

icals): The sixth, seventh, eighth, ninth and thirty-second orders are measured. Again the structure is pseudo-hexagonal only. The molecular length is 60.6 Å.U., containing 32 CH₂O-groups. The CH₂O-group again possesses the length of 1.89 Å.U. The thirty-second order is intense. The three X-ray patterns show also distinct differences in regard to the "outer" lines.

The δ-product was examined with Fe-radiation, for γ- and para-formaldehyde Cr-radiation was used. Additional orders are indicated in all cases. α-Polyoxymethylene and ordinary γ-polyoxymethylene also show a series of "inner" rings, which, however, could not be measured thus far. These lines are more diffuse, indicating a less uniform composition of the products. Additional investigations are under way. A full account will be published shortly.

These results give a definite proof for Staudinger's view of the constitution of polymer formaldehyde. It is proved that in highly polymerized bodies molecules of identical length may crystallize together. The molecule of such polymerized bodies may be determined by X-ray research, which is highly important since no other physical methods give such definite results.

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TURNING OF THE SPERM IN THE ACRIDIAN FOLLICLE

IN describing the spermiogenesis of a gryllid,¹ the author found in one species of cricket, *Nemobius fasciatus*, that first the nucleus and later the head are turned while elongating toward the open end of the follicles. The other species of crickets turn the head first toward the blind end of the follicle. Later these sperm turn in the follicle and enter the vasa efferentia, swimming with the head first. This phenomenon had not previously been described.

An examination of the literature revealed the fact that practically all the illustrations show the sperm forming with the head end toward the blind end of the follicle. This was particularly evident among the Acrididae, in which so many studies of spermatogenesis have been made.² The author therefore expressed the surmise that the sperm of grasshoppers turn in the follicle after they are formed.

This surmise he has confirmed by the study of many slides of fixed material. As the spermatids begin to elongate in the cysts all the nuclei move to the outer wall. In this stage the spermatids radiate out from

¹ W. J. Baumgartner, *Zeit. f. Zellforsch. u. micr. Anat.*, Bd. 9: 41, 1929.

² H. S. Davis, *Bull. Mus. Comp. Zool. Harvard Coll.*, 53: 59, 1908.

the center. Later, as elongation continues, some of the heads move so that all point toward the blind end of the follicle. The elongation now continues until the head, and especially the tail, are very long. It is hardly thinkable that sperm could move any great distance with long flagella-like tails leading the way, and so the surmise was made that they turn in the follicle before leaving it. The following observations are believed to give evidence for this suggestion.

(1) In several specimens such elongated cysts contain clusters of heads which are still oval in shape. These are turned toward the blind end. Further toward the open end in the same cysts in a row beside the cyst wall are several heads all turned toward the open end. These were interpreted as having turned and being on the way to the open end of the cyst.

(2) In some very long follicles groups of heads lying around the periphery near the open end are headed in that direction. These are the sperm of a cyst which have completed the turning. In many cases these sperm are beside or in among degenerating cells—larger or smaller masses of mostly uniformly staining protoplasm. I suspect that these have to do with the nourishment of the sperm. The origin of these cells was not determined.

(3) Many of the much elongated cysts show, somewhere between the forming sperm and the open end, many tails which are plainly "looped." Sometimes these loops lie in the section. Others are cut in the curve part. In a few cases the heads are in this looped condition. Here is the point at which the turning or reversing is taking place. The number of tails (or heads) in the loops varies greatly in different specimens.

Some of the unturned heads have reached the elongated thread stage. Other sperm seem to turn while the head is still oval.

The details of the time, place and manner of the turning and relative phenomena are being investigated and will be reported on later.

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