

governed by interfacial energies and respective salinities. The heat flux would exist without any water discharge. A stable regime exists, however, because for some vein size $\theta_L = \theta_V$.

Nye's (1976) "contradicts" Nye and Mae (1972) because it ignores the important findings of this previous work. It was clearly asserted in the abstract: "Internal melting and freezing at grain boundaries and veins will occur in temperate glacier ice, with some effect, not discussed here, on its permeability to water." My paper affords this missing discussion and shows that it is not "some" effect; it turns to be the essential one.

Laboratoire de Glaciologie et Géophysique
de l'Environnement,
F-38402 Saint-Martin-d'Hères Cedex,
France

LOUIS LLIBOUTRY

26 March 1997

REFERENCES

- Nye, J. F. 1976. Water flow in glaciers: jökulhlaups, tunnels and veins. *J. Glaciol.*, **17**(76), 181–207.
Nye, J. F. and S. Mae. 1972. The effect of non-hydrostatic stress on intergranular water grains and lenses in ice. *J. Glaciol.*, **11**(61), 81–101.

Sir

Acknowledgement of Professor Lliboutry's reply to "Comments by J. Nye on "Temperate ice permeability, stability of water veins and percolation of internal meltwater" by L. Lliboutry"

I am grateful to Professor Lliboutry for his response. On the second point, he is perfectly right in pointing out that my (Nye, 1976) paper omitted the heat flow between lenses and veins; this had indeed been treated quantitatively by Nye and Mae (1972), but ignoring any effect of the different salinities and without considering in detail the effect on permeability. I am glad to see that Professor Lliboutry has now given attention to the effect this heat flux may have on the permeability of glaciers to water.

H.H. Wills Physics Laboratory,
University of Bristol,
Bristol BS8 1TL, England.

JOHN NYE

26 March 1997

REFERENCES

- Nye, J. F. 1976. Water flow in glaciers: jökulhlaups, tunnels and veins. *J. Glaciol.*, **17**(76), 181–207.
Nye, J. F. and S. Mae. 1972. The effect of non-hydrostatic stress on intergranular water grains and lenses in ice. *J. Glaciol.*, **11**(61), 81–101.