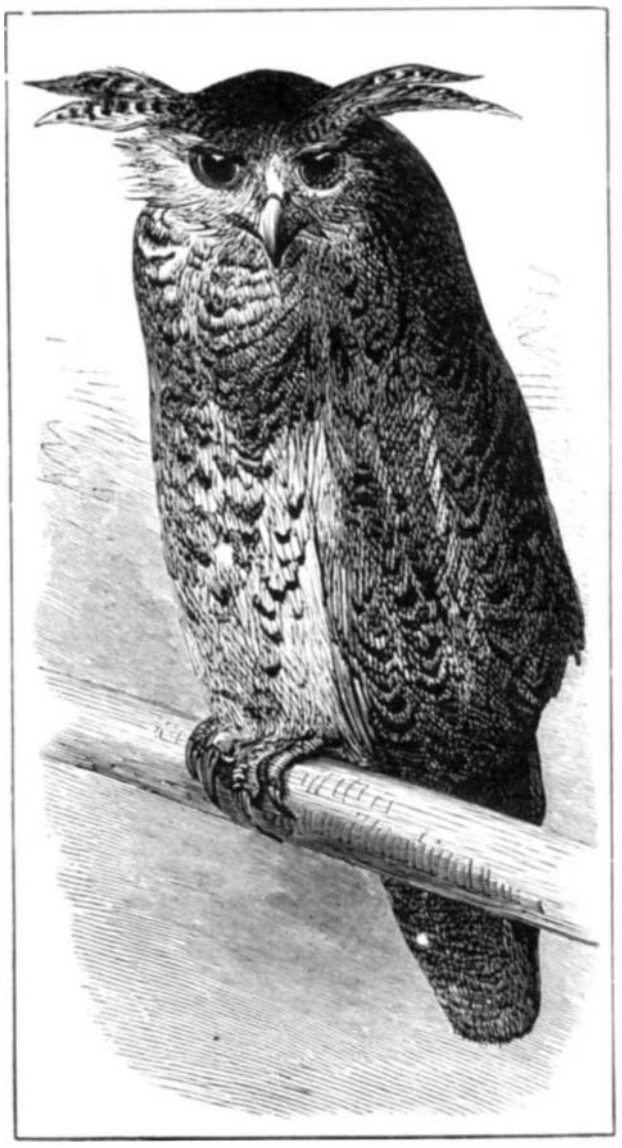
THE ORIENTAL EAGLE OWL.

Among the recent additions to the aviaries of the Zoological Society in Regent's Park is an example of the rare and little known owl of which we now give an illustration. This bird, which had not previously been received alive in Europe, was obtained in Siam by Mr. Charles Fowler, of Cheeryhinton, near Cambridge, and was presented to the Society on the 14th of last month. Its native home is said to be the forests of Karenne, in the interior of Siam. The Oriental owl belongs to the group of eagle owls, which are distinguished by their large size, and by the long tufts of feathers that spring from each side of their heads, and cause them to be commonly designated as "horned" owls. Of the habits of the species, which is found in Malacca, Java, and Borneo, as well as in Siam, little has been recorded by naturalists. But there is a closely allied species found in British India, which Jerdon, in his "Birds of India," calls the "forest eagle owl" (*Huhua Nepalensis*). Jerdon found this bird on the high forests of Malabar, where it was not very common, and was said to kill hares, various birds, cats, rats, and even fishes, and to have a low, deep, and far-sounding hoot. Other members of the group of horned owls are the great horned owl of Central Europe (*Bubo maximus*) and the Virginian owl of America (*Bubo Virginianus*), both which are also represented in the Zoological Society's collection.—*Graphic.*



THE ORIENTAL EAGLE OWL.

THE HUMPBACK WHALE.

The humpback whale, *Megaptera longimana*, is the most common representative of the mysticetes or toothless whales. It is met with in deep water all over the globe, and attains a length of from 50 to 70 feet. The fins are about 3 feet in width and 12 to 15 feet long. The tail is about 18 to 20 feet wide. In appearance it differs considerably from other members of the same family; the body is short and stout, the fore part is very thick, while the tail end is very thin, compared with the other dimensions of the body. The lower jaw is longer and wider than the upper. The back carries, at a distance from the tail end equal to about one fourth of the entire length of the animal, a fin consisting almost entirely of fat, to which the animal owes its name. Fatty growths of various form and size are also found in the center of the chin and near the shoulders. The back is lined with irregular lumps, varying in size from that of a marble to that of a man's fist. From the lower jaw twenty-five folds, of about four inches in width, extend along the neck down to the belly. These enable the animal to open its mouth very wide.

The color of the humpback varies greatly. The back is generally black, while the belly and sides are white and marbled with gray and black streaks. The fins and tail vary from a pure white to a jet black. The fins also vary greatly in form. They are sometimes long and pointed, sometimes short and thick. The tail is generally crescent shaped, but specimens have been found with short, thick tails, cut off straight at the end.

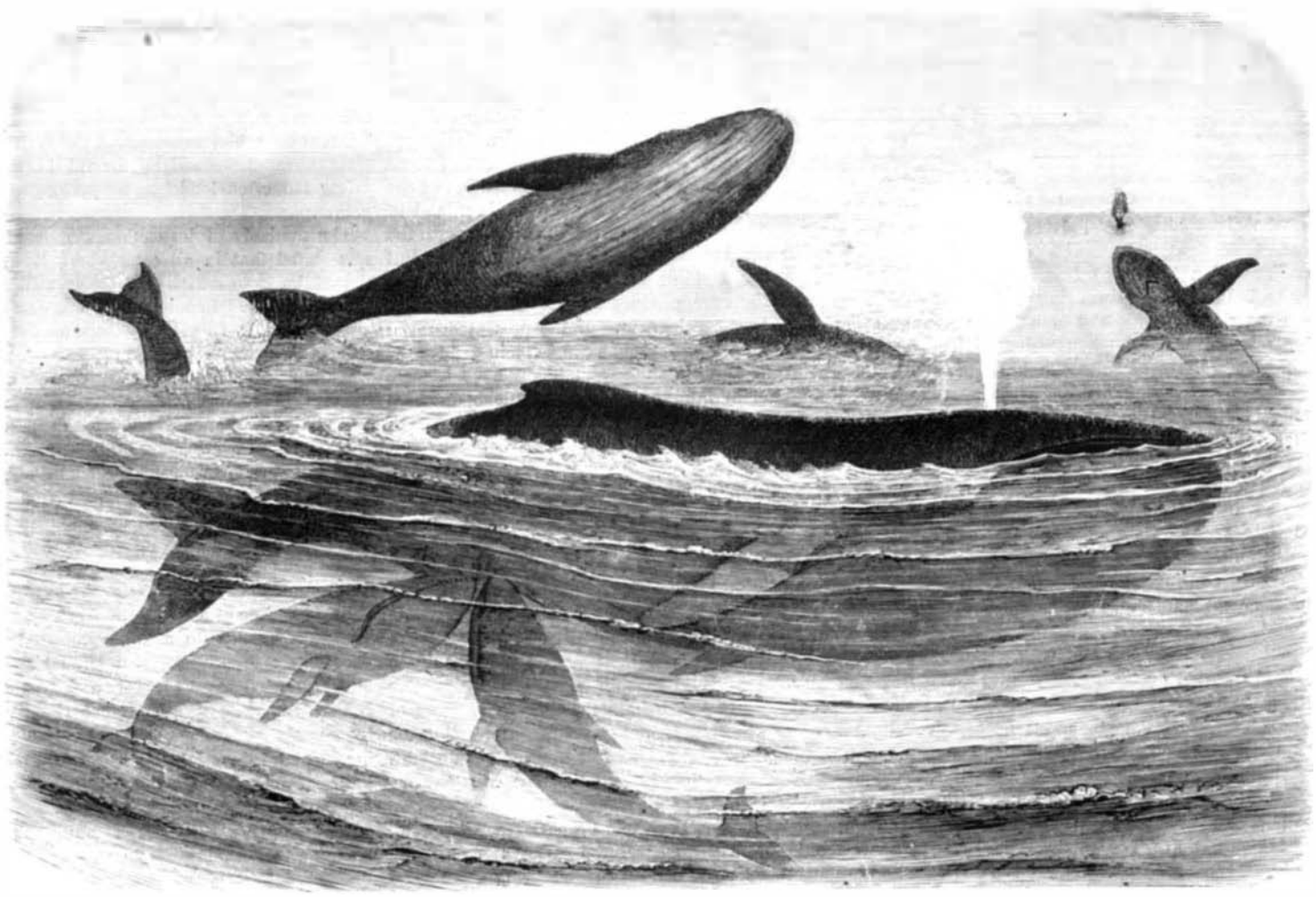
Few whales appear in larger numbers in the arctic and antarctic regions than the humpback, but it is not confined to these regions, as it is found in all latitudes. It is most probable that the polar zones are its home, and that the animals undertake annual journeys from the poles to the equator and back. They are caught in the greatest numbers on the coast of Oregon and upper California, during October and November; only a few are seen between December and April, as the animals travel from spring to December in a northerly direction, and return again between September and December.

The humpback is remarkable on account of the vivacity of its motions.

In swimming, the whole body bends together and straightens out alternately, describing an undulating line. It throws itself around in the water, swimming sometimes on the back, sometimes on the side or belly, and often it is seen to stand up vertically in the water. In fact this animal displays remarkable agility in its element, in which it seems to control its motions as perfectly as a bird in the air.

When filling its tremendous lungs it ejects, from six to twenty times in succession, a double stream of water, which rises from five to eighteen feet into the air. It feeds principally on small fish and crustaceæ.

Although the commercial value of the humpback is considerable, it is not esteemed as highly as the sperm whale or the Greenland whale, as its blubber contains considerably less oil than that of the other animals mentioned.



THE HUMPBACK WHALE.

Natural History Notes.

A Curious Case of Parasitism.—A recent number of the Bulletin of the Belgium Microscopical Society contains an account of a curious discovery made by M. Guinard, of Montpellier, of a case of parasitism on a diatom. In examining some *pinnulariæ* collected in cavities on the sea shore, from whence the sand had been removed for ballast, M. Guinard observed minute brown specks moving rapidly over the diatoms. Studied with an objective of a higher power, the little objects were found to be of a rectangular form, swollen in the middle, and having at each of their four angles a long hyaline appendage, which was constantly in motion. The animals were extremely agile in their movements, and were exploring every part of the frustule by means of their long, flexuous arms.

Rearing Sponges by Artificial Means.—During the past few years, Dr. Oscar Schmidt, Professor of Zoology at the University of Grätz, and a well known authority on sponges, has employed several weeks of the early summer in artificially producing and rearing the bath sponge. His labors have met with such success that his system has been adopted by the Austrian Government, and is now carried out on the coast of Dalmatia. It has for some time been a well known fact that several families of zoophytes have such great powers of reproduction, that a portion of one will grow and form on an entire new body. Dr. Schmidt has taken advantage of this property, his process being to cut the sponge into pieces, fasten each portion to a pile, and immerse it in the sea. The pieces then grow, and eventually from each one a spherical sponge is obtained. According to the estimates of Dr. Schmidt, a small piece of sponge at the end of three years will represent a value of about 10 cents. The total cost of raising 4,000 sponges, including the interest on the expended capital for three years, is estimated at $45, and the income at about $80, leaving, therefore, a net profit of $35. There is no doubt that the practice of this new branch of industry will prove a source of considerable benefit to the inhabitants of the Idrian and Dalmatian coasts.

A Toadstool with the Odor of Chlorine.—A writer in the December number of the Bulletin of the Torrey Club records his discovery of a toadstool, which was exhaling a strong odor of chlorine when found, and which has been described as a new species by Mr. C. H. Peck, under the name of *Agaricus chlorinosmus*. The writer states that "there could be no doubt that the plant was exhaling chlorine, since there is no other substance known having the same, or even a remotely similar odor." From this he draws the inference that the "chlorine was taken up from the soil by the plant, in the form of a chloride, most probably the chloride of ammonium, or possibly of sodium." As a comment on this the editor of the Bulletin calls attention to the fact that the Californian eschscholtzia is well known to have a colorless juice but with the odor of hydrochloric acid; yet this juice, on being tested, has been found to give not even a trace of chlorine, and "perhaps the same result will appear in the case of the new agaric."

The odors of different fungi, like those of flowering plants, are almost as numerous and varied as the species themselves. *Peziza venosa*, when fresh, is remarkable for a strong scent like that of nitric acid; *Agaricus odorus* and *A. fragrans* have an anise-like odor; some species of toadstools have exactly the odor of garlic acid; one has the scent of ripe nectarines; two or three smell like melilot; others like fresh meal; others like putrescent flesh; while almost all have a peculiar scent which has come to be called a "fungoid odor;" it is

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the faint smell of a damp cellar which has been closed for a long time—an odor of mouldiness and decay.

Trees Freezing Solid.—The *Country Gentleman* states that Dr. Hoskins, who lives in the coldest part of Vermont, where the mercury sometimes freezes, says that when this takes place, he does not think that any portion of the sap of the trees remains unfrozen; yet the hardier varieties endure this cold unharmed. "We have observed," says the editor, "the shoots of the apple, pear, and peach frozen stiff (when the thermometer sank to 10° above zero) without injury. The microscope showed them to be filled with ice crystals, no injury resulting from the freezing."

Correspondence.

Alum Baking Powders.

To the Editor of the Scientific American:

I thank you for publishing the article of Dr. Robert Peter, on "Baking Powders, etc.," in your recent issue. Allow me to add that the poor operatives and workingmen in this State, who have families of children to support, and must do it on the present low wages, make it a point always to bake their own bread in the old fashioned way with yeast. "They cannot," as they say, "raise a family on baker's bread." They have long ago found out by experience, what science has proved true by experiments, that alum in bread neutralizes its best nutritive qualities. There is no doubt that baker's bread, made as it is of second and third rate flour, is doctored with alum and alkalies to give it a white appearance. Bread made of the very best Haxall flour with yeast retains its beautiful creamy yellow tint, while the same raised with alum baking powder becomes white and dry and tasteless. No doubt many of our national diseases, such as dyspepsia, have their origin in the universal use of baking powders, and I suggest that the early decay of teeth in the United States might be traced to the deprivation of natural phosphates of lime and the substitution therefor of other alkalic salts, such as those of soda and potash, in our daily food. Anything that deteriorates or improves the "staff of life," our daily bread, in the slightest degree, is of such immense importance, that I hope you will keep open the pages of the SCIENTIFIC AMERICAN till the subject is thoroughly understood. L. K.

Providence, R. I.

American Locomotives in Italy.

To the Editor of the Scientific American:

Mr. Edward A. Quintard, of Philadelphia, is here with a 38-ton locomotive, from the late Paris Exhibition. This is a right step in the true direction. United States manufacturers must do so, to bring effectively their products before the Italian people.

It is to be hoped that Mr. Quintard may convince the Italians that it would be to their interest to buy his great and fine locomotive, as well as many others of them which may follow.

The Stenographical Machine of Michela.—One of these machines some days since was on trial before the city fathers of this city. The machine reported the debates fully and correctly, without flattery and with exact justice. However, the city fathers preferred to be reported by the representatives of the city press. Perhaps the latter have a way of reporting which might be more pleasing to those members who may utter hasty and inconsiderate discourses, which the machine, without conscience and consideration, reports word for word and letter for letter, while the manual reporters of the press smooth harsh expressions and omit and rearrange sentences. HENRY NOBLE,

Turin, Italy, January, 1879. U. S. Consular Agent.

Poor England.

The London *Standard* publishes the following from one of its correspondents, who signs himself "Traveled Englishman:"

"I came back to England, not long ago, from a somewhat lengthened journey to find my fellow countrymen suffering in no small degree from depression, if not actual distress. Banks had 'broken,' large mercantile houses had failed, great industrial works had stopped, and throughout the manufacturing districts the gloomiest apprehensions with regard to the future prevailed. Some of these apprehensions have unfortunately been realized since then, inasmuch as I see that the sufferings of the poor in Sheffield, Manchester, Leeds, Newcastle, and many of our great northern towns have been so severe as to require the formation of special public committees to collect and dispense the charitable offerings of the richer classes. It is only natural in these circumstances that a brisk controversy should have sprung up in various quarters on the subject of the cause of this distress.

"In London society people may not know much about it; but I can assure you, from what I have myself seen in some of the most important commercial and manufacturing districts, that the keenest interest is taken by all classes in the discussion of this question. What has brought about the present deplorable stagnation of trade? is the inquiry universally put nowadays in the North of England. 'High wages,' say the masters, and 'over production,' say the men, when they are asked this question. I belong to neither class, and I by no means set myself forward as an authority on the point at issue. But it happens that I have learned both at home and abroad a few facts which seem to me to have an important bearing on this question, and which, therefore, with your leave, I shall lay before your readers. How is it, I want to know, that my wife's maid, when she went, at Aix les Bains, at Homburg, and at Florence, to buy calico, found in shops where two years ago nothing but English goods were kept that the calico or cotton in stock was of American manufacture? I am not a judge of this article myself, and I really do not pretend to know whether the American goods are better or worse than those formerly supplied from the English markets. What I do know is that in this, one of our own staple manufactures, we appear to have been fairly beaten out of the field upon the Continent, and that in each case the shopkeeper when applied to for an explanation declared that he preferred American to English materials because he got a larger profit upon the former than upon the latter. How is it, again, that here in England if I want tools for my garden or my workshop I am constantly being invited by my ironmonger to try new American 'notions,' in the shape of spades, and hammers, and saws, and chisels, and axes?

"Some months ago I read a letter of Mr. Gladstone's upon a subject on which his authority can hardly be contested. In it he gave his opinion upon the common American woodman's ax, and described—as I happen to know quite accurately—the difference between it and the English article manufactured at Sheffield. The comparison, I need hardly say, was all in favor of the Yankee production. Sheffield is too conservative—in its manufactures, I mean, not in its politics—to make an ax of the best shape. So the sharp American comes in and wins. And he does this not merely in axes and the other tools I have mentioned, but in locks, bolts, stoves, lamps, and a thousand-and-one other household requisites which a dozen years ago were the peculiar production of this country. You have only, indeed, to cast your eye over your own household, sir, in order to see to how large an extent the English manufacturer has been beaten, even in articles of domestic use. Nor is it in the hardware trade only that we seem now to be getting flooded with American goods. American leather comes over here to be made up into shoes; and our famous English carriages are to a large extent built out of materials which have crossed the Atlantic, and for which the American has been duly paid. 'Glue, hair, and sandpaper' are mentioned in a recent copy of the Philadelphia *Ledger* as being now among articles largely exported to this country; and even slates—shades of the Welsh magnates!—are now quarried in the United States in order to roof in our English homes.

"Can any of your readers tell me how all this is brought about? And is not the fact alone sufficient to account in a large measure for the present depression in our manufacturing industries? I do not grumble because, if I want tomato sauce with my cutlets at this season, it is probably made out of American fruit; nor can I complain because my grocer, my butterman, and probably my butcher also, deal so largely in American goods of all kinds, for I freely admit that as a source of food supply the United States is naturally infinitely superior to our limited and over-populated country. But what I want to know is why, in the special manufactures which were once entirely ours, and which only a few years ago belonged to us more largely than to any other country in the world, we now seem to be running a bad second to the United States? Why, sir, even the cigarettes which I smoke are made in Richmond, Virginia, and the pen with which I write comes, not from Birmingham, but from an American manufactory.

"If I liked to prolong the list of articles of use and luxury which are now made for the English market in the United States, instead of being made for the United States in England, I might do so indefinitely; but I have too much respect for your space and for the time of your readers to do anything of the kind. It would be easy also to speak of those Belgian girders which are now used in the very heart of our own iron districts in the construction of buildings, and of those French engines which compete dangerously with the products of our own best engineering establishments. But I have said enough, I think, to show that, in addition to 'high wages' and 'over production,' foreign competition must be reckoned among the causes of the present distress; and I conclude by asking if any one can explain to me how it is that this competition should so suddenly have become serious, if not actually fatal to us, in the very fields of which recently we were the undisputed masters?"

Steam Boilers.

A very interesting and valuable lecture was lately delivered at Hartford, Conn., by Mr. J. M. Allen, President of the Hartford Steam Boiler Inspection Company, the discourse being devoted to the consideration of steam boilers. Mr. Allen commenced by speaking of the famous Corliss engine at the Centennial, remarking that although every one admired and wondered at it, but few really stopped to think of the source of its power and energy. Few recalled the fact that all this splendid machinery derived its motive power from the concealed steam boilers in the low line of buildings outside the Main Centennial Hall. In crossing the Atlantic in an ocean steamer, how few think of the unsightly, unattractive boilers that furnish the power for the machinery that carries the vessel forward.

In discussing this question it is proper, Mr. Allen said, that we should know of what material boilers are constructed and the methods of construction. He then gave a brief account of the manufacture of iron plates, showing the necessity of obtaining an ore free from phosphorus and sulphur, the former making a "cold short" iron, and the latter a "red short," either of which is unsuitable for boiler plates, when high pressures are to be used.

He also explained the process of "puddling," "shingling," repeating and rolling into finished plates. He showed that the presence of slag or scoria on the bars composing the pile prevent perfect welding, causing what are known as laminated sheets, illustrating all these points with diagrams, photographs, and specimens. He then described the methods of constructing boilers, punching holes in the plates, the use of the "drift pin," which was condemned, riveting, bracing, and staying. The defects from poor workmanship were pointed out and illustrated by specimens as the description progressed.

Mr. Allen devoted considerable time to the discussion of chipping and calking, showing that by the old methods boilers were liable to be very greatly injured and incipient defects developed. He recommended the planing of the edges of the sheets preparatory to calking in preference to the old method of "chipping."

The necessity of having good material and good workmanship in the construction of boilers was brought more forcibly to the minds of his hearers when he stated that a boiler 16 feet long, 60 inches in diameter, and running at a pressure of 60 lbs. to the square inch, sustained an internal pressure of not less than 1,000 tons, the tendency being to burst the surrounding metal asunder. He also stated that the railroad locomotives, which often stand near the cross walks at the depot, carry a pressure on their crown sheets of not less than 90 tons. This point was illustrated by drawings upon the blackboard. It is not to be understood that these are dangerous or excessive pressures, but are mentioned to give some adequate idea of the immense strain to which steam boilers are subjected, and also to show again the absolute need of the best material and workmanship in making them. Anything short of this he claimed was criminal neglect.

Mr. Allen then proceeded to show at what pressure a boiler may safely be worked. He stated that there were formulæ for all these, so that the bursting and safe working pressure could be easily arrived at. He further showed that the bursting pressure of the boiler above mentioned, 16 feet by 60 inches, was not less than 525 lbs. to the square inch, but that in practice only one sixth of the bursting pressure should be allowed, leaving a wide margin for safety. This would admit of about 87 lbs. of steam to the square inch as the safe working pressure of this boiler.

At this point Mr. Allen took up the subject of water used in boilers, showing that much solid matter carried in solution was precipitated by high temperatures. The carbonate of lime, sulphate of lime, carbonate of magnesia, aluminum, and other chemical ingredients, cause a hard, indurate scale, which adheres to the fire sheets of the boiler, greatly reducing the economy in fuel and rendering the plates liable to severe overheating and consequent great reduction of strength. This was illustrated by numerous specimens of scale taken from boilers in different sections of the country.

The internal corrosion of boilers was next discussed, showing that this was caused by impurities of the water. Manufactories situated on the banks of a stream, discharging their refuse and spent dyes into the current, render the water extremely impure. It will be readily seen that if those manufactories which are situated lowest down on the stream fill their boilers with this water, they will have a very impure and dangerous liquid from which to generate steam. Cases of severe and dangerous corrosion were mentioned as arising from this cause.

Specimens of corroded plate and braces were shown, where the iron was nearly wasted away, and yet it was stated that the parties owning the boilers had rested securely in the belief that their boilers are sound and well braced. These defects were discovered by careful inspection, a means of safety too often inadequately performed or neglected altogether.

The methods of inspection were next discussed, and it was stated that in all cases where it was possible, boilers should be examined internally as well as externally. Inspection by the "hammer test" was described, showing that a practiced ear, from light blows on the sheet, could detect defects in the material. The weaknesses arising from "the wear and tear" can only be discovered by the most careful internal and external inspection. Carelessness in the management of the safety valve was considered.

Instances of overloading safety valves far beyond the limit of safety were mentioned. In one instance, at least, a steam user was found to have wedged his safety valve down by driving a stick between the lever and the beams of the building overhead.

The principle of the steam gauge was described, and its importance in connection with the use of steam boilers. It is liable to defects and variations which can only be detected by comparing it with a gauge known to be correct. This process of comparison was illustrated by very unique apparatus, prepared expressly for use by the Hartford Steam Boiler Inspection and Insurance Company. The standard by which these test gauges are corrected is a mercury column, which is invariable and therefore reliable. The column in use at the company's office, which Mr. Allen described, is inferior to none in the country.

Mr. Allen next considered ebullition, the conduction of heat, and the generation of steam. These subjects were illustrated by diagrams prepared for the purpose, showing the great force which is stored up in the water in boilers, kept in place only by the superincumbent pressure of steam.

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