Supplementing it with a continuity equation and designating, as before,

$$Q = RT_0 \ln \frac{p}{p_0} + \Phi, \quad \vartheta = \frac{T - T_0}{T_0}, \quad c^2 = \frac{c_p}{c_v} RT_0,$$

we reach a system analogous to (7) and, further, we get equation (9) and solution (10)..

After this in the obtained solution it is necessary to return to the spherical coordinate system, using formulas (23), and for velocities entering in F_i (and derivatives of F_i), using solution (10), formula (24).

In formula (10) we should now replace $\int\limits_{-\infty}^{\infty}\int\int \ldots d\overline{x}' \, d\overline{y}' \, d\overline{z}'$ by $\int\limits_{-\pi/2}^{+\pi/2}\int\limits_{0}^{2\pi}\int\limits_{0}^{\infty} \ldots r^2 \cos\varphi \, dr \, d\lambda \, d\varphi$ on the right side of the integral, Further, we have

$$\frac{\partial}{\partial x_1} = \cos\varphi\cos\lambda\frac{\partial}{\partial r} - \frac{\sin\varphi\cos\lambda}{r}\frac{\partial}{\partial\varphi} - \frac{\sin\lambda}{r\cos\varphi}\frac{\partial}{\partial\lambda},$$

$$\frac{\partial}{\partial y_1} = -\cos\varphi\sin\lambda\frac{\partial}{\partial r} + \frac{\sin\varphi\sin\lambda}{r}\frac{\partial}{\partial\varphi} - \frac{\cos\lambda}{r\cos\varphi}\frac{\partial}{\partial\lambda},$$

$$\frac{\partial}{\partial z_1} = \sin\varphi\frac{\partial}{\partial r} + \frac{\cos\varphi}{r}\frac{\partial}{\partial\varphi},$$

$$\Delta = \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2} = \frac{\partial^2}{\partial r^2} + \frac{2}{r}\frac{\partial}{\partial r} + \frac{1}{r^2\cos^2\varphi}\frac{\partial^2}{\partial\varphi^2} + \frac{1}{r^2}\frac{\partial^2}{\partial\lambda^2} + \frac{\operatorname{ctg}\lambda}{r^2}\frac{\partial}{\partial\lambda},$$

$$R_1^2 = (x_1 - x_1')^2 + (y_1 - y_1')^2 + (z_1 - z_1')^2 = r^2 + r'^2 - 2rr'\cos\gamma,$$

$$r_1^2 = (x_1 - x_1')^2 + (y_1 - y_1')^2 = r^2\cos^2\varphi - 2rr'\cos\varphi\cos(\lambda - \lambda') + r'^2\cos^2\varphi,$$

$$\cos\gamma = \cos\varphi\cos\lambda\cos\varphi'\cos\lambda' + \cos\varphi\sin\lambda\cos\varphi'\sin\lambda' + \sin\varphi\sin\varphi'.$$

Let us now separate from the third integral that integral with respect to r. For brevity let us examine, e.g., only the integral M (the others are analogous):

$$M = \int\limits_0^\infty \Delta\overset{0}{Q}\frac{1}{R_1}J_0\left(\frac{2\omega r_1 t}{R_1}\right)r'^2\,dr'.$$

We find that M has the form (a is the earth's radius):

$$M = \int\limits_0^\infty \psi(r') f(r^2, r'^2, rr')\,dr = \left(\int\limits_0^a + \int\limits_a^\infty\right)\psi(r') f(r^2, r'^2, rr')\,dr' =$$

$$= \left(\int\limits_a^\infty - \int\limits_a^0\right)\psi(r') f^0(r^2, r'^2, rr')\,dr'.$$

Further, setting $r' = a^2/r''$ in the integral from a to 0, we get

$$M = \int\limits_a^\infty \psi(r') f(r^2, r'^2, rr')\,dr' + \int\limits_a^\infty \psi\left(\frac{a^2}{r''}\right) f_1\left(r^2, \frac{a^4}{r''^2}, \frac{a^2 r}{r''}\right)\frac{a^2 dr''}{r''^2} =$$

$$= \int\limits_a^\infty \left[\psi(r') f(r^2, r'^2, rr') + \psi\left(\frac{a^2}{r'}\right) f_1\left(r^2, \frac{a^4}{r'^2}, \frac{a^2 r}{r'}\right)\frac{a^2}{r'^2}\right]dr'.$$

Let us require that when r = a, $\partial Q/\partial r = 0$. For this it suffices to set

$$\left[\psi(r')\frac{\partial f}{\partial r} + \psi\left(\frac{a^2}{r'}\right)\frac{\partial f_1}{\partial r_1}\frac{a^2}{r'^2}\right]_{r=a} = 0,$$