temperature in the adjacent sea stays between 13 - 14.5°C. However, daily fluctuations can be considerable—several degrees—and an overcast period may have still greater influence. The tidal sills permit a flood influx sufficient enough to keep the salinity at a level very close to that of the adjacent sea (between 31 - 32 promille); in lakes with very shallow thresholds evaporation may tend to slightly elevate the salinity.

These warm lakes, which are characterized by dense Zostera and Ruppia vegetation, house warm-water forms, such as Venus mercenaria, Haminoea solitaria and Gemma gemma, which are not found in the adjacent sea. At present they are represented again south of the Damiscotta River and in the warm pocket of Northumberland Strait on the south coast of Prince Edward Island. They may be considered as relict forms from the post-glacial warm-period when the marine fauna of Maine and the Maritime Provinces was of virginian type, and the waters of the Bay of Fundy and the Gulf of St. Lawrence were connected through a channel across the Chignecto Isthmus.

Gemma rears its young in the gill pockets, and the planktonic life of Haminoea larvae must be very short. These forms may thus be self-perpetuating in the tidal lakes and presently endemic. For Venus, however, the interesting question arises if the spat is of endemic origin or if current-carried planktonic larvae find their way into the lakes from the outside. (See p. 30 for table.)

1963 #6

FACTORS AFFECTING GILL-PERMEABILITY IN Squalus acanthias

J. W. Boylan, B. Feldman, and D. Antkowiak, State University of New York, at Buffalo, N. Y.

Using an in vivo gill perfusion technique, we studied urea loss at the dogfish gill: (1) at perfusate temperatures between 1 and 30°C, (2) after urea loading of 33 to 166 mm/kg, and (3) with Na-free and K-free perfusate.

The temperature effect is such that there is no consistent change in gill permeability to urea between 1 and 15°C. Twenty measurements in this temperature range gave a mean and S.D. of 12.2 ± 3.04 mg/hr/kg body weight. Above 15°C gill permeability rises markedly. At 19°C the increase in urea loss from the gill is doubled, at 22°C it is 4X, at 25°C 7X, and at 30°C 10-50X normal. Survival at 30°C was 25 min in two fish studied.

When blood urea level is elevated by intravenous urea loading urea loss at the gill is increased out of proportion to the increased gradient. Doubling the plasma urea resulted in a twentyfold increase in urea excretion at the gill. Interestingly, this was not accompanied by an increase in body weight. Expressed as gill clearance of urea the normal value of 0.4 cc/hr/kg was increased to 0.9, 1.6, and 4.7 cc/hr/kg by loads of 33, 83, and 116 mm urea/kg respectively.

Preliminary experiments were conducted to determine the effect on urea loss of specific ions in the perfusate. No effect was noted on removal of K. However, equimolar replacement of sodium by Choline caused a marked increase in gill permeability to urea. This ion effect will be investigated further.

Supported by National Science Foundation Grant #G-13047.

		Mill Cove Pond	Pretty Marsh lower pd.	Pretty Marsh upper pd.	Goose Marsh Pond	Pond S. of Thompson I.
Longitude	W68°	24'30''	24'10''	24'00''	23'35''	21'55''
Latitude	N44°	20'55''	20'25''	20'35''	21'10''	25'30''
Area	km^2	0.09	0.04	0.04	0.15	0.015
Length	km	0.7	0.4	0.5	0.7	0.2
Average depth at MLW	m	<0.5	<0.5	up to 1.5	<0.3	<0.4
Sill depth below MHW	m	0.3	1.8	0.2	1.6	1.2
1963 July-August temperature range	°C	16.6-24.7	15.7-20.8	16.0-23.2	21.0-26.6	17.4-23.4
Bottom conditions		sandy mud	sandy mud and stones	sandy mud and stones	sandy mud	sandy mud
VEGETATION:						
Zostera marina		abundant		common	abundant	abundant
Suppia maritima		abundant		abundant		common
ENDEMIC RELICTS:						
Venus mercenaria		fair	some			
Gemma gemma		common		abundant	occasional	
Haminoea solitaria		common		fair		some
WARM-WATER FORMS: (also found elsewhere)						
Hydrobia minuta		abundant	common	abundant	common	abundant
Nassatius obsoletus		some		abundant		common
Crepidula fornicata			some			
Pyramidella fusca		fair			some	
Odostomia trifida				some		
Asterias forbesi				fair		
OTHER CHARACTERISTIC ANIMALS:						
Campanularia flexuosa		fair				
Campanularia amphora			common	fair		
Obelia geniculata		fair				
Littorina littorea		abundant		fair		common
Littorina saxatilis					abundant	abundant
Pitar morrhuana			fair			
Macoma baltica			common			common
Ensis directus			fair			
Mya arenaria		fair	common	fair	fair	
Mysis stenolepis		common		fair		
Oxyurostylis smithi				fair		
Idothea baltica		common			some	fair
Corophium volutator			abundant			
Gammarus oceanicus		common				
Gammarus phosphorea				common		
Crago septemspinosus						