R. McKenzie and J. D. Monk. *Chains in Boolean algebras.*

We study three invariants of a Boolean algebra A: *depth*(A), the sup of cardinalities of well-ordered subsets of A; *ordinal depth*(A), the sup of ordinals embedded in A, and *length*(A), the sup of cardinalities of linearly ordered subsets of A. We describe how these invariants behave with respect to products, free products, formation of subalgebras, etc. Some of the more difficult results are as follows. *Theorem* 1. If *depth*$(A) = \kappa$ and $\mathrm{cf}(\kappa) = \omega$, then depth is attained. For *depth*$(A) = \kappa$ limit with $\mathrm{cf}(\kappa) > \omega$ there are examples with non-attainment. *Theorem* 2. If $\mathrm{cf}(\kappa) > \omega$, A has no chain of size $\mathrm{cf}(\kappa)$, and B has no chain of size κ, then $A * B$ has no chain of size κ.(Similarly with"type" instead of "size". *Theorem* 3 (GCH) Suppose $|A| = \lambda^+$, A has a chain of type κ, $\aleph_0 \leq \kappa \leq \mu \leq \lambda$. Then A has a subalgebra of power μ and depth κ. Here GCH is necessary, and in general the theorem fails for $\mu = \lambda^+$. *Theorem* 4. ordinal depth is never attained. *Ordinal depth*(A) has the form $\omega^\alpha \cdot n$, where if $n = 1$ then $\mathrm{cf}(\alpha) > \omega$. (Receeived september 22, 1980)