But $L = 0$ by virtue of the field equation (3); that is, $\theta_\mu{}^\mu = 0$. Thus, the dilatation current and conformal current defined respectively by

$$D_\mu = x^\nu \theta_{\mu\nu}; \quad K_{\mu\nu} = \left(2x_\mu x_\lambda - g_{\mu\lambda}x^2\right)\theta_\nu{}^\lambda \tag{5}$$

are exactly conserved in the forms $\partial^\nu D_\nu = \theta_\mu{}^\mu = 0$; $\partial^\nu K_{\mu\nu} = 2x_\mu \theta_\lambda{}^\lambda = 0$

Thus, the model has dilatation symmetry.

The 0(4, 2) mass equation for equation (3) is simply

$$m - m^2/M = 0 \tag{6}$$

which has two eigenvalues, $m = 0$ and $m = M$. We may associate $m = 0$ with strictly massless Goldstone's bosons, and $m = M$ with the real world of strongly interacting particles with nonzero rest masses in the quark model. Indeed, if $m_{\mathcal{P}} = m_{\mathcal{R}}$, then chiral $SU_3 \times SU_3$ symmetry is broken in the manner proposed by Gell-Mann, Oakes and Renner.[2] We are thus able to obtain a nontrivial scale-invariant wave equation that fulfills Lorentz-covariance, gauge-invariance, 0(4, 2) invariance, and SU_3-invariance in the appropriate limit. Equations of type (3) include *convective currents* (the second-order derivative structure) and were first considered in connection with radiation reaction theories.[3]

References

1. A. O. Barut, Phys. Rev. Lett. **20**, 893 (1968).
2. M. Gell-Mann, R. J. Oakes, B. Renner, Phys. Rev. **175**, 2195 (1968).
3. G. Rosen, Nuovo Cimento **32**, 1037 (1964).

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Waste management

It is with great interest that I read "Physics Looks at Waste Management" in the February issue (page 32). I would like to make the simple point that if people were less wasteful, there would be less junk around to contend with. For example on the cover of this same issue, which represents a pile of junk cars, one can plainly see that the green one, on the top of the pile, only needs a new clutch.

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Correction

February, page 73—The figure given in the table for gas-main explosions should read 3×10^{-12} instead of 3×10^{-1}. □