

SCIENCE IN AMERICA

THE following appropriations by the U.S. Congress were made at the session of 1869-70 for the ensuing year, July 1, 1870, to June 30, 1871, in aid of Science, Literature, &c.

It should be observed that the undermentioned appropriations are those of the General Government, and not those of the separate States, which, in the aggregate, would far exceed the amount here presented.

<i>Museums.</i>		
National Museum in charge of Smithsonian Institution	20,000	
Army Medical Museum	5,000	
Agricultural Departmt. Museum	8,000	
	33,000	
<i>Botanic Gardens and Greenhouses.</i>		
Of the U.S. Capitol	35,996	
" " President's House	2,500	
" " Agricultural Department	38,200	
	76,696	
<i>Agriculture.</i>		
Department of Agriculture, Miscellaneous Expenses		138,070
[To this is to be added, items already given,—		
Botanic Garden and Living Plants	38,200	
Museum	8,000	
Library	3,800—50,000	
or an aggregate of \$188,070.]		
<i>Astronomy and Meteorology.</i>		
Observations of Eclipse, Dec. 1870, under Coast Survey	29,000	
U.S. Nautical Almanac	20,000	
National Observatory	19,800	
New Telescope for National Observatory	50,000	
Telegraphic Notices of Storms	50,000	
	168,800	
<i>Surveys, &c.</i>		
U.S. Coast Survey	703,000	
Survey of Lakes	150,000	
" Nicaragua and Tehantepec Ship Canals	30,000	
Military Surveys west of Mississippi	100,000	
Prof. Powell's Survey of Colorado of West	12,000	
Polar Explorations	50,000	
Dr. Hayden's Geological Survey	25,000	
Statistics of Mines and Mining	10,000	
	1,080,000	
<i>Light-house Establishments.</i>		1,431,207
<i>Libraries.</i>		
Library of Congress	36,220	
" of Medical Department, U.S.A.	3,000	
" of Agricultural Department	3,800	
	43,020	
<i>Education.</i>		
U.S. Department of Education	14,500	
Wilberforce and Lincoln Universities	37,000	
	51,500	
<i>Benevolent Objects.</i>		
Life-boat Service on the Coast	48,883	
Government Hospital for Insane	149,980	
Columbia Institution for Deaf and Dumb	40,775	
Columbia Hospital for Women	18,000	

National Association for Destitute Coloured Women, D.C.	\$ 10,000	\$
National Soldiers' and Sailors' Home, D.C.	15,000	
Care of 60 transient Paupers	12,000	
	234,635	
Total		\$ 3,316,928

THE INFLUENCE OF INTENSE COLD ON STEEL AND IRON

THERE has recently been a most interesting discussion at the Literary and Philosophical Society, Manchester, on the above subject, the result of which seems to be that we must at once give up the idea that such accidents as the one, for instance, near Hatfield, are due to anything beyond the control of the Railway Companies concerned.

The paper which gave rise to the discussion was by Mr. Brockbank, who detailed many experiments, and ended by stating his opinion that iron does become much weaker, both in its cast and wrought state, under the influence of low temperature; but Mr. Brockbank's paper was immediately followed by others by Sir W. Fairbairn, Dr. Joule, and Mr. Spence, which at once put an entirely new complexion on the matter.

As Dr. Joule's results are the most to the point we may take them first. He says:—

"As is usual in a severe frost, we have recently heard of many severe accidents consequent upon the fracture of the tires of the wheels of railway carriages. The common-sense explanation of these accidents is, that the ground being harder than usual, the metal with which it is brought into contact is more severely tried than in ordinary circumstances. In order apparently to excuse certain Railway Companies, a pretence has been set up that iron and steel become brittle at a low temperature. This pretence, although put forth in defiance, not only of all we know of the properties of materials, but also of the experience of everyday life, has yet obtained the credence of so many people that I thought it would be useful to make the following simple experiments:—

"1st. A freezing mixture of salt and snow was placed on a table. Wires of steel and of iron were stretched so that a part of them was in contact with the freezing mixture, and another part out of it. In every case I tried the wire broke outside of the mixture, showing that it was weaker at 50° F. than at about 12° F.

"2nd. I took twelve darning needles of good quality, 3in. long, 1/4 in. thick. The ends of these were placed against steel props, 2 1/2 in. asunder. In making an experiment, a wire was fastened to the middle of a needle, the other end being attached to a spring weighing-machine. This was then pulled until the needle gave way. Six of the needles, taken at random, were tried at a temperature of 55° F, and the remaining six in a freezing mixture which brought down their temperature to 12° F. The results were as follow:—

Warm Needles.	Cold Needles.
64 oz. broke	55 oz. broke
65 " "	64 " "
55 " "	72 " "
62 " "	60 " bent
44 " "	68 " broke
60 " bent	40 " "
Average 58 1/2	Average 59 5/8

"I did not notice any perceptible difference in the perfection of elasticity in the two sets of needles. The result, as far as it goes, is in favour of the cold metal.

"3rd. The above are doubtless decisive of the question at issue. But as it might be alleged that the violence to