1. How many atoms are there in a person of 73 kg if the composition (by mass) of human body is $65 \% O_{2}, 18.5 \% C_{2}, 9.5 \% H_{2}, 3.3 \% N_{2}, 1.5 \% C a$, $1 \% P$ and $0.35 \%$ other elements? (Hint: Ignore other elements)
(H. C. Ohanian, "Physics", Pr. 1.22)
2. The motion of a rocket burning its fuel at aconstant rate while moving through empty interstellar space can be described by

$$
x=u_{e x} t+u_{e x}\left(\frac{1}{b}-t\right) \ln (1-b t)
$$

where $u_{e x}$ and $b$ are constants ( $u_{e x}$ is the exhaust velocity of the gasses at the tail of the rocket and $b$ is proportional to the rate of fuel consumption).
(a) Find a formula for the instantaneous velocity of the rocket
(b) Find a formula for the instantaneous acceleration.
(c) Suppose that a rocket with $u_{e x}=3.0 \times 10^{3} \mathrm{~m} / \mathrm{s}$ and $b=7.5 \times$ $10^{-3} / s$ takes $120 s$ to burn all its fuel. What is the instantaneous velocity at $t=0 \mathrm{~s}$ ? At $t=120 \mathrm{~s}$
(c) What is the instantaneous acceleration at $t=0 \mathrm{~s}$ ? At $t=120 \mathrm{~s}$ ? (H. C. Ohanian, "Physics", Pr. 2.21)
3. Suppose you throw a stone straight up with asn initial speed of $15.0 \mathrm{~m} / \mathrm{s}$.
(a) If you throw a second stone straight up 1.00 s after the first, with what speed must you throw this second stone if it is to hit the first at a height of 11.0 m ? (There are two answers. Are both plausible?)
(b) If you throw the second stone 1.30 s after the first, with what speed must you throw this second stone if it is to hit the first at a height of 11.0 m
(H. C. Ohanian, "Physics", Pr. 2.51)
4. Show that $\vec{A} \times(\vec{B} \times \vec{C})=\vec{B}(\vec{A} \cdot \vec{C})-\vec{C}(\vec{A} \cdot \vec{B})$
(H. C. Ohanian, "Physics", Pr. 3.46)

