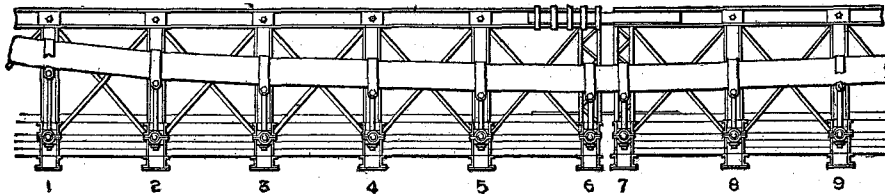


## SCIENCE AND INVENTION.

## THE ACCIDENT TO THE BROOKLYN BRIDGE.

AN accident to the world's largest suspension bridge, of such a character that, according to some authorities, part of the roadway was in danger of ripping away from the cable and dropping into the water below, is of more than local interest. The breaking of nine of the rods by which the northern roadway of the bridge depends from the cable above, which occurred on July 24 last, stopped traffic on that part of the structure for thirty-six hours and might have been attended with much more serious consequences. The accompanying cut, which is taken from *Engineering News*, August 1, shows the location of the nine broken rods. The report of Chief Engineer Martin on the occurrence as-



LOCATION OF BROKEN SUSPENDER RODS ON BROOKLYN BRIDGE.

serts that all the rods were broken within the cast-steel trunnion blocks through which the lower ends pass, so that it was easy for the breaks to escape notice, and that at least two of the breaks had occurred long before they were discovered. He believes that the first rod to break was defective in some way, and that the adjoining ones yielded, one after another, to the additional strain placed upon them. The comment of *Engineering News* is as follows:

"The accident in itself was not serious in its consequences, but it was, it seems to us, serious in the possibilities of a more wholesale failure which it indicated. The facts are that a poor design was adopted for the lower hinge connections of the suspension rods, and that through neglect the evils of this design were augmented by lack of lubrication and by rust. The first fault was perhaps unavoidable at the time the members were designed, but there is no reason why the faulty bearing should not have been kept in the highest possible state of efficiency, particularly since they were fully recognized to be especially in need of care if they were to work satisfactorily. In conclusion, it may be pointed out that it would have been a simple matter at any time during several years past to have replaced these rods with a more approved design of suspender."

It is the opinion of *The American Machinist* that the bridge has been overloaded, and it regards the snapping of the suspension rods as a warning of this fact. Says this paper in an editorial:

"It is not necessary to call attention to the alarming nature of such an 'accident' as this. When one suspension rod breaks those on each side of it must support the load of the broken one in addition to their own. When several adjoining ones break all of their load is transferred to those beyond, so that under the best of circumstances if a sufficient number break the rest must also go, and it is easy to imagine the roadway and load of the bridge being torn from it as a seam is ripped when it begins to let go.

"The most serious fact in connection with the recent 'accident' to the bridge is that it was not discovered by the engineers or by any one connected with the care of the structure, but passing teamsters and lolling policemen. It appears from the reported statements of those in charge that there has been no systematic inspection of the bridge. Some workmen have been employed around it, and it has been assumed that they would certainly see if anything was wrong. It appears further that the bridge has not been painted in four years.

"As we said, we have not a word to offer as to the competence and faithfulness of the engineers who have been and who are responsible for the safe maintenance of the bridge. The bridge,

however, may have something to say for itself. We are not disposed to be alarmists, but the recent warning given by the bridge can not be taken too seriously."

## THE SCIENTIFIC TREATMENT OF CRIMINALS.

WE should not speak of the treatment of crime, which is an abstract thing, but of criminals, which are very concrete. This is the keynote of an article contributed by the Italian criminologist Lombroso to the *Revue Scientifique* (July 13). And as criminals differ widely, the methods employed should also differ, running from free pardon up to actual medical treatment. Says the writer:

"There are very few who understand that there is anything else for us to do, to protect ourselves from crime, except to inflict punishments that are often only new crimes, and that are almost always the source of new crimes.

"This is why I believe in the effectiveness of pardon in certain crimes and for certain criminals, especially for criminals of passion—young, hyperesthetic, carried away by a great feeling such as love, parental affection, political or religious fanaticism, or the sentiment of honor, who have led an honest life

previously—even more honest than the average man. For such the crime committed constitutes its own punishment by the remorse that it awakens; they desire and even seek punishment—for such, pardon is the logical outcome.

"Pardon will sometimes benefit young criminaloids, criminals of occasion, who commit crime in the excitement of seeing something that they desire, or in the fever of intoxication or anger; especially those who deal blows or give wounds on fête days and for the first time. This is shown by the application of the Berenger law in France and of the probation system in America, England, and Belgium, aided by such institutions as that at Elmira. Thus, too, such criminals are spared confinement in houses of correction, which are often worse than prisons. The prisons and reformatories of France and Italy are veritable universities of crime and transform young criminals of occasion into habitual or professional criminals.

"But when a criminal has once become habitual, he can no longer be treated by pardon. . . . My idea is not only to have in view constantly the criminal instead of the abstract crime, but to distinguish between criminals by passion, those of occasion, the born criminal, the insane criminal, and also the criminal by acquired habit, who can be entered in the catalog of incurables.

"With these we must use very different means; pardon would only harden them in crime, and it is only partially true that a good and equitable distribution of this world's goods would make crime disappear. . . . While greatly diminishing criminality, prosperity does not do away with a large number of born criminals, without counting the habitual drinkers. . . . With all these unfortunates we have nothing to gain by pardon. The principal thing is to see that they do not become a continual danger to society. For them we must have, if not prisons, which have never been of much use, at least special houses for the treatment of the insane, the epileptics, and the alcoholics, who make up the greatest part of criminals by birth and profession.

"Above all, we must treat them as we would treat other insane persons, and this treatment, for alcoholics, should be dietetic—milk, vegetables, work in the open air—and also therapeutic—opium, nux vomica, belladonna, coca. For epileptics a similar course of treatment should be followed. . . . But for the safety of normal men and even for that of the unfortunates themselves, they must, first of all, be kept apart, which will prevent misdeeds and which, by taking away temptation, is in itself a form of treatment; but sequestration should not be torture for them nor a source of enormous expense to society. . . . Instead of fixing and making automatic the brain and muscles of the criminal with the horrible cell-system, which multiplies suicides and madness, we ought to seek to direct toward better things the thoughts of the criminal, who, finding in the exercise of his faculties a natural satisfaction in the channel to which he naturally inclines, will work with pleasure and advantage for others and for himself. . . .

"I have shown in my previous studies that genius, like moral insanity, is based on epilepsy; it is not extraordinary, then, to see moral insanity united with genius, and thus become not only inoffensive but sometimes useful to society, as we see in the cases of great conquerors and revolutionary chiefs. . . . .

"When we study the lives of the great pioneers of America and Australia, we realize that they were almost all born criminals, pirates, or assassins, whose desires for action, strife, carnage, and novelty would have been a great danger for their country but found a useful issue in the midst of savage tribes. This is the only path against crime that can be of use to honest men and also to the criminals themselves."—*Translations made for THE LITERARY DIGEST.*

### THOUGHT-TRANSFERENCE OR IMAGE-TRANSFERENCE?

EXPERIMENTS in so-called "thought-transference," or "mind-reading," where one person reproduces on paper a design thought of by another, are familiar to most of us. That they can be legitimately explained by the direct action of one brain on another is not acknowledged generally by men of science. Some interesting instances of the kind were recently described in *Cosmos* by M. de Rochas, who asserts that they prove what he calls the "exteriorization of thought," or the existence of thought outside of the human brain. This view would assume that "thought" overflows the brain, as it were, and spreads into the adjoining space. If there is another brain in that space, it may be affected. A correspondent of the same paper, M. de Kirwan, takes this opportunity to call attention to the fact that in this and similar cases, even if we admit the facts, there is no transmission of thought at all, properly speaking, but merely of images. He says: "In all these examples it seems to me that there is a transmission of *images*, but not of thoughts, at least in the exact sense of that word. My neighbor, 40 to 60 centimeters [1 foot 4 inches to 2 feet] distant from me, concentrates his attention with all his energy on a drawing that he has seen an instant before. And a reproduction, more or less faithful, of the image fixed in my neighbor's brain is traced in my own, with such distinctness that I can transfer it to paper with the aid of a pencil.

"Admitting that the reality of the facts are incontestably established, we may conceive that the nervous fluid of my neighbor, who is near me but not in contact with me, meeting my own nervous fluid, transfers to it the image formed in his brain, and that my fluid in turn proceeds to form this image in my own brain.

"In all this, we have to do only with images. I see nothing of thought in it.

"What is thought? It is the elaboration of the idea, and the idea is the notion of the universal and the abstract. Doubtless the starting-point of this elaboration is the image formed in the brain . . . but this is not thought itself but only the indispensable condition of it.

"These curious phenomena . . . seem to me to be explained rather by something like 'the cerebral transmission of images' than by 'the exteriorization of thought'; for we are dealing with images and not with thoughts, with transmission from one brain to another and not to exteriorization in a medium."—*Translation made for THE LITERARY DIGEST.*

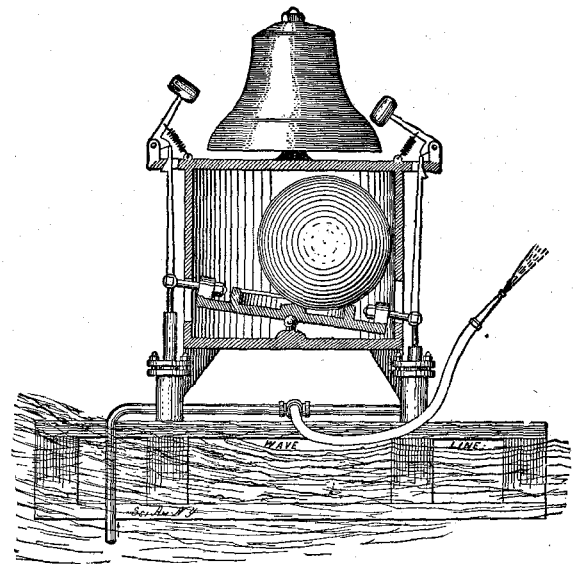
**Some Rare Sounds.**—"Once or twice in a lifetime," says *The Pilot* (London), "the sensitive ear is rewarded by a private and exclusive delight never to be forgotten. One stands breathless, listening, whilst the wonder lasts. The beautiful thing is then put by in the choicest cabinet of recollection to be a joy forever. Of such is the sound, so rarely heard, of falling snow. It must be night, dark night, that no other sense may be disturbed, and the air must be absolutely still. Then you may hear the heavy flakes falling to earth with a tiny sound like the faintest rustle of gold-foil. At a later season of the year, after heavy snow and February rains, the subconscious sleep may be gently parted by another delicate sound—the musical 'lipper' of a slow-rising flood as the river spreads inland, gains upon the lawn, and lifts its rippling wavelets to the very walls of the house. . . . After the great February flood, and after the iron frost which

made its latter weeks so bitter to the poor, there might be heard in the still hours before the dawn a curious distant tinkling like the spontaneous breaking of glasses. As the waters gently subsided, thin sheets of ice, formed late in the day, broke as they rested on the hedgerows, and the broken sheets slid over each other into the ditches below. The sound was quite musical, thin and pure, eerie and ghostlike. After a long and breathless tropical day, toward sunset the sound of a mighty wind may be heard coming nearer from the distance. If one is in the forest, the roar of this great crescendo is sharpened by the cracking of boughs and the occasional crash of a falling tree. The sky is darkened as suddenly as when Elijah waited on Mount Carmel, and the rain follows with the same soothing hush. Then, when the roar has passed, when the fantastic waving of tree-tops and branches has ceased, or passed on over the hills into the next thirsty valley, you may hear a strange and beautiful sound. It is the murmur of myriads of large drops falling in rapid succession, so regularly and so heavily that a chaos of soft musical notes is produced like a wind-borne waft from some far-distant orchestra. These are the voices of air and water; the voice of earth and fire is more terrible, and more difficult to recall. It was to be heard 400 miles off one thundery noonday in 1884, in the heart of the Malay Peninsula, too deep-throated for the voice of the heaviest guns, whilst the earth tremor that came with it was far beyond the power of any explosive yet known to man. We learned weeks afterward of the terrible catastrophe of Krakatoa in the Sunda Strait, with all its sad and shocking details."

### POWER FROM THE WAVES.

ATTEMPTS to utilize the energy of the ocean waves have been numbered by the hundred. Nearly all of them have failed or met with such qualified success that we do not hear of them commercially. A wave motor that has been perfectly successful on the small scale in which it has been sought to utilize it is described in *The Scientific American* (August 3) by C. F. Holder. It is the invention of Messrs. Banning and Carey. The writer says of it:

"The invention is to be permanently established at the harbor of Avalon [Cal.] to ring a bell as a fog alarm and to pump salt



SECTION THROUGH MOTOR, SHOWING PUMPING AND BELL-STRIKING MECHANISM.

water into a large reservoir from which the streets of the town are watered. The machine is also to be used in pumping out ships.

"The inventors originally were searching for power to ring a bell, but when the machine was completed it was found that there was more value in the pumping capacity. . . . It is a large iron cheesebox-shaped vessel about two feet in diameter, and is intended to be riveted to the deck of a ship or to a floating plat-