width at the blunt point, ¾—1½ inches. The butt end should be welded, to increase strength and prevent spreading. Other features are similar to those of the regular angle piton. Limitation of maximum size is dependent upon metal strength (proportional to metal thickness) and thus on the weight that one is willing to carry.

P. K. SCHOENING

The Rock Anchor (Bolt) Set. Increasing numbers of rock climbers, with and without a fancy for technical undertakings, have begun to add the rock anchor set to their supplies of hardware.[2] The equipment was originally developed for purposes of direct aid, but it has proved valuable in other ways, *e.g.,* in the fixing of belay, safety and rappel anchors. The rock anchor has a strength of about 3000 lbs.; pitons have strength varying between 300 and slightly over 2000 lbs.

The usefulness of the anchor depends on the type of rock encountered. On hard rock failure of a drill or consumption of too much time may constitute a limitation.[3] Average granite requires about four minutes of drilling and only slightly dulls the drill. If a climber's position is such that a sound anchor is needed, expenditure of more time in drilling may be quite acceptable. Often the finding of a good crack and the insertion of a piton take 15 minutes or more. Comparing the strength of a piton with that of a bolt, one realizes that the time spent in fixing the latter may be well spent. On softer rock there is probably no limitation—since progressively longer anchors can be used to obtain the required strength. Anchors up to three inches long have been used successfully. If the rock were much softer (and the desire to climb persisted), some other device could be found, *e.g.,* a large nail.[4]

A very useful rock anchor (bolt) set includes: (1) two ¼-inch three-fluted Rawl twist drills (masonry); (2) a No. 14 drill holder, cut off, with a hole in the handle and a safety cord attached; (3) three ft. of ¼-inch rubber tubing for cleaning the holes; (4) ten ¼-inch Rawl-drives (stud type), five of them 1½ inches long for harder rock and five two inches long for softer rock; (5) five hangers, preferably of the ring type. Amazingly, the weight of this set is about 1¼ lbs. P. K. S.

[2] Cf. P. Schoening, "Rawl-Drive Climbing Anchor," *A.A.J.,* VIII (1951), 206-9.
[3] Cf. p. 345 above.
[4] See P. K. Schoening, "Pinnacle Summits via Rock Anchors," *Mountaineer,* XLIII (1952).