MANUFACTURE OF CAST STEEL AND HOMONOGENEOUS IRON.

In treating puddled steel, raw steel and puddled iron, for the production of cast steel and homogeneous iron, the material to be treated has usually been (at great expense) balled and shingled to clear it from the cinder, and subsequently generally rolled into bars, cut up in pieces, and remelted. According to an invention recently patented by Mr. John Gjers, of Middlesborough, when crude iron or refined iron is caused through the action of iron cinder or other additional matter to boil and to come to nature, the material is transferred under treatment from the puddling even before the process of balling. By remelting or keeping fluid the material, it is caused to separate from the cinder and to attain a uniform quality ready to run into ingots. Thus Mr. Gjers melts crude pig iron, or refined iron, or recarbonized puddled iron, and works it in the usual way in a puddling furnace, and causes it through the action of rich pure iron cinder or other additional matter commonly used when making puddled steel—such for instance as manganese and salt—to boil and to come to nature in the manner adopted for making puddled steel or puddled iron. At or before the stage called top boil, just before the metal begins to thicken and to come to nature, but before the stage when it is fit or ready for balling up, the material under treatment is tapped with as much of the cinder as cannot at this period of the process be separated. It is transferred into a receptacle, in a reverberatory furnace on Siemens' regenerative principle. It may also be run on to the open hearth of a reverberatory gas furnace which may be either on Siemens' regenerative plan, or on the blowpipe plan in which gas is used in conjunction with a hot blast. The essential feature of the furnace to be employed is that it should be capable of producing a temperature sufficiently high to melt steel or homogeneous iron, and it is also important that the flame should be capable of regulation to either an oxidizing or a carbonizing flame.

Here, in the reverberatory furnace, Mr. Gjers allows the transferred metal in a fluid state to remain at rest for a length of time, exposed to a neutral or to a carbonizing or an oxidizing heat, according as the crude steel metal requires more or less decarbonizing; the heat being sufficient to keep it perfectly fluid until the metal has thoroughly separated from the cinder, which will float on the top, and until it has arrived at the requisite point of carbonization to form the steel or homogeneous iron which may now be tapped into ingot molds. Or the cinder may first be tapped or removed, and other flux (such as oxides of iron and manganese in the shape of pure ores of those metals) may if necessary be added to assist in decarbonizing and to protect the metal. To the metal may be added a certain quantity of either wrought or crude iron, of the shape of spiegel iron or other matter (manganiferous) so as to arrive at the point of carbonization and temper desired.

As far as possible the process is regulated, so that the transference from the puddling furnace may be made at such a period of the coming to nature, as will enable the metal after having been made thoroughly fluid and remained so sufficiently long to decarbonize in the reverberatory furnace, to be obtained without addition of malleable iron or ore at the degree of carbonization desired. If the proper precautions are taken to boil and to work the iron well in a suitable cinder in the puddling furnace, it will generally be pure enough for steel. At the last stage of fluidity, while it is yet fluid enough to run, and just when it is about to congeal or come to nature, it still contains about two per cent too much carbon. By transferring and exposing it, for three or four hours, in the reverberatory furnace in a liquid state to a neutral or slightly oxidizing flame under a cover of oxidizing cinder, this excess of carbon gradually works off; and when it is worked down to the point desired (which may be ascertained by testing samples), it is tapped into ingots. To temper and improve the steel or homogeneous iron, in most cases, before tapping the metal, a small proportion of manganese in some of its combinations is added.

It has been found beneficial to let the metal decarbonize to an extent slightly below the desired degree of carbonization of the steel or homogeneous iron, and then to improve and recarbonize the metal by adding a small proportion of spiegel iron, amounting to about 1 per cent of the whole. The carbon may, in some cases, be partly reduced by the addition of wrought iron, or, it may be, other malleable iron in any form containing less carbon than the desired steel. In practice, it has been found advantageous for this purpose to make use of scrap bars, blooms, or balls in a heated state, which are gradually introduced and melted with the fluid metal tapped from the puddling furnace. In some cases, cast steel or homogeneous iron is made by using ordinary puddle balls in combination with the fluid metal tapped from the puddling furnace, for which purpose it is found convenient to partially tap or transfer the contents of the puddling furnace just before the metal comes to nature, and to allow one half, less or more, of its contents to run into the reverberatory melting furnace. The rest may be allowed to continue working in the puddling furnace until it has thoroughly come to nature, and has become malleable, and the cinder has dropped, when it may be transferred either by shovels or in lumps and added to the fluid metal, previously tapped from the puddling furnace, on to the hearth of the reverberatory melting furnace.

The whole of the metal thus mixed, after being thoroughly fluided and brought to the desired point of carbonization in the reverberatory steel melting furnace, may then be run into ingots. Or four or more puddling furnaces may be employed to one melting furnace, and the entire contents of one or several of the puddling furnaces may be transferred before the period of coming to nature, while yet fluid, and the contents of the remaining furnaces may be transferred after the contents have got into nature; the entire contents of the whole of the puddling furnaces may then be melted together in the steel melting furnace. Or the crude steel metal tapped from the puddling furnace, at the period named, may, particularly when it is desired to treat it in crucibles, be run into molds as flat cakes, which, being broken in pieces, may be remelted in crucibles (or in the reverberatory furnace), in conjunction with malleable iron or with iron ore, to orm steel.—*The Mechanics' Magazine.*

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents

For the Scientific American.

VERSIFICATION BY AN ANTIQUARIAN OF THE HINDOO COSMOGENY OF THE TEN AVATARAS,

THEY BEING THE SACRED BOOKS AND TRADITIONS OF THE HINDOOS.

The Fish denotes the fatal day
When Earth beneath the waters lay.

The Bull's the emblem of the God
Who raised again the mighty clod.

The amphibious Reptile marks the time
When it began the shores to climb.

The Lion King and savage trains
Now roam the woods or graze the plains.

Next little Man begins his reign
O'er earth and sky and watery main.

Ram with ax then takes his stand,
Fells the thick forest—clears the land.

Ram with plow turns up the soil,
And teaches men for food to toil.

Ram with bow 'gainst tyrants fights,
And thus defends the people's rights.

Budha for reformation came,
And formed a sect well known to fame.

When Kalki mounts his milk-white steed,
Heaven, Earth, and all! will then recede.

According to the Hindoo theology the duration of the universe consists of ten periods or Avataras, the first of which is 432,000 years, the second is 2×432,000, the third 3×432,000, and so on, and the tenth of 10×432,000 years. And the total duration from creation to destruction will be 23,760 000 years. Now it is not a little singular that the number 432 is considered in the East as a sacred or mystic number, and was so regarded by the ancient Chaldeans, Egyptians, and others Again, if we add together the numbers 1, 2, 3, and 4, the sum will be 10 (or the ten avataras). Again, the earth has four magnetic poles, which revolve around the pole of the earth, approximately in the following periods: the first in 1×432 years; the second in 2×432, 864 years; the third in 3×432, or 1,296 years; and the fourth in 4×432, or 1,728 years. The least common multiple of these numbers is 5,184, which multiplied by the half of ten, gives 25,920 years, which is very nearly the period that it takes the pole of the earth to revolve around the pole of the ecliptic, which gives rise to the precession of the equinoxes. Hence we may infer that the ancients were acquainted with these grand phenomena. I will now offer the following suggestions as to why the number 432 and its multiples and sub-multiples were considered sacred by the ancients. The following table will exhibit in part my explanation:

$$432 = 3\times144 = 3\times12^2$$
$$864 = 6\times144 = 6\times12^2$$
$$1296 = 9\times144 = 9\times12^2$$
$$1728 = 12\times144 = 12^3$$

The number twelve is everywhere used in the Bible as a sacred or mystic number. Hence we have the 12 sons of Jacob, the 12 tribes of Israel, the 12 apostles of our Savior, the ten commandments delivered to Moses which were completed by the Lord by adding two more to them, thus making 12 in all; showing a completeness, a fullness, not represented by any other number. Again, the dimensions of the most holy altar in the temple of Solomon was four-square, and its measure was 12×12×4. And the molten sea was supported by 12 oxen. The seventh chapter of Revelation says that 144,000 of the tribes of Israel were sealed with the seal of the living God, and in the fourteenth chapter, that 144,000 of the redeemed praised God before the 4 beasts and the elders, and in the twenty-first chapter we find a description of the New Jerusalem, which is 4 square, has 12 gates, and the length and breadth and the hight thereof are all equal, and he found the measure to be 12,000 furlongs. Then the contents must be cube of 12,000, or 1,728,000,000,000. These analogies tend to show why the ancients regarded the number 432 as sacred. Again, the sacred tradition and prophecies of every race and nation were doubtless dictated by extatics long before the art of writing was invented. Is it to be supposed that their prophecies and visions were lost? By no means. They mapped them in the skies, among those fixed and unchangeable stars which glitter in the heavens above—a record that never changes and will last until time shall be no more. If we cast our eyes to the heavens we will see there illustrated the foregoing beautiful lines. Who cannot see the universal deluge when the earth was beneath the waters, in the water bearer who is pouring out a flood in which the fish do swim and the ship (Noah's Ark) is tossed by its tumultuous waves. These constellations are plainly mapped out. Again, the reptile crawling on the dry land is nothing more than the serpent that tempted Eve, and is represented in the heavens by a great serpent which is pursuing a woman to devour her. In the ancient charts she is represented with a child in her arms and is flying into the wilderness. Is this not mother Eve, and is it not typical of the flight of the Virgin into Egypt, which is also strikingly told in the twelfth chapter of Revelation? Then follows the animal kingdom, which is also mentioned in our Bible, and they are represented in the heavens by the constellations of the lion, the bear, the bull, the goat, the horse, the dog, the sheep, the dove, the raven, the swan, the eagle, the wolf, etc. At length Man appears the master of creation. This is precisely in accord with our Bible. And it was for this reason that the ancients represented a man as surrounded by the 12 signs of the zodiac, each sign corresponding to one of his members. We see this figure printed in our common almanacs, which is probably older than the pyramids of Egypt, and as ancient as theology itself. Then Ram appears—"He fells the forest, tills the ground." (Ram is a Hindoo god, and his name is often found in ancient history as an affix or a suffix to proper names, as Ram-ises. Semi Ramis, etc.) This is doubtless an emblem of Cain. He too is represented in the heavens by the constellation of husbandman or Bootes, who is a cultivator of the vine. He is represented as holding a club, emblematic of his wicked disposition, for we are told that he slew his brother Abel. Abel is also represented in the heavens by the constellation of Auriga, who holds a kid in his arms. The position of these two constellation in the heavenly sphere are so nearly opposite each other that it is presumable that they were so mapped out to show how different in character were Cain and Abel, or in other words, good and evil. Then "Ram with bow" is an emblem of both Nimrod and Sampson, and are seen represented in the heavens by those beautiful constellations Orion and Hercules. Then Budha appears as a redeemer. Is this not another name for our Savior, who is also represented in the ancient charts of the heavens by a child in the arms of a virgin. And lastly, in the granddrama, Kalki appears, "mounted on his milk white steed." This can be no other than the white horse mentioned in the sixth chapter of Revelation, and called "Death on the pale horse." And again, in chapter xix., where the heavens are opened and a white horse appears, and his rider is called Faithful and True. This is also represented in the heavens by the constellation of Pegasus, on which Perseus rode to the rescue of the princess Cassiopeia, who was chained to a rock and about to be devoured by a great sea dragon. The first meridian of the heavens passes only 6 min. 26 sec., or 1° 38′ 30″ to the eastward of the bright star Algeneb, one of the stars forming the Square of Pegasus. Now the precession of the equinoxes carries the first meridian to the eastward at the rate of about 50½″ per year; consequently Algeneb must have been on that meridian about 117 years ago. The square city spoken of in Revelation is beautifully represented by the square of Pegasus. The first meridian has already entered that city, and is gradually advancing towards the citadel, the heart of Pegasus, which it will reach in about a thousand years. At the same time that it pierces the heart of Pegasus it will also pass through his rider, and then we may quote the prophecy of the ancient avataras:

"When Kalki mounts his milk-white steed,
Heaven, Earth, and all! will then recede."

Do we not see this illustrated before our eyes. Never has mankind made so much progress as during the last one hundred years (or since the first meridian entered into the square city). Faithful and True is preparing the white horse—he has already one foot in the stirrup—he will soon mount his milk-white steed. Kalki is beating the call to arms and knocking at the door of our hearts to rouse us to action. The city of the New Jerusalem is being adorned for the marriage with the brightest jewels of the minds and intellects of men. Her gates are standing ajar, and we can even now catch a glimpse into the glorious city whose fame is described in every sacred book ever written, and whose fair proportions are seen in the heavens represented by the Square of Pegasus. Thus we see that our Bible, the ancient Avataras, and the stars agree. And why should they not? Truth is one and universal. And I feel sure that if we could read the internal sense of all sacred books we would find them to agree perfectly. It is man alone who perverts them.

W. P. Buckner.

Center of Gravity in a Revolving Vertical Wheel.

Messrs. Editors:—On behalf of the members of this Institute, I take the liberty of asking you to say, through your able columns, whether the enclosed theory regarding a vertical wheel in motion is true; and if it is true whether it has now been introduced for the first time, as Mr. McCarroll of this city professes himself to be the discoverer of it.

O. J. Swegles,
President Buffalo Mechanics' Institute.

The theory and its attempted demonstration are given as follows, by Mr. James O'Riordan in a communication to some newspaper, the name of which our correspondent has withheld.

We have no recollection of seeing this theory before, but in a paragraph attached to the slip containing the communication of Mr. O'Riordan, we find a statement that it was formerly submitted to us, and a charge that we treated the subject in a way that seemed to show want of appreciation of its merits. There is no doubt that we should have dismissed the subject as unworthy serious discussion, had it come to us in the way of ordinary correspondence. We would do so now had it come from a private source, as we deem it of no practical value, and we exceedingly dislike to cumber our pages with purely theoretical discussion. We will however for this once make an exception in favor of this communication, and endeavor to show the entire fallacy of the doctrine, as therein set forth.

Matteawan, Aug. 3d, 1868.

In reply to your query of the wheel, viz., "Whether the weight of a vertical wheel, when in motion, rests on the same point as when in repose."

It does not. The point on which the weight rests—the center of gravity—recedes from the center and approaches nearer to the periphery of the de-