön; more especially applied to it after entrance into the egg before its union with the egg-nucleus. In this sense equivalent to the "male pronucleus" of Van Beneden. (O. HERTWIG, 1875.)

Sper'mocentre, the sperm-centrosome during fertilization. (FOL, 1891.)

Spi'reme (*σπείρημα*, a thing wound or coiled; a skein), the skein or "Knäuel" stage of the nucleus in mitosis, during which the chromatin appears in the form of a thread, continuous or segmented. (FLEMMING, 1882.)

Spon'gioplasm (*σπογγίον*, a sponge; *πλάσμα*, a thing formed), the cytoreticulum. (LEYDIG, 1885.)

Ste'reoplasm (*στερεός*, solid), the more solid part of protoplasm as opposed to the more fluid "hygroplasm." (NÄGELI, 1884.)

Substantia hyalina, the protoplasmic ground-substance or "hyaloplasm." (LEYDIG, 1885.)

Substantia opaca, the protoplasmic reticulum or "spongioplasm." (LEYDIG, 1885.)

Synap'sis (*συνάπτω*, to fuse together). A stage in the nucleus preceding the first maturation-division, characterized by the massing of the chromatin at one side of the nucleus. From it the chromatin-masses emerge in the reduced number. (MOORE, 1895.)

Te'loblast (*τέλος*, end; *βλαστός*, a germ), large cells situated at the growing end of the embryo (in annelids, etc.), which bud forth rows of smaller cells. (WHITMAN, WILSON, 1887.)

Telole'cithal (*τέλος*, end; *λέκιθος*, yolk), that type of ovum in which the yolk is mainly accumulated in one hemisphere. (BALFOUR, 1880.)

Te'lophases, Telokine'sis (*τέλος*, end), the closing phases of mitosis, during which the daughter-nuclei are re-formed. (HEIDENHAIN, 1894.)

To'noplasts (*τόνος*, tension; *πλαστός*, form), plastids from which arise the vacuoles in plant-cells. (DE VRIES, 1885.)

Trophoplasm (*τροφή*, nourishment; *πλάσμα*). 1. The nutritive or vegetative substance of the cell, as distinguished from the idioplasm. (NAGELI, 1884.) 2. The active substance of the cytoplasm other than the "kinoplasm" or archoplasm. (STRASBURGER, 1892.)

Tro'phoplasts (*τροφή*, nourishment; *πλαστός*, form), a general term, nearly equiv-

alent to the "plastids" of Schimper, including "anaplasts" (amyloplasts), "autoplasts" (chloroplasts), and chromoplasts. (A. MEYER, 1882–83.)

Yolk-nucleus, a word of vague meaning applied to a cytoplasmic body, single or multiple, that appears in the ovarian egg. [Named "Dotterkern" by CARUS, 1850.)

Zy'gote or **Zy'gospore** (ζυγόν, a yoke), the cell produced by the fusion of two conjugating cells or gametes in some of the lower plants.