Find an expression for $\left(\frac{\partial s}{\partial v}\right)_T$ for a gas whose equation of state is $(P-\frac{a}{v^2})(v-b)=RT$

According to the Maxwell relations is $\left(\frac{\partial s}{\partial v}\right)_T = \left(\frac{\partial P}{\partial T}\right)_v$ and with the equation of state $(P-a/v^2)(v-b)=RT \rightarrow P=\frac{RT}{v-b}+\frac{a}{v^2}$ it follows that $\left(\frac{\partial s}{\partial v}\right)_T = \left(\frac{\partial P}{\partial T}\right)_v = \frac{R}{(v-b)}$