the Ca content was increased to .3 normal Ca content, development was relatively normal and skeletal elements were also fabricated. In an intermediate range, .2 Ca, skeletal formation occurs in some instances but usually is delayed in appearance or suppressed entirely. When embryos were reared in sea water containing compounds such as protamine sulphate, Hyamine, a quaternary ammonium salt, or toluidine blue, all containing strong positively charged molecules, the embryos developed but were devoid of skeletons. These observations indicate (1) that a higher concentration of Ca is necessary for skeletal development than for metabolic processes permitting embryonic development. (2) The effect of strong positively charged molecules in contact with the surface of the embryo through which ions are transfered inhibits or suppresses Ca transfer and as a consequence skeletal development. The additional observation that ions reaching the internal regions of the embryos in which the skeleton develops must pass through an ectodermal layer containing a sulphated polysaccharide suggests that this substance may be associated with cation transfer.

Rhodanese in Marine Invertebrates

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The enzyme rhodanese, which has a general occurrence in vertebrates, and supposedly functions as an intracellular transsulfurase, has been analyzed for occurrence and activity in marine invertebrates. It was assayed by virtue of its capacity to catalyze the transfer of sulfur from thiosulfate onto cyanide forming thiocyanate. For this purpose an assay technique was worked out, which was suitable for tissue homogenates of marine material yielding enzyme activities in the 0.25 μmol SCN- range.

The survey of the marine invertebrates showed the occurrence of rhodanese in practically all animal groups. Mostly the relative activities were low, with the exception of the Mollusca phylum, in which activities comparable with those of the vetebrates were found. An analysis of the organ-distribution of rhodanese in different mollusks revealed a preference for such organs which have an excretory function or otherwise partake in degrading or synthesizing exo- or endogenous material, e.g. digestive gland, kidney, gills and pericardium.

The digestive gland of the scallop, *Pecten*, is a particularly rich source for the enzyme. The enzyme from this material was partially purified, and its properties compared with a horse liver rhodanese of comparable purity. The general properties were found similar, but sufficient dissimilarities exist to warrant the conclusion that the enzymes from the two sources, though members of a common enzyme family, are distinct. The thermal denaturation point is 56° C. for the mammalian rhodanese,

45° C. for that from clam liver, the 50% inhibition point for Cu^{2+}ions was reached at $c = 3x10^{-6}$ in the mammalian enzyme, at $c = 5.6x10^{-5}$ in the clam enzyme. The pH optima coincide, but the response to phosphate ions differs markedly. The sensitivity to cyanide and the protective effect of thiosulfate much less pronounced in the clam rhodanese as compared with the mammalian rhodanese.

The Normal Development Of The Sand Dollar Egg

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The time sequence of the early cleavage stages, from fertilization to 32-cell stage, of the egg of the sand dollar, *Echinarachnius parma*, was followed microphotographically and the results statistically analyzed. Parallel series were run for different temperatures. The further development up to pluteus stage was mapped microscopically and the time sequence established. The gained fundamental information will be used in further studies of the embryology of this echinoderm material.

Maternal-Embryo Relationships in the Spiny Dogfish, Squalus acanthias.

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While the dogfish embryo shows no "placentation", and the existence of a gaseous exchange between mother and embryo is obvious, other possible chemical relationships are still obscure. No difference in total iron was found between early (capsule and late (pup) embryos. No evidence of a fetal pup hemoglobin was found in oxygen saturated absorption curves. The uterine fluid changes from one similar to blood in the capsule stages (urea, Cl, Ca, Mg, pH) to a slightly modified form of sea water for the pup stages (no urea, Mg, Cl). This later fluid has a pH under 6, detectable Fiske-SubbaRow phosphate, and a positive Nessler reaction not due to urea or volatile ammonia. This sea water probably enters through the utero-cloacal pore which becomes very flaccid in the pup stages. The pups urinate into the uterus (direct observation). Experiments indicate that, based on maternal urine and bile content, the uterus is permeable in the uterine-maternal direction to phenol red, atabrine, and sodium fluorescein. The uterus is impermeable to these substances in the maternal blood-uterine direction. The embryo is impermeable to those substances except after oral ingestion. The uterus and embryo are permeable to maternally injected antipyrine, and the uterus is permeable to maternally injected I^{131}. Move-