STORING THE POWER OF THE WIND.

Treating recently of the possibility of utilizing the wind power which now so constantly goes to waste everywhere about us, mention was made of two means for accomplishing the object—electrical storage batteries and reservoirs for compressed air. It is worth while to state that the article was written with the full conviction, and for the purpose of bringing presently to fair understanding the fact that neither of these will do the work, and to urge inventors and active minds to work out the problem by which something better may become available.

What storage batteries may eventually be brought to do, is entirely uncertain. The whole subject of the actual management of electricity, so that it shall be an agent for mechanical uses, safe, trustworthy, and *cheap*, is yet so little understood that though we have great hopes for the future, our use of it at the present is subject to much difficulty.

As to storage batteries, in any of the various forms in which they have been made, and bearing the names of different inventors, it is but fair to remember that the accounts which have been published have been chiefly those put forth by interested parties, those who had pecuniary interests involved; and without imputing any intentional deception, it is easy to understand that such statements may go further than practical working will warrant.

The batteries are in truth of small real value. No man would dare to depend on them as a means of carrying on work whose success required a steady and even power. In the first place, they are very wasteful, for the claims made of the great percentage of power recovered from them are certainly not borne out, when they are subjected to fair investigation by those who have no object in proving their great excellence It is not too much to say, in general terms, that very nearly *half* the power transmitted to them is not recovered.

Then, again, trials seem to indicate that their life is short. The constant chemical action disintegrates the plates so rapidly that very frequent renewal is necessary. This, it is true, may not be very expensive, but it is very troublesome. And it is evident that until, or unless, they can be greatly changed and improved they will not do what we need in this case.

The other mode suggested was the use of reservoirs. The only difficulty here is the expense of the plant; expense involving also bulk. To illustrate the matter we will assume the case of a manufacturer employing for his daily work a twenty horse power engine. This he uses ten hours daily for six days, and it would be disastrous to his business to have this power fail him for even an hour. The wind power is so far unsteady that unless he could retain in his reservoir the means of running his engine two consecutive days at least, it would not be prudent for him to depend upon it; he might find his works lying idle for lack of power. That amount of advanced storage would, it is true, seldom be necessary. For a large part of the year he would not need ten, or five, or perhaps even two hours in advance; still he must be *safe*, and in order to be so he must meet the extreme want. A reservoir to contain a store of air compressed to such an extent as would be practicable to run his engine twenty hours must measure at least 30,000 cubic feet. Five cylinders of sixteen feet diameter and an equal length would approximately make it.

With these reservoirs his factory could go on in the future without expense for power; there would be the interest on the original outlay, and the cost of wear and tear; nothing more. The plant and the bulk are, as indicated, the difficulty. In some cases it may not stand in the way, but generally and especially for heavy power they amount to a real prohibition. We need something better, and we return to the original question: Who will devise the means of storing wind power?

It surely ought not to be given up as a matter beyond our reach. The means of running machinery to an extent practically unlimited are immediately ready to our hand when this one thing can be obtained. A.

The Medicaments of Brutes.

In a communication to the Biological Society of London, recently sent by M. Delaunay, on the medical practice of animals, the doctor gave some interesting facts, from which he argued that the human reason ought to be trusted as much as animal instinct in many instances where medical science seems to be at fault; and he insists that the desire of sick persons for certain foods and drinks may be a natural instinct rather than a morbid fancy.

But he does not state how the one may not be mistaken for the other. In his list of examples of medical instinct in the lower animals, M. Delaunay says that animals bathe for cleanliness and health, that they get rid of their parasites by using dust, mud, clay, etc. Those suffering from fever restrict their diet, keep quiet, seek darkness and airy places, drink water, and sometimes plunge into it.

When a dog has lost his appetite, it eats that species of grass known as dog's grass (*dogtooth*), which acts as emetic and purgative. Cats also eat grass. Sheep and cows, when ill, seek out certain herbs. An animal suffering from chronic rheumatism always keeps, as far as possible, in the sun. If a chimpanzee be wounded, it stops the bleeding by placing its hand on the wound, or dressing it with leaves and grass. When an animal has a wounded leg or arm hanging on, it completes the amputation by means of its teeth. A dog, on being stung in the muzzle by a viper, was observed to plunge its head repeatedly for several days into running water. This animal eventually recovered.

A sporting dog was run over by a carriage; during three weeks in winter it remained lying in a brook, where its feed was taken it. The animal eventually recovered. A terrier hurt its right eye; it remained lying under a counter, avoiding light and heat, although it habitually kept close to the fire. It adopted a general treatment, rest and abstinence from food.

The local treatment consisted in licking the upper surface of the paw, which it applied to the wounded eye, again licking the paw when it became dry.

The doctor thinks that veterinary medicine, and perhaps human medicine, can gather from these facts useful indications, precisely because they are prompted by instinct.

Manufactures of the United States.

The Census of 1880 makes the following showing:

Industries.	Hands employed.	Wages paid.	No. estabs.
Iron and steel	306.958	$128,787,924	6,498
Lumber and wood	244,926	79,843,837	38,090
Cotton and mixed textiles	228,845	58 931,172	1,475
Men's and women's clothing	185,945	52,541,358	6,728
Woolen goods	169,897	49,259,324	3,390
Boots and shoes	128.635	52,252,127	18,390
Carriages and smithing	104,718	38,185,271	43,122
Tobacco, etc	87.587	25,054,457	7,674
Brick, tile, etc	67,203	13,764.723	5,697
Furniture and upholstery	64,127	25,571,831	6,087
Leather, harness, etc	63,136	25,081,913	13,708
Printing and publishing	62,800	32,838,959	3,634
Flour and grist mill products	58,401	17,422,316	24,338
Agricultural implements	39,580	15,359,610	1,943
Shipbuilding	21,341	12,713,813	2,188
Total	1,844,102	$627,708,634	182,935

The total number of hands employed in all the industries in the census year (1880) was 2,738,859; the aggregate of wages paid was $947,953,795, and total number of establishments is given at 253,852. The statistics of iron and steel manufactures include blast furnaces, bloomeries, forges, rolling mills, steel works, forge products, machinery, and finished and ornamental iron work of all kinds; of lumber, sawed, planed, turned, carved, sash, doors, and blinds; brick and tile include drain pipe and terra cotta statistics, and printing and publishing incorporates lithographing. The following table exhibits the leading industries in order of annual value of products:

Industries.	Value annual products.	Value materials used.	Total capital.
Iron and steel	$551,543.109	$319,594,960	$405,636,070
Flour and grist mill products	505,185,712	441,545,225	177,361,878
Lumber and wood	407,615,968	245,986,332	242,248.783
Cotton and mixed textiles	277,172,086	150,993,278	259,500,851
Woolen goods	271,916,746	166,640,753	160,798.466
Men's and women's clothing	241,553,254	150,922,509	88,068,969
Leather, harness, etc	241,056,230	177,821,175	91,310,030
Boots and shoes	207.387,903	122,542,745	56.548,665
Carriages and smithing	139.410,873	57,522,275	76.038,143
Tobaccos, etc	118,670,166	65,384,407	39,995,292
Printing and publishing	97,701,679	35,216,159	67,485.529
Furniture and upholstery	85,004,618	40,005,090	47,231.529
Agricultural implements	68,640,486	31,531,170	62,109,668
Shipbuilding	36,800,327	19,736,858	20,979,874
Brick, tile, etc	33,868,131	10,119,538	28,659.329
Total	$3 284,527,288	$2,035,561,974	$1,821,973,976

The total value of products of all industries reported by the census was $5,369,579,191; the value of materials used was $3,396,823,549; and the total capital was $2,790,272,605. It will, therefore, be observed that the totals of the industries in the second table are approximately two-thirds of the grand totals named. A general inspection of both tables confirms what we have hitherto stated, that there is about $1 000 of capital invested in manufacturing and mechanical industries to every employe. Thus it appears that for every person employed in those industries, the interest on $1,000 must be provided for in making an estimate of the cost of production.

It will be noticed that, while the aggregate capital of all industries is $2,790,272,605, the total number of employes is 2,738,895. In the fifteen lines of industry mentioned above, there are 1,844, 102 employes accounted for, and the total capital engaged by the industries given is $1,821,973,-976. Another striking coincidence is that the average amount of capital employed by the 182,935 establishments represented in the above fifteen lines of industry is just about $10,000 each.

Improvements in Photographic Emulsions.

The processes by which Dr. H. W. Vogel, of Berlin, carries out his improvements in the preparation of emulsion are said to entirely avoid the disadvantages of the ordinary aqueous bromide of silver gelatine emulsions. The process has been fully protected by letters patent in this country and elsewhere. The essential feature of Dr. Vogel's invention is the use of gelatine combined with pyroxyline into a homogeneous fluid, which, it is stated, was unknown until he discovered a suitable solvent, which he finds among the inferior members of the fatty acids, *e. g.*, formic, acetic, propionic acid, etc., their derivatives, and mixtures of the same. Dr. Vogel gives the following four methods, which he has found successful:

1. I first produce a gelatine emulsion according to the customary process, which is then dried by means of cold or warm air, or other means for extracting the water. This dry bromide of silver gelatine (which can also contain iodide of silver and chloride of silver) I then dissolve warm in one of the above mentioned acids, using three to ten times as much or even more acid. The quantity of acid to be used depends on the solvency of the gelatine, and must be tried for each kind. This acidulous emulsion is now used alone after having been diluted with alcohol to the required consistency, or can be mixed with pyroxyline. The pyroxyline is dissolved in acetic acid, a like acid, or a mixture of such acid with alcohol. The most appropriate quantity of pyroxyline is about one per cent of the quantity of acidulous emulsion employed.

2. Pyroxyline is dissolved in one of the fatty acids—for instance, formic acid or acetic acid, or a mixture of such acids *per se*, or with alcohol or other solvent which will dissolve both gelatine and pyroxyline. For easily soluble pyroxyline, alcohol or methylated spirit, or a mixture of the same, can be used as solvent. The proportions can be varied in many different ways, so that the following formula serves simply as an example:

Pyroxyline	2 grammes.
Acetic acid	50 "
Alcohol	50 "

The collodion produced by this process is mixed with about an equal quantity of acidulous emulsion, as above described. The gelatine emulsion collodion produced can be slightly warmed and applied like ordinary collodion to glass plates, paper, etc., and exposed to the light either in a moist or dry condition.

3. A collodion emulsion is prepared according to the customary formula and precipitated as usual by water; or the emulsion is allowed to dry up, then washed, and the dry matter dissolved in one of the above mentioned acids or mixtures of the same with alcohol. Gelatine, either alone or after being dissolved in one of the solvents mentioned above, is now added to the collodion preparation. The proportions can be varied in the like degree as in the preparation of the ordinary collodion emulsion. The following is, for instance, one of the various proportions of the mixture: 7 grammes of the precipitated pyroxyline containing bromide of silver are dissolved in 150 grammes alcohol and 90 grammes acetic acid, then 2 grammes gelatine are dissolved in 20 grammes acetic acid and added to the same.

4. Dissolve gelatine and pyroxyline in one of the above-mentioned solvents, or dissolve them separately, and then mix the solutions. Finely powdered bromide of silver prepared in the customary manner, or any one of the silver haloid salts, or a mixture of the same, is now added to the gelatine collodion solution; or the silver haloid salts are produced in the gelatine collodion solution through double decomposition. These proportions can also be varied in different ways.

Storage Gas Battery.

An adaptation of Sir W. Grove's gas battery as an accumulator has been devised by Mr. F. J. Smith, who describes it in the *Philosophical Magazine* for March. To enable the battery to discharge for a considerable time, the gases are put under high pressure. One made in this way has been in use for the past eighteen months. It consists of a strong lead vessel well lined with rubber varnish to prevent any dissolution of the lead.

The plates are platinized platinum cylinders with wires and terminals running through the case in insulating sheaths. A manometer is attached to register the pressure; and a 10 per cent mixture of sulphuric acid and water is used to charge the bell. With this arrangement Mr. Smith easily obtains a pressure of seven atmospheres, and the platinum cylinders, one of which has twice the capacity of the other, can hold a proportionately larger quantity of gas than they would do at the ordinary pressure.

A second form has been constructed for the author by Messrs. Becker & Co. In this a U-shaped glass tube is employed, the manometer being attached to the bend, and sheets of platinum being fused into each leg. This form, although well suited for lecture purposes, only bears a small pressure. A curious observation is that the electro-motive force of the accumulator varies with the pressure of the gas.

In addition to constructing this battery Mr. Smith has charged small Faure or lead secondary batteries under pressure, and found that the time of discharge is longer when thus charged. Mr. Smith is at present engaged in studying this obscure phenomenon; and for the benefit of others engaged in similar inquiries he states that oxygen liberated by electrolytic action acts almost instantly on India-rubber tubing or varnish, and causes it to split and crack.

Condensed Skim Milk as a New Food.

According to the *Chemiker Zeitung*, M. Muller has evaporated skimmed milk in a vacuum, so as to obtain a permanent product, which can be preserved for many months in a dry atmosphere, and which has valuable alimentary properties. He thinks that it may be of great use in pastry, and in various kinds of baking, and the best sugar of milk can be made from it. The skimmed milk which is collected in dairies and cheese factories is usually given to animals or wasted in sewage; it contains, however, large quantities of salts and particles of butter and caseine, which can be utilized by Muller's method —*Rev. Scientif.*

ACCORDING to *Weidemann's Beiblatter*, a shark belonging to the genus *Scymnus* is phosphorescent on its whole under surface, with the exception of a black stripe on the neck The upper surface is non-luminous.