Contribution Title:	MATHEMATICAL ANALYSIS OF UNSTEADY FLOWS OF FLUIDS WITH PRESSURE, SHEAR-RATE AND TEMPERATURE DEPENDENT MATERIAL MODULI
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In his treatise titled "The physics of high pressures" (1931), Bridgman carefully documented that the viscosity and the thermal conductivity of most liquids depend on the pressure and the temperature. The relevant experimental studies show that even at high pressures the variations of the values in the density are insignificant in comparison to that of the viscosity, and it is thus reasonable to assume that the liquids in question are incompressible fluids with pressure dependent viscosities.

We rigorously investigate the mathematical properties (such as the existence and regularity) of unsteady three-dimensional internal flows of such incompressible fluids. The model is expressed through a system of partial differential equations representing the balance of mass, the balance of linear momentum, the balance of energy and the equation for the entropy production. Assuming that we have Navier's slip at the impermeable boundary we establish the long-time existence of a (suitable) weak solution when the data are large.