duction to the subject. After a short chapter describing the formal properties of continued fractions, the remainder of the book describes the representation and approximations of numbers by continued fractions, and their measure theory. While the latter portion is rather mathematical, its clarity makes it accessible to any reader who has got that far.

Linear Algebra (2nd ed.). By Werner H. Greub. 338 pp. (Springer-Verlag, Berlin) Academic, New York, 1963. $12.00.
Reviewed by Dagmar Renate Henney, University of Maryland.

The second edition of Professor Greub's *Linear Algebra* presents a translation from the author's original text (which was written in German) into English. With this the author even changed the spelling of his name from Graeub to Greub and Americanized his name further by adding a fashionable middle initial. But there are also considerable changes in the subject matter which make it worthwhile for the scientist who owns the German version to consider the purchase of the English version also. The German text contains eleven chapters, whereas the second edition has two additional chapters.

The first half of the book compares favorably to Gel'fand's or Halmos' books. It is devoted to an introduction to linear spaces, linear transformations, matrices (treated here more theoretically and with fewer applications than in Nering's *Linear Algebra and Matrix Theory*), determinants, oriented linear spaces, multilinear mappings, and tensors. It is interesting to note that Professor Greub's representation of linear algebra is based on the concept of a linear space and not as is usually done on n-dimensional Euclidean space. In his presentation the influence of Hermann Weyl and William Threlfall is noticeable. Special emphasis is given to tensors. The notion of vector-valued tensors is introduced and used to define contractions. There is an additional treatment of transformations of tensors under linear mappings in the English version and the antisymmetry-operator is studied in more detail while the dual product is generalized to mixed tensors. The author covers skew-symmetric powers of the unit tensor and illustrates their importance in the characteristic polynomial. The chapter devoted to adjoint tensors shows various applications of the duality theory to tensors arising from an endomorphism of the underlying space. A discussion of linear product spaces, linear mappings of such spaces, unitary spaces, and invariant subspaces concludes the text.

There are few but generally well-chosen problems at the end of each chapter. A chart showing the relations and interdependence of the chapters (as used by Dunford and Schwartz also) can be found preceding Chapter 1. This is one of the most precise and valuable versions available in English today.

The Theory of Space, Time and Gravitation (2nd Ed.). By V. Fock. Transl. from Russian by N. Kemmer. 439 pp. (Pergamon, Oxford) Macmillan, New York, 1964. $15.00.
Reviewed by James L. Anderson, Stevens Institute of Technology.

Since it first appeared in 1955, this treatise has become a standard work in the field of relativity theory, taking its place alongside the works of Weyl, Pauli, Eddington, Tolman, Möller, and Bergmann. Beautifully written, it contains much material not readily available elsewhere. However, it is an extremely individualistic work devoted to an exposition of the author's own special views of the foundations of relativity theory. (He insists, for instance, on referring to what is commonly known as the general theory of relativity as gravitation theory.) It is a tribute to the book that although many workers in the field disagree strongly with these views they are unanimous in their regard for the book as a piece of scientific writing.

The second edition of Fock's book shares all of the virtues of the first edition but little more. Aside from a somewhat expanded section on the uniqueness of the energy-momentum tensor and two additional appendices containing applications of this material to the cases of electrodynamics and hydrodynamics, the second edition contains only one other addition to the first. However, this addition, contained in Section 49*, is significant in that it bears on the whole of Fock's approach.

Fock's main thesis is that there exist in nature privileged reference frames which must be discovered by one means or another and that a theory is incomplete until these frames are characterized within that theory. In special relativity they are the Galilean reference frames, while in the general theory, Fock asserts that the so-called harmonic coordinates constitute such a class of frames. For Fock, the value of such privileged frames is twofold. For one, they correspond to space-time measurements made with ideal clocks and measuring rods. More important, they serve to define what he calls the relativity principle of a given theory as the assertion of the equivalence of all the privileged frames of that theory. The group of coordinate transformations that lead from one such frame to another constitutes the transformation group appropriate to this relativity principle. In the special theory this group is the inhomogeneous Lorentz group. It is also the inhomogeneous Lorentz group, Fock argues but does not prove rigorously, for a certain class of solutions of the general theory.

The significance of Section 49* lies in the fact that Fock is able there to characterize the Lorentz group in the special theory in a purely geometrical manner without the need of bringing in the Galilean reference frames. As a consequence, his strongest argument for the existence of privileged frames is thereby invalidated. (One can also describe the measurement process in a frame-independent manner.) Furthermore it is clear from this section that what Fock has called a relativity principle is what is called a symmetry principle by other authors. We emphasize this point since Fock again asserts in Section 49* that a general principle of relativity is impossible. This assertion is the basis of his contention, stated throughout the book, that the term general relativity is meaningless. While it is pointless to argue over terminology, we would like to mention here that it is quite possible to give a meaning to this term very near to the one intended by Einstein. In special relativity the