class on the three-fold [this is (11.8.1) of the text].

$\kappa = 3$. For surfaces of maximal Kodaira dimension the higher pluricanonical mappings are morphisms; it is unknown whether this is the case for three-folds. It is also not known whether deformations of such three-folds still have $\kappa = 3$. One would hope that a moduli space would exist for such three-folds as one does for surfaces of general type; indeed, some work towards this goal has been accomplished now. Again the case of sextic three-folds in $\mathbf{P}^4$ doesn't seem to have been studied.

The author has indeed provided the mathematical community with a valuable manuscript. It could well serve as the basis for independent study or for a seminar; although, for a seminar topic perhaps a detailed look at the classification theory of surfaces would be more profitable. As a reference it serves best as a guide to the literature; although one notable feature is that it includes some new and better proofs of published results.

BIBLIOGRAPHY

1. M. Artin and D. Mumford, *Some elementary examples of unirational varieties which are not rational*, Proc. London Math. Soc. (3) **25** (1972), 75–95. MR **48** #299.

2. E. Bombieri and D. Husemoller, *Classification and embeddings of surfaces*, Proc. Sympos. Pure Math., vol. 29, Amer. Math. Soc., Providence, R. I., 1975, pp. 329–420.

3. C. H. Clemens and P. A. Griffiths, *The intermediate Jacobian of the cubic threefold*, Ann. of Math. (2) **95** (1972), 281–356. MR **46** #1796.

4. V. A. Iskovskih and Ju. I. Manin, *Three-dimensional quartics and counterexamples to the Lüroth problem*, Mat. Sb. **86** (**128**) (1971), 140–166 = Math. USSR Sbornik **15** (1971), 141–166. MR **45** #266.

5. S. Kobayashi and T. Ochiai, *Meromorphic mappings onto compact complex spaces of general type*, Invent. Math. **31** (1975), fasc. 1, 7–16.

6. D. Mumford, *Curves and their Jacobians*, The Univ. of Michigan Press, Ann Arbor, 1975.

7. U. Persson, Ph.D. thesis, Harvard Univ., Cambridge, Mass.

8. L. Roth, *Algebraic threefolds with special regard to problems of rationality*, Springer-Verlag, Berlin, 1955. MR **17**, 897.

9. J. Shah, Ph.D. thesis, Mass. Inst. Tech., Cambridge, Mass.

10. A. N. Tyurin, *Five lectures on three-dimensional varieties*, Uspehi Mat. Nauk **27** (1972), no. 5 (167), 3–50 = Russian Math. Surveys **27** (1972), no. 5, 1–53.

GAYN B. WINTERS

BULLETIN OF THE
AMERICAN MATHEMATICAL SOCIETY
Volume 83, Number 3, May 1977

Introduction to axiomatic quantum field theory, by N. N. Bogolubov, A. A. Logunov, and I. T. Todorov, Mathematics Physics Monograph, no. 18, W. A. Benjamin, Inc., Reading, Massachusetts, 1975, xxvi + 708 pp., $32.50.

Let us begin with a brief history of why physicists attach great importance to the quantum theory of fields. Dirac, Heisenberg and other great scientists conceived this theory as a synthesis of two extremely fruitful ideas. On the one hand, relativistic quantum mechanics (the Dirac equation) had extended Schrödinger mechanics to predict quantitatively the fine structure of the hydrogen atom spectrum. It also suggested the existence of antimatter. On the other hand, classical field theory (Maxwell's equations for electromagnetism and the Newton-Einstein theory of gravity) provided the theoretical basis for macroscopic physics. The hypothesis of quantum field theory was that