

two distinct categories. Climbing and long-distance running have medical connotations; downhill sliding, ski-joring and jumping have surgical connotations. In the former group the movements involved are mainly concerned with progression in a straight line, or, if in a curved one, are yet slow and well under control; in the latter they are quick and badly under control, especially when there is an abrupt change of direction. Consequently, in the former the disability is apt to take the form of exhaustion and cardiac over-strain, while in the latter we meet with abrasion, laceration, contusion, concussion, sprain, dislocation and fracture. In connection with the surgical disabilities speed and alteration of the line of projection seem to be the controlling factors. Statistics from Switzerland show that the injuries listed in the second group are more than one hundred times as common as are the disabilities of the first group. This would seem to indicate that most of the people in that country who go in for ski-ing do so for the sake of downhill gliding and not for climbing or flat-racing, and the same would seem to be true for Canada.

Disabilities on the side of the heart are said by Oscar Hug, of Zürich, to have been much commoner twenty or thirty years ago than they are now, in spite of the fact that nowadays the runs are sometimes much longer, the speed is greater, and the number of contestants has enormously increased. Henschen, in Sweden, in the 90's of the last century, by percussion methods found dilatation of the heart in as high as thirty per cent of ski-racers. In contrast with this, Hug and his associates, using the more perfect orthodiagraphic methods, did not find one case of cardiac dilatation among the racers at the Olympic Winter Games at St. Moritz in 1928. Rather unexpectedly, it was found that the hearts of racers were even smaller immediately after the contests than before, and, moreover, the greater the effort, the smaller the heart. This surprising result is to be attributed to the careful physical training to which the contestants submit themselves beforehand. As a corollary, we

may infer with certainty that no one should undertake long-distance runs and hill-climbing who has not been specially prepared for it, any more than one would enter a boat race "green."

In the case of descents, slalom and jumping, on the other hand, the matter is one of skill rather than endurance. Smoothness and promptness in co-ordination between nerves and muscles and the correct statics of the articulations here play a decisive role. Excessively violent pressure and traction, suddenly applied, can disrupt the normal anatomical relationships. The chief cause of this excessive pressure or traction is the great speed with which the body hurtles through the air, followed by the sudden stop. In a steep descent or a big jump this speed has been shown to reach on occasion fifty or sixty miles per hour. That injuries due to this cause are not more frequent or more serious, as we would expect *a priori*, is explained by the fact that the majority of falls occur tangentially rather than at right angles to the receiving surface, so that the force of the impact is greatly mitigated. The injuries found are usually those due to pressure caused by the body striking the ground too vertically, as for example, fractures of the femora; and the traction injuries, those due to a twist when the direction of movement is suddenly altered, which include sprains, twists and fractures. The latter type of accident is less serious, as a rule, than the former. With regard to the distribution of the injuries, the figures of Bernhard, v.Saar, Hug, and Knoll agree that the lesions are more common in the parts of the body nearest the skis. The lower extremities are affected in 68 per cent of cases. Serious injuries to the head or abdominal organs are very rare. The region of the ankle is involved in 31.5 per cent and the knee in 26.5. In general, injuries to the joints are much more numerous than fractures of the bones. Fortunately, the majority of injuries due to ski-ing can be completely cured, so that the sport can be taken up again safely, to the extent even of racing and jumping.

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