ystems in the ete pulverizathe degree of of literally ater rim, and asses as they ed and availto determine r beneath the gative results ven high conlling to depth ater anatomy experience in Hudson Bay r sites. (Prong a field trip g program is " should con-

definitely and a good start nal geological l significantly es beyond the as the maria ate coastlines" ntain ranges are in fact

epted craters, frequently do formation of questions may of very large

isions may be high energy hat the earth data already winced of this efore the list

ple. A hole is e thrown out.

TABLE II MISCELLANEOUS HIGH ENERGY PROCESSES

MISCEPHATEOUS HIGH EMERGE I MOUSES	_	
Process	$E \gamma$	iergy
Golfball off tee		109 ergs
Thimbleful of TNT		1011
Half ton of TNT		1016
Atom bomb—20 kilotons		10^{21}
Total airborne explosives, World War II		1023
H-bomb—100 megaton		10^{25}
Earthquake, San Francisco (1906), Chile (1960)		10^{24}
Annual total for earthquakes		10^{25}
Heat flow from Earth	8 ×	1027
Mountain range (1,600 \times 480 \times 1 km) raised 1 km		10^{29}
Arizona Meteor Crater—dig out		1022
Ries Kessel—dig out		1027
Hudson Bay Crater, 440 km—dig out		1031
Spheroid, of density 3.5 gm/cc and speed 72 km/sec, with diameter of:		
0.032 km		
0.32	$1.5 \times$	1027
3.2	1.5 ×	1030
32	$1.5 \times$	1033
320.	$1.5 \times$	1036
640,	$1.2 \times$	1037
Rotational energy—Moon	$3 \times$	1030
Rotational energy—Earth		1036
Energy-Moon about Earth		1085
Energy—Moon about Sun		1088
Energy-Earth about Sun	$^2 \times$	1040

The larger the impact the greater the scars, but other effects become increasingly important. A partial list is given:

- (1) Earth encircling tidal waves set off by shock on land masses and by direct hits in oceans.
- (2) Triggering of volcanic or earthquake activity in unstable portions of the earth's crust, in addition to the creation of new local heat sinks and mechanical stress areas.
- (3) Firestorms of great extent by collisions in densely forested areas, contributing vast quantities of organic debris in various stages of thermal decomposition to subsequent sedimentary accumulations. The Siberian fall of 1908, a small one, knocked down and "toasted" a forest 30 km across and knocked down a broader ring beyond this.