Boveri Festschr. f. Kupfer — ASCARIS MEGALOCEPHALA (BIVALENS.) First cleavag
normal; In the second cleavages, and five sec
nes, one of the mitoses is normal, the other, gi
rise to the somatic components is diminutory:
The ends of the long chromosomes break off f
middle region. This fragments into 60-70 small c
somes. The embolism pieces degenerate. A sp
cytoplasmic material preventing diminution may e
as indicated by centrifugation; 2 cells non-dimin
In a diminution mitosis, the spindle fibers are
Hogue Arch Entwm 29, 1910 at the center.
Boveri Arch Entwm 30, 1910 In polyspermics, 4 cells form at once, 2 non-di

King & Beams JEZ 77 (1938) Same conclusion in fact: distributed substan
Similar process in many nematodes

Kahle Zoologica 21 1908 — MIASTOR [Diptera]. First 2 cleavages, 1 passe
beaut. plates; PHD.'s from Leipzig — pole of the egg. At that pole; there are many gran
the cell there gave the germ cell. (mitochondria)
Acc. Kahle the telophase nuclear wall cut
long chromosomes, extended half disintegrating. Ry
in 4th division. Other workers show whole ch
Kreczkiewicz Folia Morph. 6 somes lost. The chromosome number in th
Huettner Anat Rec 60 1934 somatic cells is 12, in germ 2n = 48. Thu
Pietberger Chromosoma 1 1940 (Oligarcis) actually a reduplicated chromosome.

Morgan & Bridges Carnegie 278 — Drosophila A series of gynandromorphs. Non-d
tion. Assumed that the germ originate from a sing

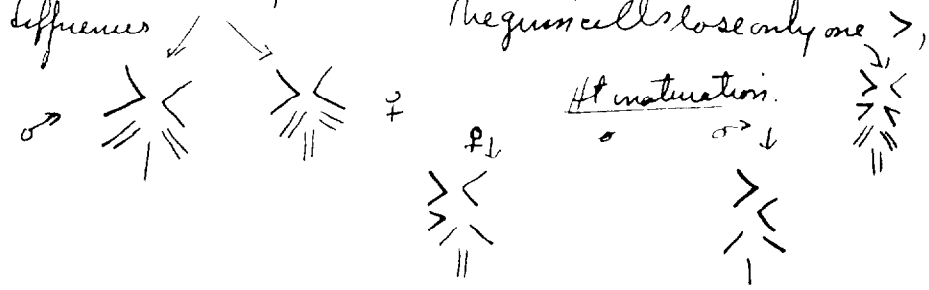
Huettner J Morph 37 1923 migration. The polar nuclei varies from >5<11.
Rabinowitz J Morph 67 1941 But the gonads are mixed.
In embryology only a few polar cells include gran material; these yield germ cells.
No elimination in Drosophila

Tühn Zool Jahrb [Anat] 35 ('12) In Entomostraca (Daphnia ...)
Groups of five cells in gonads; others are sacrifice to the one that develops. The nurse cell nuclei are pyrotic. That mass lies at random. The cleavage furrow after the 2nd division include the nuclear mass (a Kerni balenkörper; Parakopulationskörper); cells containing this are the germ cells.

du Bois Z. Zellf 19 (1933) In Sciara:
All fertilized eggs have 12 chromosomes:

1st five cleavages are normal.
In some cells the > are extruded

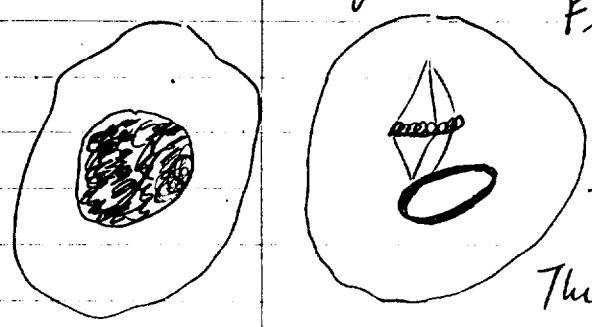
In the 6th through 8th divisions, further elimination differences
The germ cells lose only one >,



1/13/42 other presumed cases of germ cell determination

Gilbert Zool Jahrb (Anat) 30 1910

Dytiscus (water beetle, cytologically difficult) In ♀ in the last oogonial division, the germ nucleus differentiates one side becoming slightly pycnotic. The chromosomes come from the typical portion. The rest of the nucleus forms a ring: The ring is Feulgen positive. This occurs in 4 divisions, the ring segregates to 1 cell of 16. This forms the oocyte egg cell; the others are nurse cells.

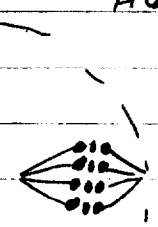


This is not a germ determination as such

Seiler, Arch Zellf 13 (1915)

Cooper, KW Chromosoma 1 (1939) Arachnida

LEPIDOPTERA: Lymantria, Ephestia In maturation division. As metaphase tetrads appear and separate, some material was found between the chromosomes.



Stuff disappears

In Pediculopsis, this is found in both meiosis, and the early cleavages of the zygote. Feulgen negative.

Summary:

1. True determination, may be extra chromosomal
   - A. Pole plasm
   - B. Nurse nuclei or adjacent cytoplasm
   - C. Elimination; diminution
2. Pseudo A. Dytiscus
   - B. Lepidoptera

Fertilization

Controversy —

Must involve several consequent processes, but the essential task and purpose is syngamy, nuclear.

Large variation in phase of development of the fertilized egg.

In Dinophilus (a rotifer like animal) the sperm enters long before maturation begins

Ascaris - just before the first prophase. as the sperm nucleus becomes diffuse, the egg matures.

In Coelenterata, Echinodermata, eggs are generally mature.

In Annelids, Arenicola the meiosis has begun at the time of fertilization.

In Echinoderm eggs, fertilization may occur prematurely

until the germinal vesicle has broken down; thereafter even the isolated cortex can be "fertilized."

Just Biol Bull 44 1923 If the cortex is removed (bolting cloth) complete no sperm will enter.

Violent currents in egg in relation to the sperm entrance. Fertilization cone; egg swallows sp

Path of pronuclei to "equilibrium" The ♂ may migrate directly to the ♀ pronucleus.

In some large eggs, the first path is rectilinear; T an orientation in respect to nucleus, the copulat path

see pp 82 et seq →

1/15/43 Partial Fertilization – gynogenesis No action nucleus. May occur "accidentally" in nature (hy crosses, etc)

Bělař Z. Zellf 1 (1924) Rhabditis (nematode?) after 2 pb are given off the sperm enters at one pole, normally movements are as:

Under relatively anoxic conditions, the chromosomes arg as usual, but the ♀ pronucleus does not migrate. In the neighborhood of the sperm an amphiaster forms. If dy

the amphiaster.

Packard Biol Bull 36 1918 Radium inactivated eggs, nuclei destroyed. The sperm also will start with first cleavages up to blastulae

in normal life history activation of egg without the participation of sperm.

Artificial Parthenogenesis

Hypertonic sea water → multipolar asters

Fertilization membrane not well sep

In double treatment, butyric - s.w. cytolysis checked by la

There may be a revisited division before cleavage.

2 steps in fertilization cortical cytolysis + its check. Bu Just has shown hypertonic sea water is adequate if properl adjusted.

Herlant Arch Exp Zool 57 (1918) had actually proposed that each component of the double treatm gave rise to 1 aster. !!

In Amphibia -

Guyer Science 1925 Puncture egg with fine needle dipped in blood. Believe leucocytes acted!

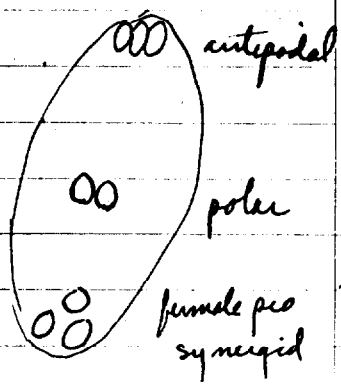
Bataillon CRAS 150 1910 In Toad eggs, only sterile puncture is required

Loeb J. Gen Phys 3 1921 In Rana, only needle is required

Parmentier J Exp Zool ca 1938-40 Various embryos. Only restored diploids survive. Mosaics. Both sexes!!! How explain?

Plant karyology

Progressive reduction of haploid phase. In maize only 8 nuclei in the female gametophyte.



The male gametophyte has 2 haploid germ nuclei. In double fertilization, triploid endosperm and diploid ~~gametes~~ zygotes are formed with consequent modification of Mendelism.

Early work on fertilization directed at centrioles.

Rabl '89 – Fusion or syngamy of centers!!! Not sustained

"probably no definite rule of the centriole origin"
The sperm brings in the center, usually.

In egg fragments division will occur
In "partial fertilization" only centriole participates
In polyspermy, numerous spindles.
In some cases, egg provides its own centrioles, as Gyrodactylus, Fasciola, other trematodes.

Conklin Biol Bull 7 1904 Study of (parthenogenetic) Crepidula. Convinc of genetic continuity.

Wilson p445 ff In Nereis The middle piece is left out. But this may have an elongate centriolar rod through the nucleus.

FIN DE LIVRE

4-13-43. C.L. Huskins on Chromosome Coiling.

Trillium first demonstrated mic

In Trillium there is spiralization in both divisions.

Relational coil shown.

At somewhat elevated temperatures, the spirals seem to iron out.

Reasons for difficulty:

1. Spiralization was first deductive; Darlington "has been completely disproven.
2. Variations in appearance: technique
   organisms, stage, size down to inv.
3. Number of strands in a chromosome.
4. Visiblity
5. Optical artefact; psychological factors particularly at limit of visibility
6. 3 dimensional visualization difficult for many people. Stupidity

see e.g. ASB '40

A: the relational coil: a twisted electric wire is 2 spirals in the same direction. Right-hand spiral is right handed from any aspect.

Doubling of coil and bipartite coil are the same

B. Direction of coil cannot be determined from photos. (MJD White)

Chromonemes vs. Spirals.

Strand Number: Kawada & Nakamura hold 8 strands

Mimic spiral fairly clear but may be really only the two cross strands. !!!!

If a spiral is coiled with ends fixed

But ends do not slip apart.

If ends rotate, the spiral can fall apart.

In Tradescantia: a clear minor spiral → major in 2nd division

In Trillium, the major persists; matrix contracts.

" the matrix does not contract, chromonema elongates

Darlington proposes molecular spiral.

Huskins holds that in last premeiotic anaphase the relational coil is formed. Gene reproduction occurs during a coil stage. Pulling out causes twisting for entwisting, relational spiral is produced.