ESSENTIALLY NONLINEAR ONE-DIMENSIONAL MODEL OF CLASSICAL FIELD THEORY (Addendum)

L. A. Takhtadzhyan and L. D. Faddeev

The literature cited to this paper (Teor. Mat. Fiz., 21, 160 (1974)) contains: [7] L. D. Faddeev and L. A. Takhtadzhyan, Phys. Lett, (to be published). Unfortunately, for reasons that remain unknown to us this paper, with the title: "The relativistic one-dimensional model, generating several particles" was not published in Physics Letters, although it was sent to this journal twice (in December 1973 and in June 1974). Below we give the text of the conclusion of this paper.

"Finally, let us say a few words on the quantum-mechanical interpretation of our results. We are convinced that when the field u(x, t) is quantized there are no significant changes in the structure of the results, since existing experience suggests that for long times and infinite motions the quantum dynamics become quasiclassical. The most interesting difference is that when the field u(x, t) is quantized the possible values of the coupling constant γ are exhausted by the numbers $8\pi/N$, where the parameter N is a positive integer. This follows from the fact that the phase space corresponding to the internal degree of freedom is compact and has phase volume $16\pi^2\gamma^{-1}$ which must be integral units of 2π. The quantized mass M of a bound state takes the N different values $(2N/\pi)\sin[\pi/2N]\,(k+1/2)$, $k = 0, 1, \ldots, N-1$. Of course, these conjectures can be confirmed only by a consistent quantum-mechanical analysis of the equation $u_{tt} - u_{xx} + \sin u = 0$, which we are at present undertaking. It is remarkable that when N increases so do the masses of the charged particles and the number of bound states of two particles with opposite charges, whereas the coupling constant γ decreases. All this suggests that we have a model for baryon charge without a gauge group and the concomitant undesirable long range interaction."

We should like to use this opportunity to correct an unfortunate misprint in our paper (Teor, Mat. Fiz., 21, 160 (1974)): in the formula on Russian page 173, there occurs $\left(\frac{\eta}{|\zeta|}\frac{1}{\sqrt{1-v^2}}(x-vt+\beta_0)\right)$; it should be $\left(\frac{\eta}{|\zeta|}\frac{1}{\sqrt{1-v^2}}(t-vx+\beta_0)\right)$.

Translated from Teoreticheskaya i Matematicheskaya Fizika, Vol. 22, No. 1, p. 143, Jaunuary, 1975.