Remarks to "Comment on 'Observation of scalar longitudinal electro dynamic waves' by C. Monstein and J. P. Wesley" of J. R. Bray and M. C. Britton

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Theoretical aspects. –   Current can flow out onto the surface of the metal ball to accumulate a surface charge precisely as out onto the surface of any other condenser plate. Bray and Britton have incorrectly concluded that current J_r cannot flow out onto the surface of a metal ball of radius r to produce an oscillating surface charge $\dot{Q} = 4\pi\dot{\sigma}r^2$; because they have not considered the discontinuity boundary condition at the surface, where $J_r = \dot{\sigma}$. They have correctly concluded that the scalar wave equation for the electrostatic potential Φ, involving $\nabla \cdot (\nabla\Phi) = \nabla \cdot \mathbf{E} \neq \mathbf{0}$, violates Maxwell's fourth equation. But the Maxwell theory fails in this particular case as well as in other ways [Wesley (2002)]. The Lorentz condition is irrelevant, there being no $\mathbf{A}$ field in a longitudinal electric $\mathbf{E}$-wave. In conclusion, by Bray and Britton that our theory is "flawed" is, thus, not justified.

Practical aspects. –   To the second objection against our paper I clearly have to agree. I erroneously built in a 'typo' into our Eq. 1.

$$\nabla^2\Phi - \partial^2\Phi^2/\partial t^2 c^2 = -4\pi\rho \tag{1}$$

which - by the way - nobody else recognized. The correct form of course is

$$\nabla^2\Phi - \partial^2\Phi/\partial t^2 c^2 = -4\pi\rho \tag{2}$$

Since the project was a 'side effect' of our daily engineering work, there was and is no regular budget available for further detailed investigations. This kind of research unfortunately is not directly related to our key program. Due to some missing laboratory equipment and facilities, we are also not in a position to demonstrate, that a spherical ball antenna *cannot* generate a classical TEM-wave. It is rather difficult to demonstrate the negative result of the absence of classical TEM-waves using ball or plate antennas. The ball antenna was explicitly designed to mainly produce scalar waves. The character of the waves was demonstrated to be longitudinal by introducing a polarizer between sender and receiving power meter. Longitudinality was also demonstrated by introducing a radially oriented halve-wave dipole with a light bulb in the center of the dipole. The bulb only lit when the dipole was orientated radially but not when orientated perpendicular to the transmission ball antenna. Unfortunately, it was not

possible to use a controlled environment in the form of an outdoor antenna range. As far as we know there is no such farm available here in Switzerland. The carefully selected bank of the river Rhein was the best test facility we could get for free. An anechoic chamber with one kilometer in size or even more would be nice to have, but it may be rather difficult to organize one.

We also know that further investigations are necessary, and we hope that other, better situated investigators will improve the experimental setup and will repeat our observations.

REFERENCES

[Wesley (2002)]   J. P. Wesley, *Scientific Physics*, Benjamin Wesley, 78176 Blumberg Germany, 2002 pp. 90-166; 301-320.