We shall apply these equations to a steady motion with velocity-potential φ, without supposing that $Div\ \mathfrak{v}$ vanishes. We shall however neglect quantities of the order $\mathfrak{v}^2$.

Now if, instead of t, we introduce as a new independent variable

$$t' = t + \frac{\varphi}{V^2}\ ,$$

and instead of $\mathfrak{v}$ and $\mathfrak{H}$ the vectors $\mathfrak{F}'$ and $\mathfrak{H}'$, defined by

$$\mathfrak{F}'_x = 4\,\pi\,V^2\,\mathfrak{v}_x + (\mathfrak{v}_z\,\mathfrak{H}_y - \mathfrak{v}_y\,\mathfrak{H}_z),\ \text{etc.},$$

and

$$\mathfrak{H}'_x = \mathfrak{H}_x - 4\,\pi\,(\mathfrak{v}_z\,\mathfrak{d}_y - \mathfrak{v}_y\,\mathfrak{d}_z),\ \text{etc.},$$

the equations become

$$Div\ \mathfrak{F}' = 0\ ,$$

$$\frac{\partial\mathfrak{H}'_z}{\partial y} - \frac{\partial\mathfrak{H}'_y}{\partial z} = \frac{1}{V^2}\frac{\partial\mathfrak{F}'_x}{\partial t'}\ ,\ \text{etc.}$$

$$Div\ \mathfrak{H}' = 0\ ,$$

$$\frac{\partial\mathfrak{F}'_z}{\partial y} - \frac{\partial\mathfrak{F}'_y}{\partial z} = -\frac{\partial\mathfrak{H}'_x}{\partial t'}\ ,\ \text{etc.}$$

These formulae have the same form as those that would hold for an aether without motion, and this is sufficient to obtain in a moment the well known theorems concerning the rotation of the wave-fronts and the rectilinearity of the rays of light. At the same time we see that at the boundary of the different layers of the aether, which slide one over the other, there is never a reflection of light.

It is curious that in the two rival theories somewhat the same mathematical artifices may be used.

3. There seems to be nothing against the assumption that, while the aether may be condensed by gravitation, molecular forces are incapable of producing this effect. In this way it might be explained that small masses, e. g. the flowing water in FIZEAU's experiments, cannot drag the aether along with it. In these cases the coefficient of FRESNEL would remain of use.

4. A decision between the two theories would be soon obtained, if the phenomena of the daily aberration were sufficiently known. Unfortunately, this is by no means the case; even, as Prof. VAN DE SANDE BAKHUYZEN assures me, one has never purposely examined what the existing observations teach us concerning this aberration.

Mathematics. — *"On reducible hyperelliptic Integrals."* By Prof. J. C. KLUYVER.

(Will be published in the Proceedings of the next meeting.)

(April 22th 1899.)