These results cannot be obtained on Planck's theory.

I hope shortly to publish a full account of the assumptions involved in this calculation, together with additional results.
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Dimensional Changes produced in Iron and Steel Bars by Magnetism.

WHILE engaged on research work of an engineering nature, I came upon some facts with regard to the behaviour of magnetism on iron and steel bars in the semi-plastic state beyond the yield point that I am unaware have been noted before. I propose, therefore, to give a brief account of the experiments carried out and the results obtained, on the chance that they may prove of interest to others who have time to pursue the matter further.

A specimen of mild-steel about 18 inches long, ¾-inch diameter, and 8 inches between gauge points, having been fixed in the jaws of the testing machine, was surrounded by a solenoid, and a current supplied sufficient to cause magnetic saturation. The specimen had then a tensile load applied to it in the usual way until it ruptured, the magnetism being kept at the saturation point all the time. Other bars were then tested, with and without magnetism, and in the result it was found that the magnetised bars were distinctly less in length between gauge points than the unmagnetised—in other words, that the elongation was less in the first case than in the second.

In order to make the comparison as fair as possible, and to eliminate the effects of difference of composition and of manufacture, the specimens for each experiment (consisting of the rupturing of one unmagnetised and one magnetised specimen) were each cut from the same bar. A few of the results are given in the table below. These were taken at random from a large number of examples, and will serve to give some idea of the nature of the changes. The material in each case (with the exception of experiment No. 10, in which it was wrought iron) was ordinary mild-steel taken from bars about 12 feet long, just as they were delivered to the laboratory.

No. of experiment	Diameter of specimen (inches)	Extension on 8″ length bar Unmagnetised	Extension on 8″ length bar Magnetised	Decrease in extension	Percentage decrease in extension	Breaking load (a) Unmagnetised (b) Magnetised	Maximum load (a) Unmagnetised (b) Magnetised
1	¾	2·6	2·19	0·41	15·8	(a) 18,680 (b) 18,845	(a) 26,185 (b) 25,910
2	¾	2·5	2·25	0·25	10·0	(a) 18,080 (b) 18,800	(a) 26,115 (b) 26,040
3	¾	2·5	2·25	0·25	10·0	(a) 18,960 (b) 18,970	(a) 26,170 (b) 25,930
4	¾	2·5	2·25	0·25	10·0		(a) 26,240 (b) 26,100
5	¾	2·65	2·35	0·30	11·9	(a) 20,030 (b) 20,130	(a) 26,580 (b) 25,400
6	¾	2·45	2·25	0·20	8·2	(a) 18,630 (b) 18,120	(a) 26,770 (b) 26,290
7	⅞	2·55	2·43	0·12	4·7	(a) 23,030 (b) 23,000	(a) 33,300 (b) 33,000
8	⅝	2·5	2·35	0·15	6·0	(a) 12,950 (b) 13,010	(a) 18,500 (b) 18,400
9	1	2·5	2·25	0·25	10·0	(a) 38,680 (b) 36,210	(a) 51,360 (b) 50,515
10	⅞	2·2	2·15	0·05	2·3		(a) 30,900 (b) 30,900
11	1	2·5	2·31	0·19	7·6		
12	¾	2·4	2·25	0·15	6·2		
13	¾	2·38	2·28	0·10	4·2		
14	1	2·63	2·35	0·28	10·6		

Units=inches and pounds.

The results may be summarised as follows:—

(a) The amount of the decrease of elongation caused by the magnetism varies from about 3 per cent. to 16 per cent.

(b) The composition of the steel, its hardness, &c., affect the amount of the decrease of elongation.

(c) The average maximum load without magnetism seems higher than the average maximum load with magnetism.

(d) The average breaking load without magnetism seems lower than the average breaking load with magnetism.

(With regard to (c) and (d), nothing definite can be put forward, as it is an extremely difficult matter to gauge the maximum and breaking points to a hundred pounds or so on a 70-ton testing machine.)

(e) Careful measurement shows that, after rupture, the magnetised specimen is thicker all over its length than the unmagnetised, but that the greatest difference is at the place of local extension. This points to the likelihood that the magnetism hinders the flow of the metal, and that this hindering action begins just after the yield point is reached, and attains its maximum value at local extension. This is also brought out in the case of the experiment with wrought iron (No. 10), which shows on fracture numerous planes of cleavage that no doubt hindered the formation of "waist," and caused the relatively small decrease of elongation.

The following are readings, taken inch by inch, between 8-inch gauge points on ¾-inch mild-steel specimens cut from the same bar:—

After Rupture.

	1st inch	2nd inch	3rd inch	4th inch	5th inch	6th inch	7th inch	8th inch
Unmagnetised ...	1·24″	1·26″	1·30″	1·38″	1·70″	1·36″	1·24″	1·20″
Magnetised... ...	1·20″	1·23″	1·28″	1·50″	1·50″	1·26″	1·24″	1·20″

The unmagnetised specimen broke almost exactly between the fourth and fifth inches, and the magnetised at the end of the fourth inch.

It was thought possible that if the diminution in elongation were due to the magnetism hindering the flow of the metal, tests on a Brinell hardness testing machine might give some results, but though many were carried out, nothing decisive was obtained. A few compression tests were also made, but insufficient to give trustworthy data.
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"Blowing" Wells.

IN a village about three miles from Norwich, and situated about 140 feet above sea-level, there are three of these "blowing" wells. They are, roughly, about 100 yards apart, and each is 3 feet in diameter and from 70 feet to 80 feet in depth. When last opened, some years back, they were found to be empty of water. One of them was then domed over with an iron dome, which after a time blew off owing to the pressure of air (or other gases) within the well. The other two wells have since been domed over in a similar manner, but it was necessary to insert a 3-inch ventilation pipe into the dome in each case because of the great pressure of air that sometimes accumulates within.

Observation shows that this pressure is sometimes positive for several consecutive days, and that the air then comes out of the ventilation pipe with considerable force, so much so that, in the case of one well which has a grating over the end of the pipe, the well "roars" so loudly that it can be heard for a distance of several yards. At other times the pressure in the well is negative, and then leaves and other débris get sucked into the grating. There is a strong belief, locally, that an accurate forecast of the weather can be gauged by the intensity of the "blowing." I have never heard or read of similar "blowing" wells, and it is difficult to assign an adequate explanation for this alternating positive and negative pressure in the well. Can there be any connection between the blowing and changes in atmospheric pressure, as is locally supposed, or do the rise and fall of the level of the water in the river Yare (which is about two miles distant, and is at this point only about 4 feet above sea-level) have any possible effect on this curious phenomenon?

Norwich, May 3.
SYDNEY H. LONG.