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The hundred wonders of the world

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Springs and wells.

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which is a bridge suspended by chains, seldom passed unless by the adventurous miners.—Asgarth force, in Yorkshire, is likewise a very interesting fall.

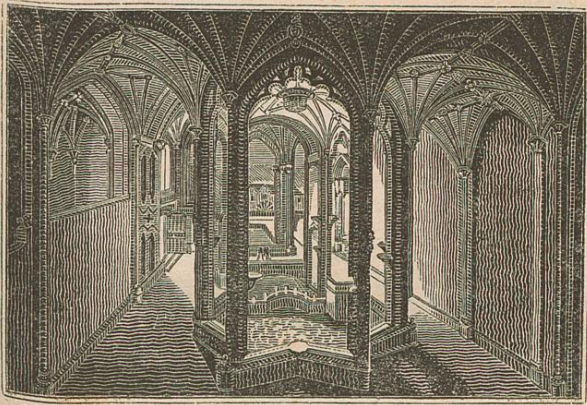
In SCOTLAND, the FALL OF FYERS, near Loch-Ness, is a vast cataract, in a darksome glen of a stupendous depth. The water rushes beneath, through a narrow gap between two rocks, and thence precipitating itself more than forty feet lower into the bottom of the chasm, the foam, like a great cloud of smoke, rises and fills the air. The sides of this glen are stupendous precipices, blended with trees overhanging the water, through which, after a short space, the waters discharge themselves into the lake. About half a mile to the south of this fall, is another which passes through a narrow chasm, whose sides it has undermined for a considerable distance. Over the gap is a true Alpine bridge, formed of the trunks of trees covered with sods, from the middle of which is an awful view of the water roaring beneath. In Perthshire, the river Keith presents a very considerable cataract, the noise produced by which is so violent as to stun those who approach it.—The western coast of Ross-shire is, however, peculiarly distinguished by these natural wonders, among which may be cited the grand cataract of the river Kirkag, and the cascade of Glamma, which latter being situated amid the constant obscurity of woody hills, is truly sublime.

In IRELAND, the noble river Shannon has a prodigious cataract, which, at about fifty miles from its mouth, prevents it from being longer navigable for vessels of a larger burthen.

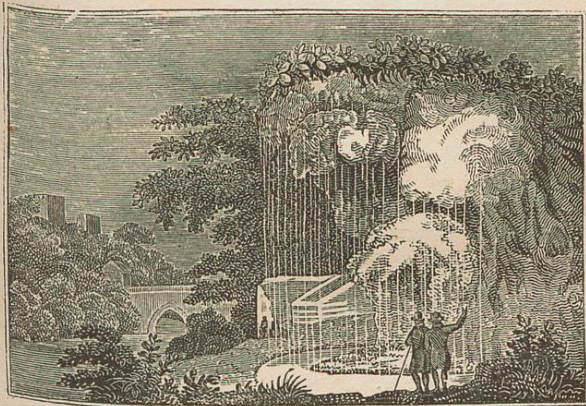
SPRINGS AND WELLS.

SAINT WINIFRED'S WELL.

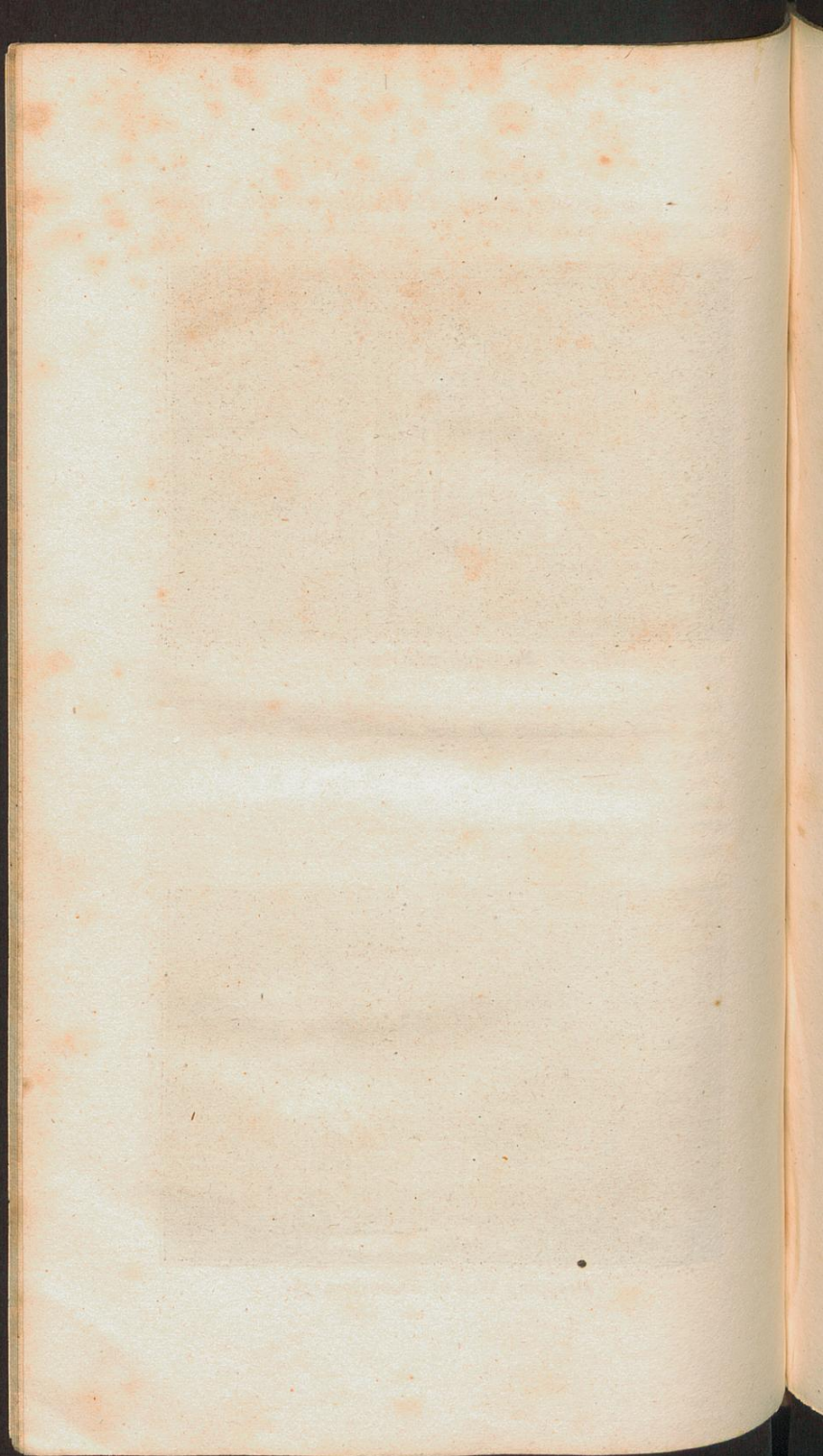
HOLYWELL, in Flintshire, is famous for SAINT WINIFRED'S Well, one of the finest springs in the world. On account of the sanctity in which it was holden, it gave name to the town. This well pours out, each minute, *twenty-one tons of water*, which, running in the middle of the town, down the side of a hill, is made use of by every house as it passes, after which it turns several mills, and is employed in various



St. Winifred's Well,



Dropping Well at Knaresborough.



manufactures, which greatly increase the population of the place, and its neighbourhood. Over the spring, where a handsome bath has been erected, is a neat chapel, supported by pillars, and on the windows are painted the chief events of St. Winifred's, or, as it was anciently written, Wenefrede's life. About the well grows moss, which the ignorant and superstitious devotees most stupidly imagine to be St. Winifred's hair. This saint is reported to have been a virgin martyr, who lived in the seventh century, and, as the legend says, was ravished and beheaded in this place by a pagan tyrant; the spring having miraculously risen from her blood. Hence this bath was much frequented by Popish pilgrims, out of devotion, as well as by those who came to bathe in it for medicinal purposes. Mr. Pennant says, "the custom of visiting this well in pilgrimage, and offering up devotions there, is not yet entirely laid aside: in the summer a few are still to be seen in the water, in deep devotion, up to their chins for hours, sending up their prayers, or performing a number of evolutions round the polygonal well."

It might have been supposed that the present enlightened age would have been secure against a repetition of impostures of this kind; but Doctor Milner, a Catholic Bishop, of Woolverhampton, has taken much pains to persuade the world that an ignorant proselyte, of the name of Winefrid White, was there cured of various chronic diseases so late as the year 1804, by a miracle. Sir Richard Phillips, having, in the Monthly Magazine, referred this pretended miracle to the known effects of strong faith on ignorant minds, in any proposed means of cure, has been attacked by the catholic clergy for his incredulity; but, in number 302 of the Monthly Magazine, he replies in the following words.

"We have no doubt whatever that Winefrid White was cured by her journey to Holywell, and by bathing in the wonderful natural spring at that place; but we are not credulous enough to believe that her cure was effected by any antagonist properties of the water to the cause of her disease—nor impious enough so to sport with ETERNAL OMNIPOTENCE as to assert that a capricious suspension of the laws of Nature took place for this purpose. On the contrary, we believe that the poor woman was cured by causes

well known to every medical practitioner, and proved in hundreds of recorded instances; that is to say, by her faith in the means proposed for her cure, wrought to the highest pitch by her religion, and by the assurances of those to whom she was accustomed to defer. We think, nevertheless, that the publication of this '*Case of Winefrid White*' savours strongly of religious empiricism, and is exactly analogous to the '*cases of cure*' which we every day see advertized in all the newspapers. We refrain from treating the subject theologically, yet it appears to us that *Matthew, chap. 24, verse 24*, proves that 'signs and wonders' are not only no evidence of divine interposition, but may be used even by 'false prophets, so as to deceive the very elect.' The continuance of miraculous powers will be found, we suspect, to depend on other circumstances than the date of the year. They disappear wherever the printing-press begins to be freely used, and, by its agency, fixes all the circumstances that attend them; and they still continue to flourish wherever the history of the circumstances depends for any period on traditional evidence. Miracles are, therefore, performed in abundance, even in our days, among the Negroes, the Hottentots, the Caffrees, the Tartars, the South Sea Islanders, and the Indians of the two Americas. The last we believe on record are to be found in the Hon. M. Elphinstone's published Embassy to Caubul in 1808: he states that the sick were carried after him many days' journey; and, at page 28, he says, 'some thought we could raise the dead; and there was a story current, that we had made and animated a wooden ram at Mooltaun—that we had sold him as a ram; and that it was not till the purchaser began to eat him, that [the material of which he was made was discovered.]—We forbear,' says Sir Richard "to press the subject further."

DROPPING WELL AT KNARESBOROUGH.

THIS dropping well, or petrifying spring, rises at the foot of a limestone rock, at an inconsiderable distance from the bank of the river Nidd. The spring, after running about sixty feet, divides, and spreads itself over the top of the rock, whence it trickles very fast, from thirty or forty places, into a channel hollowed for the purpose, each

drop producing a musical kind of tinkling, probably owing to the concavity of the rock, which, bending in a circular projection, from the bottom to the top, occasions its brow to overhang about fifteen feet. This rock, which is about thirty feet in height, forty-eight in length, and from thirty to fifty in breadth, started, in the year 1704, from the common bank, and left a chasm, from five to nine feet wide, over which the water passes by an aqueduct formed for the purpose. It is clothed with evergreens and other shrubs, which add greatly to the beauty of this very interesting scene.

The water is said to abound with fine particles of a nitrous earth, which it deposits, but when in a languid motion only, and leaves its incrustations on the leaves, moss, &c. which it meets with, in trickling thus slowly through the cavities of the rock. This spring is estimated to send forth twenty gallons of water in a minute. Here are to be seen pieces of moss, birds'-nests, with their eggs, and a variety of other objects, some of them very curious, which have been incrustated or petrified by the water.

WIGAN WELL.

ABOUT a mile from Wigan, in Lancashire, is a spring, the water of which burns like oil. On applying a lighted candle to the surface, a large flame is suddenly produced, and burns vigorously. A dishful of water having been taken up at the part whence the flame issues, and a lighted candle held to it, the flame goes out; notwithstanding which the water in this part boils and rises up like water in a pot on the fire, but does not feel warm on introducing the hand. What is still more extraordinary, on making a dam, and preventing the flowing of fresh water to the ignited part, that which was already there having been drained away, a burning candle being applied to the surface of the dry earth at the same point where the water before burned, the fumes take fire, and burn with a resplendent light, the cone of the flame ascending a foot and a half from the surface of the earth. It is not discoloured, like that of sulphureous bodies, neither has it any manifest smell, nor do the fumes, in their ascent, betray any sensible heat. The latter unquestionably consist of inflammable air, or hydrogen gas; and it ought to be ob-

served that the whole of the country about Wigan, for the compass of several miles, is underlaid with coal. This phenomenon may therefore be referred to the same cause which occasioned the dreadful explosion of Felling Colliery; but in the present case, this destructive gas, instead of being pent up in the bowels of the earth, accompanies the water in its passage to the surface.

BROSELEY SPRING.

THIS celebrated boiling spring, or well, at Broseley, in Shropshire, was discovered in the month of June, 1711. It was first announced by a terrible noise in the night, there having been a remarkable thunder-storm. Several persons who resided in the vicinity having been awakened in their beds by this loud and rumbling noise, arose, and proceeding to a bog under a small hill, about two hundred yards from the river Severn, perceived a surprising commotion and shaking of the earth, and a little boiling up of water through the grass. They took a spade, and digging up a portion of the earth, the water immediately flew up to a great height, and was set on fire by a candle which was presented to it. To prevent the spring from being destroyed, an iron cistern has been placed over it, provided with a cover, and a hole in the centre, through which the water may be viewed. If a lighted candle, or any burning substance, be presented to this aperture, the water instantly takes fire, and burns like spirit of wine, continuing to do so as long as the air is kept from it; but on removing the cover of the cistern, it quickly goes out. The apparent boiling and ascent of the water of this spring, are still more obviously the result of hydrogen gas, or inflammable air, than in the preceding instance of Wigan well.

HOT SPRINGS OF ST. MICHAEL.

IN the eastern part of this island, or one of the Azores, is a round deep valley surrounded by high mountains, in which are many hot springs; but the most remarkable is that called **THE CALDEIRA**, situated in the eastern part of the valley, on a small eminence by the side of a river, on which is a basin about thirty feet in diameter, where the water continually boils with prodigious fury. A few yards distant from it is

a cavern in the side of a bank, in which the water boils in a dreadful manner, throwing out a thick, muddy, unctuous water, several yards from its mouth, with a hideous noise. In the middle of the river are several places where the water boils with so intense a heat, that a person cannot dip his finger into it without being scalded. On its banks are several apertures, out of which the steam rises to a considerable height, and is so hot that it cannot be approached by the hand. In other parts, the spectator would be led to suppose that the bellows of a hundred forges are blowing in concert; while sulphureous streams issue out in a thousand places. The bushes even, near these spots, are covered with pure brimstone, condensed from the steam which issues from the ground. In the small caverns whence the steam issues, many of the inhabitants prepare their food.

HOT SPRINGS OF THE TROAS.

THE Troas, a country of Phrygia, in Asia Minor, of which Troy was the capital, abounds with hot springs; the most interesting one of which is thus described by Doctor Clarke. It is situated near a place called Bonarbashi, signifying literally "*The head of the springs,*" and gushes perpendicularly out of the earth, rising from the bottom of a marble and granite reservoir, and throwing up as much water as the famous fountain of Holywell in Flintshire. Its surface seems vehemently boiling; and, during cold weather, the condensed vapour above it, causes the appearance of a cloud of smoke over the well. While the mercury stood at 46° in the open air, it rose, when the thermometer was plunged in the water, to 62° . Notwithstanding the warmth of this spring, fishes were seen sporting in the reservoir. In every part of the district through which the Mender flows, from Ida to the Hellespont, are many of these springs, of different degrees of temperature.

The Geysers have already been described, in treating of Mount Hecla, and its surprising volcano. In following up the details of the phenomena of this nature given above, by a brief notice of other bubbling, tepid, and boiling springs, it may not be improper to premise that heat, water, and vapours of various kinds, exist in prodigious

quantities beneath the surface of the earth; and frequently, as has been seen in the phenomena of volcanoes and earthquakes, burst forth from enormous openings, with tremendous destruction. It often happens, however, that the openings are small and porous, and that the vapours ascending through them, are simply combined with water. Hence that almost infinite variety in the characters of these springs, fountains, and lakes, the waters of which are combined with extraneous substances. In some cases the elastic gases, or vapours, ascend from specific levity alone, and are destitute of all taste and odour; insomuch that springs are found which bubble without boiling, or betraying heat or any other foreign quality. In other cases they are strongly impregnated with heat; and are then either tepid or boiling, according to the proportion of extricated caloric they contain. Occasionally, whether hot or cold, they are blended with metallic, sulphureous, saline, and other substances, and hence assume the name of mineral waters; while, if the substance thus dissolved be combustible, as naphtha, bitumen, or turpentine, the fountain will often inflame and burn on the application of a lighted torch.

The water of the noted BOILING SPRING AT PEROUL, near Montpellier, is observed to heave and boil up very furiously in small bubbles, which manifestly proceed from a vapour breaking out of the earth, and rushing through the water, so as to throw it up with noise, and in many bubbles; for on digging in the vicinity of the ditch where the spring lies, and pouring fresh water on the dry spot newly dug, the same boiling is immediately observed. A similar bubbling of the water is likewise found near Peroul on the sea shore. In several dry places near the spring, are small venti-ducts, passages, or clefts, whence steam issues; and at the mouths of these passages, small light bodies, such as feathers, pieces of straw, leaves, &c. being placed, are soon blown away. This vapour, on the application of a lighted candle or torch, does not flame or take fire, as is the case with that of the boiling spring at Wigan; so that there are two different sorts of steams to occasion these boilings, at the same time that neither of the fountains is medicinal, or even warm.

Other boiling waters, of a very different temperature,

possess, like those of the hot springs of St. Michael, a sufficient degree of heat to boil eggs, and to serve for other culinary purposes. Among these may be instanced those of the SOLFATARA, near Naples; those on the summit of Mount Zebio, in the Modenese territory; and those which constitute the source of the imperial bath at Aix la Chapelle. In JAPAN, a hot spring is said to burst forth which constantly maintains the boiling point, and the water of which retains its heat much longer than common water. It does not flow regularly, but during an interval of two hours each day; and the force and violence of the vapours are then so great, that large stones are ejected, and raised to the height of ten or twelve feet, with a noise like that of the explosion of a piece of artillery.

From the phenomena which have been adduced, it appears that the exhalations constantly escaping from the vast subterraneous magazines in which they are prepared, vary greatly in their qualities and effects. Some are cold and dry, resembling air or wind, as those near Peroul, and in the cavities of mountains, especially those of Æolus, and other hills of Italy; as well as in particular mines. Others are inflammable, and of a bituminous nature, though not positively warm, as those of Wigan well. Others are very hot, sulphureous, and saline, more especially those of the natural stoves, sweating vaults, grottoes, baths, and volcanoes near Naples, Baiæ, Cuma, and Puzzuoli, as also in some of the subterraneous works at Rome. And others, again, are of an arsenical, or other noxious quality, as those of the Grotta del Cane. Now, these various streams meeting with, and running through water, must occasion in it a great variety of phenomena and effects.

It is observed by Doctor Thomson, in his history of the Royal Society, that the HOT SPRING AT BATH has continued at a temperature higher than that of the air for a period of not less than two thousand years, although it is so far distant from any volcano, that, without a very violent and improbable extension of the agency of volcanic fires, it cannot be ascribed to them. There are various decompositions of mineral bodies, which generate considerable heat; or, to speak more properly, water is itself the decomposed substance generating heat by its decomposition.

The evolution of azotic gas is a proof that the heat of the Bath waters is owing to a particular decomposition which takes place within the bowels of the earth. The greatest heat of these waters, is 116° of Fahrenheit's scale; but that of the mineral waters of Carlsbad, in Bohemia, ascends to 165° .

RECIPROCATING FOUNTAINS, OR SPRINGS, may be cited among the most curious phenomena of nature. An irregularity of flow is not uncommon in boiling springs; but there are other springs which evince a periodical influx and reflux almost as regular as the tides of the ocean. These changes, it will be seen, frequently occur several times in a day, or even in an hour. They are ascribed to various causes, either subterraneous, or superficial; but, in general, springs and lakes of this description have been ascertained to communicate with others beneath, through pores or apertures of various diameters, which serve equally to carry off the waters, and to supply them afresh. In such cases the flux and reflux of the upper head of water, must, necessarily, depend on the state of that beneath; and the causes which alternately augment and diminish the latter, must produce a similar effect on the former.

PADERBORN SPRING, in Westphalia, disappears twice in twenty-four hours, returning constantly, after a lapse of six hours, with a great noise, and so forcibly as to drive three mills at a short distance from its source. The inhabitants call it *the bolderborn*, that is, the boisterous spring.—LAY-WELL spring, near Torbay, is about six feet in length, five in breadth, and nearly six inches deep. The flux and reflux, which are very visible, are performed in about two minutes; when the spring remains at its lowest ebb for the space of about three minutes. In this way it ebbs and flows twenty times within the hour. As soon as the water begins to rise, many bubbles ascend from the bottom; but on its falling, the bubbling instantly ceases.—GIGGLESWICK SPRING, in the West Riding of Yorkshire, lies at the foot of a hill of limestone, named Giggleswick Scar. Its reciprocations are irregular, both with respect to duration and magnitude, the interval of time between any two succeeding flows being sometimes greater, and at other times less, insomuch that a just standard of comparison cannot be formed. The rise of

the water, in the stone trough, or cistern, which receives it, during the time of the well's flowing, is equally uncertain, varying from one inch to nine or ten inches, in the course of a few reciprocations. This spring, like the preceding one, discharges bubbles of air at the time of its flowing.—Near the LAKE OF BOURGET, in Savoy, is a reciprocating spring which rises and falls with a great noise, but not at stated and regular times. After Easter, its ebbings and flowings are frequently perceived six times in an hour; but in dry seasons not more than once or twice. It issues from a rock, and is called *la Fontaine de Merveille*, the marvellous fountain.

BITUMINOUS AND OTHER LAKES.

PITCH LAKE OF TRINIDAD.

NEAR point LA BRAYE, TAR POINT, the name assigned to it on account of its characteristic feature, in the Island of Trinidad, is a Lake which at the first view appears to be an expanse of still water, but which, on a nearer approach, is found to be an extensive plain of mineral pitch, with frequent crevices and chasms filled with water. On its being visited in the autumnal season, the singularity of the scene was so great, that it required some time for the spectators to recover themselves from their surprise, so as to examine it minutely. The surface of the lake was of an ash colour, and not polished or smooth, so as to be slippery, but of such a consistence as to bear any weight. It was not adhesive, although it received in part the impression of the foot, and could be trodden without any tremulous motion, several head of cattle browsing on it in perfect security. In the summer season, however, the surface is much more yielding, and in a state approaching to fluidity, as is evidenced by pieces of wood and other substances, recently thrown in, having been found enveloped in it. Even large branches of trees, which were a foot above the level, had, in some way, become enveloped in the bituminous matter. The interstices, or chasms, are very numerous, ramifying and joining in every