Theorem 4. Let R be as in Theorem 2. Each torsion-free R-f-module M can be embedded in a Hahn-product of f-modules $V(\Gamma, N_\alpha)$ where $\Gamma$ contains the Q(R)-value set of E(M). (Received February 11, 1971.)

71T-A73. PATRICK J. FLEURY, State University College of New York, Plattsburgh, New York 12901. Cotriples and the Witt functor. Preliminary report.

An H-map between commutative rings is a function $t:R_1 \to R_2$ with $t(0) = 0$, $t(1) = 1$, $t(ab) = t(a)t(b)$, and $t(a) + t(b) = t(a+b)(1+t(ab))$. Coleman and Cunningham ("Harrison's Witt ring of a commutative ring," to appear) have shown that there is an endofunctor, W, on the category of commutative rings with the following property: there is an H-map $t_A: A \to W(A)$ for any commutative ring such that for all H-maps $t:A \to A'$, there is a unique ring homomorphism $G_t:W(A) \to A'$ with $G_t t_A = t$. Let $U:\underline{R} \to \underline{S}$ be the underlying set functor from commutative rings to sets and let $\underline{X}$ be the full subcategory of the comma category $(U, U)$ whose objects are H-maps from UA to UA'. We find that there exists a pair of adjoint functors $F_1 \dashv U_1:\underline{X} \to \underline{R}$ where $U_1(UA \to UA') = A$ and $F_1(A) = t_A: A \to W(A)$. The triple which these give rise to is the identity and the cotriple is idempotent. Furthermore, the functor $F_1$ is cotripleable. (Received February 11, 1971.)

71T-A74. J. DONALD MONK and PAUL R. SPARKS, University of Colorado, Boulder, Colorado 80302. Counting Boolean algebras. Preliminary report.

The following two theorems solve the counting problem for Boolean algebras and $\sigma$-complete Boolean algebras respectively. Theorem 1. For any infinite cardinal $\mathfrak{m}$, there are $2^{\mathfrak{m}}$ nonisomorphic Boolean algebras of power $\mathfrak{m}$. Each algebra constructed has an ordered basis. Theorem 2. For any infinite cardinal $\mathfrak{m}$, (i) if $\mathfrak{m} \neq \mathfrak{m}^{\aleph_0}$, then there are no $\sigma$-complete Boolean algebras of power $\mathfrak{m}$, (ii) if $\mathfrak{m} \neq \mathfrak{m}^{\aleph_0}$, then there are $2^{\mathfrak{m}}$ nonisomorphic $\sigma$-complete Boolean algebras of power $\mathfrak{m}$. Concerning $\mathfrak{n}$-complete Boolean algebras with $\mathfrak{n} > \aleph_0$ we have only a partial result: Theorem 3. If $\mathfrak{m}$ and $\mathfrak{n}$ are infinite cardinals such that $\mathfrak{m}^{\mathfrak{n}} = \mathfrak{m}$, then there are $2^{\mathfrak{m}}$ nonisomorphic $\mathfrak{n}$-complete Boolean algebras of power $\mathfrak{m}$. Note that cases in which $\mathfrak{m}^{\aleph_0} = \mathfrak{m}$ but $\mathfrak{m}^{\mathfrak{n}} \neq \mathfrak{m}$ are not covered. Finally, the number of nonisomorphic complete Boolean algebras is still unknown. Recall in this connection Pierce's theorem that there is a complete Boolean algebra of infinite power $\mathfrak{m}$ if and only if $\mathfrak{m}^{\aleph_0} = \mathfrak{m}$. (Received February 10, 1971.)

*71T-A75. HENRY W. GOULD, West Virginia University, Morgantown, West Virginia 26506. A new primality criterion of Mann and Shanks and its relation to a theorem of Hermite.

It is observed that a new necessary and sufficient condition for primality of a number due to Henry B. Mann and Daniel Shanks may be stated in two variant forms: (a) k is a prime if and only if n is a factor of $\binom{n}{k-2n}$ for all integers n such that $k/3 \leq n \leq k/2$; (b) $2n + 1$ is a prime if and only if $n - k$ is a factor of $\binom{n-k}{2k+1}$ for all $k = 0, 1, \ldots, [(n-1)/3]$. The 'only if' parts of these theorems follow from a theorem of Hermite that $\binom{m}{n}$ is always divisible by m/d where d is the g.c.d. of m and n. Another theorem of Hermite suggests that there may exist similar criteria of primality. Moreover, it is shown how the theorem may be extended to perfectly arbitrary arrays of generalized binomial coefficients. The key to this extension is the theorem that