

air at 75° is perhaps too warm for the feelings of many people, a continued bath at that temperature is felt to be cold and depressing. Again, a bath of 98° to 102° acts far more excitingly than air of the same temperature, both because, being a better conductor, water brings more heat to the body, and because it suppresses the perspiration, which is greatly augmented by air of that temperature. Further, a temperature a few degrees below blood heat is that of indifferent baths, which can be borne longest without natural disturbance of the system.

Cold baths act by refrigeration, and their effects vary according to the degree of temperature. The effects of a cold bath, the temperature not being below 50°, are these:—there is a diminution of the temperature of the skin and of the subjacent tissues; the blood at first rises in temperature nearly 4°, but soon subsides again, this diminution of temperature of the blood usually not taking place in the bath, but shortly after leaving it. There is a certain feeling of shock diffused over the whole surface, and if the cold is intense it induces a slight feeling of numbness in the skin. It becomes pale and its capillaries contract. The further action of a cold bath reaches the central nervous system, the heart and the lungs, as manifested by the tremor of the limbs it produces, along with a certain degree of oppression of the chest and a gasping for air, while the pulse becomes small and sinks. After a time reaction takes place, and brings redness to the skin and an increase of temperature.

The colder the water is, and the more powerful and depressing its effects, the quicker and more active is the reaction. Very cold baths, anything below 50°, cannot be borne long. Lowering of the temperature of the skin may be borne down to 9°, but a further reduction may prove fatal. The diminution of temperature is much more rapid when the water is in motion, or when the bather moves about; because, if the water is still, the layer of it in immediate contact with the body gets warmed to a certain degree.

The effects of *hydropathy* depend on the power of abstracting heat from the body, and of stimulating it by the application of cold water. The action is depressing or exciting, according as the withdrawal of heat or the stimulation predominates.

A great deal depends on the form of the bath; thus one may have—(1.) Its depressing operation,—with a loss of heat, retardation of the circulation, and feeling of weariness, when the same water remains in contact with the skin, and there is continuous withdrawal of heat without fresh stimulation. This occurs with full or sitz baths, with partial or complete wrapping up the body in a wet sheet which remains unchanged, and with frictions practised without removing the wet sheets. (2.) Its exciting operation,—with quickening of the action of the heart and lungs, and feeling of glow and of nervous excitement and of increased muscular power. These sensations are produced when the layer of water next the body and heated by it is removed, and fresh cold water causes fresh stimulus. These effects are produced by full baths with the water in motion used only for a short time, by frictions when the wet sheet is removed from the body, by douches, shower baths, bathing in rivers, &c. The depressing operation comes on much earlier in very cold water than in warmer; and in the same way the exciting operation comes on faster with the colder than with the warmer water. The short duration of the bath makes both its depressing and its exciting action less; its longer duration increases them; and if the baths be continued too long, the protracted abstraction of animal heat may prove very depressing.

We shall not attempt to give more than those few hints about hydropathic processes, and shall merely remark that, under them the system is subjected to alternate periods of

excitement and of rest. There is persistent lowering of the temperature of the body, with contraction of the capillaries and local anæmia. This is succeeded by the reverse, or by local hyperæmia. There is powerful excitement of the vascular and nervous systems. The processes of absorption and of excretion are stimulated. There is a great increase of perspiration. The transformation of tissue is materially quickened.

We must next consider the operation of warm baths of different temperatures.

*Tepid, 85° to 95°.*—The effects of a bath of this temperature are confined to the peripheral extremities of the nerves, and are so slight that they do not reach the central system. There is no reaction, and the animal temperature remains unchanged. Baths of this kind can be borne for hours with impunity.

*Warm baths from 96° to 104°.*—In these the action of the heat on the peripheral surface is propagated to the central system, and causes reaction, which manifests itself in moderately increased flow of the circulating fluids to the surface, and in an increased frequency of pulse. It appears to supply a slight stimulus to the renewal of tissue.

With a *hot bath* from 102° up to 110° the central nervous and circulating systems are more affected. The frequency of the pulse increases rapidly, the respiration becomes quickened, and is interrupted by deep inspirations. The skin is congested, and the retained animal heat bursts out, causing a profuse perspiration.

*Very hot bath.*—Everything above 110° feels very hot; anything above 120° almost scalding. Baths of from 119° to 126° have caused a rise of 2° to 4½° in the temperature of the blood. Such a bath can only be borne for a few minutes. It causes violent reflex action on the heart and the arterial system, excessive congestion of the skin, and violent perspiration.

In the use of hot baths a certain amount of vapour reaches the parts of the body not covered by the water, and is also inhaled.

*Vapour* baths produce profuse perspiration, and act in cleansing the skin, as powerful hot water baths do. Vapour, owing to its smaller specific heat, does not act so fast as water on the body. A vapour bath can be borne for a much longer time when the vapour is not inhaled. Vapour baths can be borne hotter than water baths, but cannot be continued so long, as vapour, being a bad conductor, prevents radiation of heat from the body. A higher heat than 122° is not borne comfortably. The vapour bath, though falling considerably short of the temperature of the hot air bath, heats the blood considerably more.

*Hot air* baths differ from vapour baths in not impeding the respiration as the latter do, by depositing moisture in the bronchial tubes. The lungs, instead of having to heat the inspired air, are subjected to a temperature above their own. Hot air baths, say of 135°, produce more profuse perspiration than vapour baths. If very hot, they raise the temperature of the body by several degrees.

Vapour baths, hot air baths, and many hydropathic processes agree in producing violent sudation, and also frequently in subjecting the body, while in a state of perspiration, to the action of water of a comparatively low temperature. Of perspiration we shall only say, that it is sensible and insensible: 30 oz. may be considered to be about its average amount in the twenty-four hours; of this, which is chiefly water, about ⅓ of an oz. consists of urea and of other peculiar substances. A man has been known to lose 3 lb in a Russian bath; some think more may be lost. As perspiration eliminates water and effete matter from the system, and also aids in respiration, it is obvious that its regulation must have an important effect on the economy.

In comparing the general effects of hot and cold baths, it

may be said that while the former tend to check cutaneous transpiration, the latter favour it. It is supposed, but is scarcely proved, that cold baths, by the stimulus they give, increase the reaction of the gastric and other fluids of the stomach, and of the alimentary canal, and that warm baths rather serve to retard it. Either hot or cold baths, but especially the latter, favour the secretion of urine. Whether warm or cold baths, like the breathing of hot or cold air, have any effect on the exhalation of carbonic acid has not been determined.

The warm bath causes swelling and congestion of the capillaries of the surface in the first instance; when the stimulus of heat is withdrawn their contraction ensues. A cold bath, again, first causes a contraction of the capillaries of the surface, which is followed by their expansion when reaction sets in. A warm bath elevates the temperature of the body, both by bringing a supply of heat to it and by preventing the radiation of heat from it. It can be borne longer than a cold bath. It draws blood to the surface, while a cold bath favours internal congestions. There is in both cases increased oxidation or waste of the tissues; but with the warm bath there is less call made on the system, as oxidation depends chiefly on increased heat, which in the case of the warm baths is artificially supplied. The reason why a man when much exhausted feels a hot bath refreshing, while he cannot bear a cold one, may be that the increased heat conveyed to him by the warm bath helps the process of oxidation, and thus relieves his system. Cold refreshes by exciting the functions, heat by physically relieving their action; a hot bath calms by reducing the loss of heat, and by supplying a certain amount of it. Very hot baths, it is true, act like cold baths, as stimulants to the heart and nervous centres; but they do it more gradually and with less shock to the system than cold baths. The general result of this comparison would show that warm are a milder remedy than cold baths, and are applicable often when the system does not possess power of reaction sufficient to make the use of the latter expedient.

As regards the use of baths simply for the promotion of health, it follows, from what has been stated, that warm baths are best suited for the delicate, for the very young, and for the old; cold baths for the strong and active, in whom the powers of reaction are unimpaired. It would be out of place to say much here about the use of baths in medicine. Warm baths according to their degree of heat are of great value in relaxing spasms, in calming the nervous system, and in neuralgias, chronic rheumatism, and gout. Turkish baths are useful in these last affections, and wherever it is of importance that there should be free action of the skin. Cold baths, again, are more useful when the system requires tonics, and when it can bear the shock of cold affusion; when diseases of the system, especially of the nervous system, are more functional than organic. It is obvious that the cold-water cure, including, as it does, copious sudation, combines in a certain degree the effects of both kinds of baths.

But baths often produce injurious effects when used injudiciously. Long continued warm baths are soporific, and have owing to this action often caused death by drowning. The effects of very hot baths are swimming in the head, vomiting, fainting, congestion of the brain, and, in some instances, apoplexy.

The symptoms seem to point to paralysis of the action of the heart. It is therefore very evident how cautious those should be, in the use of hot baths, who have weak hearts or any obstruction to the circulation. Fat men, and those who are full-blooded or predisposed to epilepsy, should avoid them. Protracted indulgence in warm baths is relaxing, and has been esteemed a sign of effeminacy in all ages. Sleepiness, though it will not follow the first immersion in

a cold bath, is one of the effects of protracted cold baths; depression of the temperature of the surface that exceeds 9° becomes dangerous. The risk in cold baths is congestion of the internal organs, as often indicated by the lips getting blue. Extremely cold baths are, therefore, very unsafe wherever there is a tendency to internal congestion; and they are always dangerous when the system is exhausted by fatigue.

We shall conclude with a few words of advice about ordinary bathing for hygienic purposes:—Wherever it is practicable, bathing should be over before 1 p.m. It is not to be thought of when the stomach is loaded, or after much wine. The shorter the bath is, especially if the water be cold, and the bather cannot swim, the better,—say five minutes. He should swim if possible, and then a quarter of an hour is long enough. Bathing should not be practised more than once a day. When one is over-heated, but not exhausted, it is advisable to bathe at once, without waiting to cool. After hot air or vapour baths care must be taken that cold be not caught, although the more enthusiastic advocates of such baths declare that there is no risk of this.

For the literature of baths in earlier periods we would refer to the *Architecture of Vitruvius*, and to Lucian's *Hippias*; to A. Baccius, *De Thermis Veterum* (in Grævii *Thesaur. Antiquitat. Roman.*, 1694, vol. xii.); to Cameron's *Roman Baths*, London, 1772; to Gell's *Pompeiana*, London, 1836; to Bechi, *Museo Borbonico*, ii. 49–52; to Becker's *Gallus*, and to the article "Balnea" by Rich, in Dr Smith's *Dictionary of Greek and Roman Antiquities*. Some of the more important works on the use of water externally are those of Floyer, *Enquiry into the Right Use of Water*, London, 1697; F. Hoffman, *De Aqua Medicina Universali*, Halle, 1712; Lucas, *Theory and Use of Baths*, Dublin, 1772; James Currie, *Medical Reports on the Effects of Water*, Liverpool, 1788; Marcard, *Ueber die Natur und die Gebrauch der Bäder*, Hanover, 1793. Some of the best works on Hydropathy are those of E. Johnson and Petri, and the very complete *Manuals of Fleury* and of Beni Barde. There are many separate brochures on Turkish baths by Urquhart, Brereton, Haughton, Barter, Bartholomew, Luther, and a separate work by Sir John Fife. A considerable amount of information regarding bathing may also be found in Dunlop's *Philosophy of the Bath*. (J. M.)

BATHURST, a town of New South Wales, on the Macquarie River, 122 miles W.S.W. of Sydney, with which it is connected by railway. It stands in a fertile plain on the western side of the Blue Mountains, and is the centre of an important gold field. Founded in 1815 by Governor Macquarie, and named in honour of Lord Bathurst (the third earl), it soon became a place of considerable size, and was raised to the rank of a municipality in 1862. It is built in rather a spacious style, with broad and regular streets running at right angles. Many of the buildings are large and handsome; and it possesses numerous churches and schools, a theatre, a hospital, and various societies. Population in 1871, 5030.

BATHURST, ALLEN BATHURST, EARL OF, a distinguished statesman in Queen Anne's reign, was born in the year 1684. After completing his education at Cambridge, he was elected in 1705 to represent the borough of Cirencester. He distinguished himself particularly in the struggles and debates relative to the union of England and Scotland, firmly supporting a measure which he thought calculated to strengthen the Government and add to the prosperity of the country. Though he was content to act a subordinate part in the opposition planned by Harley and St John, his intimate friends, in order to sap the credit of the duke of Marlborough and his adherents, nevertheless he did good service to his party by arraigning, with more eloquence than truth, the conduct of the general and of the earl of Godolphin, whom he accused of lavishing the treasures of the nation on conquests more splendid than serviceable. The loss of the battle of Almanza, which happened about this time, seconded his efforts and those of his associates in dispelling what they called the intoxication of former successes, and disparaging achievements which

reflect immortal honour on the British name. But his personal regard for Lord Somers, president of the council, suffered no abatement, although they were of different opinions in politics; and when Somers was deprived of office, Bathurst acted with such tenderness and delicacy as to preserve his esteem in a private station. In consideration of his zeal and services, the queen, in 1711, advanced him to the peerage by the title of Baron Bathurst, of Battlesden, in Bedfordshire. In the Upper House he distinguished himself by impeaching the directors of the notorious South Sea scheme, and by resisting the bill brought in against Atterbury. He was a determined opponent of Sir Robert Walpole; and when, after an obstinate struggle, that minister was forced to resign his various posts, Lord Bathurst was sworn of the privy council, and made captain of the gentlemen pensioners, an office which he resigned in 1744. In 1757 he was appointed treasurer to George III. (then Prince of Wales), and continued in the list of privy councillors at that monarch's accession to the throne; but, on account of his advanced age, he declined to take any further part in politics.

Lord Bathurst was not less distinguished as a patron of literature than as an active statesman. Congreve, Vanburgh, Swift, Prior, Rowe, Addison, Pope, Arbuthnot, Gay, and most of the men of genius of his own time, cultivated his friendship, and were proud of his correspondence. Pope, in his *Epistle on the Use of Riches*, which is addressed to Lord Bathurst, compliments his friend in some highly characteristic lines. Sterne also speaks of him in terms of affectionate admiration. He received further elevation to an earldom in 1772, and lived to see his second son Henry promoted to the peerage by the title of Baron Apsley, and several years lord high chancellor of Great Britain. By his marriage with Catherine, daughter of Sir Peter Apsley, Lord Bathurst had four sons and five daughters. He died after a few days' illness, at his seat near Cirencester, September 16, 1775, in the ninety-first year of his age.

BATHURST, RALPH, uncle of the preceding, was born in the year 1620. He studied divinity in Trinity College, Oxford; but, on the breaking out of the civil war, he changed the course of his studies, and, applying himself to medicine, took the degree of doctor in that faculty. By dint of assiduous application, he soon rose to eminence in his profession; and in the time of the Commonwealth was appointed physician to the state. At the Restoration, however, he quitted the practice of physic; was elected a fellow of the Royal Society, and president of his college; and, having entered holy orders, was made chaplain to the king, and afterwards dean of Wells. Soon after, he filled the office of vice-chancellor of Oxford, and was nominated by King William and Queen Mary to the see of Bristol; but this honour he declined. To the accomplishments of an orator, philosopher, and poet, he added an inexhaustible fund of wit. Ridicule—of which he was an absolute master—was the weapon with which he used to correct the delinquents of his college. His poetical pieces in the *Museæ Anglicanæ* are excellent of their kind; he wrote also several other poems, both in English and Latin. He died June 14, 1704, in his eighty-fourth year. (*Life and Remains*, by Th. Warton, 1761.)

BATHYCLE, a Greek sculptor, born at Magnesia on the Meander, known for his sculptures on the throne of the statue of Apollo at Amyclæ near Sparta, which Pausanias saw and describes (iii. 18, 6). His date is uncertain, but cannot well be later than between 563–549 B.C. The statue itself existed before his time. For an attempt to reconstruct this throne see Brun, *Rhein. Museum* (new series), vol. v. p. 325.

BATON-ROUGE, a town in the state of Louisiana, North America, situated on a bluff on the left bank of the

Mississippi, 120 miles above New Orleans. It has a court house, state penitentiary, national arsenal and barracks, military hospital, deaf and dumb asylum, and state university. Baton-Rouge was one of the first settlements of the French. In 1849 it was made the capital of the state, but has since given place to New Orleans. Occupied by the Federal troops after the capture of that city, it was defended in 1862 by General Williams against the attack of the Confederates under Breckenridge. Population in 1870, 6498.

BATONI, POMPEO GIROLAMO, a native of Lucca, who was regarded in Italy as a great painter in the 18th century, and who unquestionably did much to rescue the art from the intense mannerism into which it had fallen during the century preceding. His paintings, however, are not of the highest order of merit, though they are generally graceful, well designed, and harmoniously coloured. His best production is thought to be his group of Peace and War. Batoni painted an unusual number of pictures, and was also celebrated for his portraits. He was born in 1708, and died at Rome in 1787.

BATOUM. See BATUM.

BATRACHUS, according to Pliny (xxxvi. 42), the name of a Greek architect who, along with Sauras (both natives of Sparta), was employed by Metellus in the construction of certain temples in Rome. The story goes that, being forbidden to inscribe their names on the buildings, these two architects gained their end by placing the figures of a frog (*batrachos*) and a lizard (*saura*) on the base of the columns. But it is possible that the fanciful use of such figures for ornament in later times may have led to the invention of both the names.

BATTALION is the tactical unit of infantry. It is the term applied to the most numerous body of dismounted men which one commanding officer can personally superintend. It consists of from four to ten companies, is always commanded by a field officer, and has a normal war strength of about 1000 men. Two or more battalions constitute a regiment; two or more regiments a brigade; two or more brigades a division; two or more divisions a *corps d'armée*; and two or more *corps d'armée* an army. In the British service, however, there are several regiments consisting of but one battalion. See ARMY.

BATTAS, a people in the northern portion of Sumatra, which regards itself as the oldest in the island, and is distinguished by a pertinacious adherence to ancient customs. The Batta is of middle height, his colour is a light brown, and his hair is black and is worn long. He is dirty in his dress and dwelling, and eats any kind of food that presents itself, though he lives chiefly on rice. A little iron-work, earthenware, and cloth constitute the only industrial products of the tribe. The houses are of wood, roofed with palm-leaf ribs; and the villages are defended by earthen walls and bamboo palisades. The people show a very peaceful disposition, but are valorous when occasion demands. Cannibalism is practised.

*Batta or Batak Language.*—Up to the publication of Dr H. N. van der Tuuk's essay *Over schrift en uitspraak der Tobasche taal* (1855), the first fruits of an eight years' residence amongst the Battas, our knowledge of the Batak language was confined to lists of words more or less complete, chiefly to be found in Marsden's *Miscellaneous Works*, in Junghuhn's *Battäländer*, and in the *Tijdschrift van het Bataviaasch Genootschap*, vol. iii. (1855). By his exhaustive works (*Bataksch Leesboek*, in 4 vols., 1861–2; *Bataksch-nederduitsch Woordenboek*, 1861; *Tobasche Spraak-kunst*, 1864–7) that eminent Dutch savant has made the Batak language the most accessible of the various tongues spoken in Sumatra. According to him, the Batak language is nearest akin to the Old Javanese and Tagal, whereas a recent writer (A. Schreiber. *Die Battas in ihrem Verhältniss*

*zu den Malaien von Sumatra*, 1874) has endeavoured to prove its closer affinity with the Malay proper. Like most languages spoken by less civilized tribes, the Batak is poor in general terms, but abounds in terms for special objects. The number of dialects is three, viz., the Toba, the Mandailing, and the Dairi dialects; the first and second have again two subdivisions each. The Battas further possess six peculiar or recondite modes of speech, such as the *hata andung*, or language of the wakes, and the *hata poda*, or the soothsayer's language. A fair acquaintance with reading and writing is very general among them. Their alphabet is said, with the Rejang and Lampong alphabets, to be of Indian origin. The language is written on bark or bamboo staves from bottom to top, the lines being arranged from left to right. The Batak literature consists chiefly in books on witchcraft, in stories, riddles, incantations, &c., and is mostly in prose, occasionally varied by verse. See on it the fourth volume of the *Batak Leesboek*, or *Reader*, above mentioned.

BATTERING RAM (*Aries*), a military engine used before the invention of gunpowder, for beating down the walls of besieged fortresses. It consisted of a long heavy beam of timber, armed at the extremity with iron fashioned something like the head of a ram. In its simplest form the beam was carried in the hands of the soliders, who assailed the walls with it by main force. The improved ram was composed of a longer beam, in some cases extending to 120 feet, shod with iron at one end, and suspended, either by the middle or from two points, from another beam laid across two posts. This is the kind described by Josephus as having been used at the siege of Jerusalem (*B. J.*, iii. 7, 19). It was covered over with a roof, shell, or screen of boards (called the *testudo*) to protect the men employed in working it from the stones, darts, and other missiles discharged by the besieged from the walls. It was also provided with wheels, which greatly facilitated its operations. A hundred soldiers at a time, and sometimes even a greater number, were employed to work it, and the parties were relieved in constant succession. Josephus says that no wall could resist the continued application of the ram.

BATTERY is the tactical unit of artillery. It is the term applied to the largest number of fully equipped mobile guns which can be personally superintended by one man. Batteries may be divided into the four classes of *horse, field, mountain, and position* artillery batteries. In England, France, and Germany batteries consist of six guns; in Austria and Russia of eight guns each. The guns of horse field artillery are drawn by from four to eight horses, the usual number being six. Each battery has a certain number of men told off for the service of the gun, called *gunners*, and others to manage the draught called *drivers*. In the horse artillery the gunners are mounted on horses, in field batteries they are carried on the limbers and waggons, in mountain and position batteries both gunners and drivers usually walk. Both horse and field batteries are recognized tactical units of an army, and are maintained in an efficient state in time of peace. Position batteries are organized generally in time of war, are possessed of the heaviest guns consistent with mobility, and are useful in certain special cases, such as the attack or defence of a fortified position, the bombardment of a town, &c. Mountain batteries consist usually of light guns mounted on the backs of mules, and are adapted solely for warfare in mountainous countries. See ARTILLERY. The term battery is also applied to the companies of dismounted artillerymen necessary to fight fortress and siege guns; to separate groups of guns in permanent works; and to the earthworks constructed for the protection of guns in siege operations.

BATTERY, as a law term, is the unlawful beating of another. See ASSAULT, vol. ii. p. 724.

BATTEUX, CHARLES, a French writer on philosophy and the principles of literature, was born near Vouziers in 1713, and died in 1780. In 1739 he came to Paris, and after having taught with success in the colleges of Lisieux and Navarre, was appointed to the chair of Greek and Roman philosophy in the College of France. In 1746 he published his treatise *Beaux Arts réduits à une même Principe*, in which he extended the Aristotelian definition of the art of poetry to art of all kinds. His *Cours de Belles-Lettres*, 5 vols., 1765, was afterwards included with some minor writings in the large treatise *Principes de la Littérature*, 1774. The rules for composition there laid down are, perhaps, too methodical and pedantic. His philosophical writings were *La Morale d'Épicure tirée de ses propres écrits*, 1768, and the *Histoire de Causes Premières*, 1769, a survey of the history of philosophy which is by no means devoid of merit. In consequence of the freedom with which he attacked in this work the abuse of authority in matters of philosophy, he was removed from his professorial chair. His last and most extensive work was a *Cours d'Études à l'usage des élèves de l'école militaire*, 45 vols.

BATTICALOA, the chief town of a district in the Eastern Province of Ceylon, situated on an island in lat. 7° 44' N. and long. 81° 52' E. It is of importance for its haven and the adjacent salt lagoons. The inhabitants are principally natives; but there is a fort and an English settlement. Population of town, 3353, and of district, 93,220.

BATTLE, an engagement between two armies, as distinguished from the skirmishes, or minor actions, fought between their smaller sections. A battle is said to be general, where the whole, or the greater part, of each army is brought into action; and partial, where only brigades, divisions, or some corps d'armée out of several upon the ground, are engaged. However the numbers may vary, the great principles to be applied in delivering battle are at root in all ages the same. It is no doubt true that, in the circumstances under which battles are fought, there is nothing invariable; on the contrary, it is scarcely possible to suppose two cases alike in every particular, or even resembling each other in all their leading features. From the very nature of things, the minor data of the problem are variable; but the grand principles—those which depend on moral elements—continue immutably the same. On the other hand, the material elements which enter into the calculations of a general are constantly changing; and it is this circumstance which affords scope for the exercise of his genius, his sagacity, and his military science. But it would be manifestly absurd to maintain that, because the lesser conditions are so frequently altered, the great principles of the art are changed with them. The issue of battle is indeed always uncertain,—because the calculations of the general may be defective, his combinations unscientific, his foresight limited, or his temperament rash and impetuous; and because, even where none of these causes of failure exist, events which no human sagacity could have divined or provided against may occur to defeat the wisest plans. But all this implies that if every contingency could have been foreseen and properly met, the result would not have been doubtful, and that the grand chances are always on the side of him who, being provided with sufficient means for his end, forms his plan with the greatest sagacity, and executes it with corresponding vigour and ability. For, variable as the results of battles appear, decisive success has in all ages followed the combinations of great commanders; and victory in the long-run has seldom failed to pay homage to science. And this is because those principles which science has established as universally applicable depend on certain fixed laws in

human nature, which ages have not changed since history was first written. That undisciplined forces, for example, are easily shaken by panic arising out of any such sudden disaster as the fall of their general, was as true in the day when Ahab, for this reason, disguised himself at Ramoth-Gilead as it is now. That infantry, thoroughly broken up and exposed on open ground, may be taken or destroyed by a very inferior number of cavalry, was illustrated no less by Hannibal at Cannæ than by Murat's charge round the allied right at Dresden. The feeling that there was no safe retreat open in case of disaster was as fatal to the Persians at Marathon as to the French at Leipsic. The crushing effect of heavy columns pressing against a line (which, as only the outer part of the column can act, is purely moral) was quite as conspicuous in the victory of Epaminondas at Mantinea as when Napoleon cut his enemy's centre through at Austerlitz. Above all, military history, from the earliest times, proves two facts of prime importance to commanders in every action: the one, that the best troops become unsteady when their flank is gained, just as a single man in a struggle desires to face fairly the adversary about to rush on him; the other, that a comparatively small body coming fresh into action with troops exhausted by the exertions and nervous tension of a battle, has an advantage over much larger numbers. And being thus fixed, these principles obviously yield certain general rules, to which every prudent commander of any age strives to conform. Circumstances may lead him to violate them, but the examples of Leipsic and Waterloo are there to prove that, even with the greatest of generals, the result may be ruinous. In the first case, the French were forced to fight with their backs to a river; in the second, by a combination they were not prepared for their flank was struck by the Prussians when they were fully engaged with Wellington in front; and total defeat ensued in both.

A battle is not only the most imposing, but also the most important event in war. It is the consummation to which all previous combinations necessarily tend; it is that grand act which may decide the fate of empires as well as armies. The highest and dearest interests of nations, nay, even of humanity itself, may be involved in its issue. It cannot, therefore, be uninteresting to look briefly at the theory of those received principles by the skilful application of which the fate of battles has in all ages been determined.

All the methods in which a battle can be fought may be reduced to three for abstract purposes, each governed by a distinct principle. The first, the purely defensive, consists in waiting for the enemy, in a position chosen for the purpose, the object being simply that of maintaining it successfully against him. Theorists almost universally condemn this, and that with good apparent reason; for there is something peculiarly trying to the moral endurance of even the best troops in feeling that they are pinned to one spot to await the assaults of the enemy without any prospect of retaliation. But the rule is not without exceptions, as is plainly proved by comparing the two great examples of purely defensive actions fought during the campaigns of 1862-63 in America,—Fredericksburg and Gettysburg. The defender in each case was perfectly successful, beating off his assailant with tremendous loss; but the results were very opposite. Lee's victory at Fredericksburg stopped, indeed, the advance upon Richmond for the time, but did not seriously affect the course of the war. Meade, on the other hand, by beating the Confederates off at Gettysburg, completely turned the tide of the campaign, and compelled Lee to abandon all idea of invading the North and commence a difficult retreat to Virginia; while thenceforth Washington was saved from all danger of being separated from the states that supported the union. This was because the position maintained at Fredericksburg

was no more than one point on a single line of advance direct upon Richmond, whereas that of Gettysburg was so completely the key to the whole of the campaign of Maryland, that, whilst it was held by Meade, it was impossible for Lee to advance beyond it or any part of the north-eastern states. The failure to carry it therefore paralyzed the whole scheme of the Confederates for transferring the burden of the struggle to hostile soil. And from a comparison of the varying consequences of these actions, so similar in their course, it will be seen that the defensive battle is justified only when the position to be maintained is one of vital consequence for the enemy to seize in order to carry on further operations with success. Lee has been fairly condemned by even friendly critics for not turning his defensive attitude at Fredericksburg into an offensive on the repulse of the enemy's attack. No one blames Meade for the like conduct at Gettysburg, because his holding his ground fully accomplished all that it was necessary for him to do. But such an instance as this last, it should be added, can but rarely occur.

The second system is the entirely-offensive,—in plain words, the attacking the enemy wherever found, with all force available. As it carries with it the moral power which in all ages is found to accompany, until some decided check occur, bodies of disciplined men moving freely forward to the assault, and as it gives the leader the power of choosing the weaker points of his adversary's line on which to concentrate his blows, so it has ever been the favourite with bold and skilful generals leading good troops. Frederick and Napoleon alike preferred it, and won some of their chiefest victories by using it freely. Wellington employed it with marked success in the latest phases of the Peninsular War in 1813-14. Grant adopted it avowedly in his great struggle with Lee in Virginia in 1864. And the Prussians fought on this principle throughout the two great wars of 1866 and 1870-71. History, however, shows that it is only fully justified when the attacking general has a force decidedly superior either in numbers or in moral power; or when, as in the famous case of Frederick at Leuthen, he possesses such extraordinary skill in manoeuvring as to give him all the advantages of long odds, although engaged against superior numbers. It has the serious defect that if the defence prove more successful than was expected, the assailant may have to bring up successively and exhaust all his forces, and thus leave himself without any reserve to meet a sudden onset from the opposite side. In such case defeat probably entails the complete wreck of the hitherto offensive army, and with it possibly the loss of the campaign.

It is for this reason that prudent commanders are wont, where the choice lies with them, to select the third mode, the defensive-offensive, or a combination of the two preceding. This consists in taking up a position with the design of awaiting the adversary's attack on it, but also of watching the opportunity afforded by the exhaustion of his army in its assaults, or by his extending it too widely in choosing the best points from which to make them, in order to pass suddenly to the offensive. Wellington is justly famous for the success with which he employed this form of action. But it is one of the highest tests of generalship to know exactly when most fitly to use either. And as Napoleon won three at least of his most striking victories,—Marengo, Austerlitz, and Dresden,—by passing at the right moment suddenly from an apparently passive attitude of defence to a vigorous offensive, so Wellington, after all the world had come to regard him as great only on the defensive, used the strictly offensive form, with the like success, at Vitoria, Orthez, and Toulouse, the last of these three actions being one of such apparent temerity as can hardly be paralleled in modern history, and yet perfectly

justified by his instinctive knowledge of the demoralized state of the enemy whose position he undertook to force. Marlborough, who as a fighter of great battles has never been surpassed, and who, like Wellington, led a mixed army of English and allies, appears to have always had a decided preference for the offensive;—so little does nationality supply any just rule for selecting either. Marlborough's choice, in all probability, was adopted from the comparatively passive attitude of his various adversaries at Blenheim, Ramillies, and Malplaquet, which tempted a bold offensive on his part. Lee, though certainly addicted to the strictly defensive, which was suited to his inferiority of numbers and to the strong nature of the ground he usually occupied, had the true instinct (as was especially shown in his great victory at Chancellorsville) of seizing any special opportunity offered by the carelessness of an adversary who brought against him apparently overwhelming forces. And in the late war, although the German generals elsewhere continually took that bold offensive which was justified at first by superior numbers, and later by the increasingly high spirits of their troops, yet in the most important and bloodiest action of the whole, Mars-la-Tour, they were content, after it had been well begun by their own attack, to pass to the completely defensive,—it being evident that by merely maintaining the position they had taken up across the French line of retreat from Metz, all the immediate advantage possible from victory would be won.

On the whole, therefore, it may be affirmed that no theory is sound which prescribes or forbids the use of any of the three methods, or lays down strict rules for the application of any of them. Defence is, however, the natural attitude of the weaker party, as Clausewitz, the greatest of all theoretical writers on war, has carefully pointed out. Under what conditions it is to be accepted, or how long adhered to when once assumed, are problems which it requires true genius to grapple with successfully; for they can only be solved rightly according to the circumstances of the hour, perhaps of the moment. To see a crucial instance illustrated by a failure, we may look at Gravelotte. There Bazaine was forced by the case to fight on the defensive. An opportunity occurred in the day, on the decided repulse of the German right-wing under Steinmetz, of striking such a counterblow as, from Napoleon's hand, would probably have forced a victory over even the great odds possessed by the German commander. But Bazaine had no spark of the instinctive genius needed. He lost the opportunity, and with it the battle,—the loss entailing the last hope of rescuing his host from the dangerous and indeed ignominious position in which previous errors of judgment had placed it.

In conclusion, in order to demonstrate the undying truth of the main principle of battle, which is that, the general conditions being equal, the moral advantage is invariably at the outset with the offensive rather than the defensive,—with the army that feels itself moving forward rather than that which stands still,—it is well to refer to the recent discussion on the effect of breech-loading arms. It was almost universally assumed by theorists, especially by those of Prussia herself, when she first put the needle-gun into her soldiers' hands, that the power of the new weapon would be most perceptible in defence, for which its more rapid fire seemed so specially adapted. The Prussian instructions, drawn up before 1866, avowedly followed this view. Those who compiled them overlooked the fact that the moral power of the weapon would of itself tend to carry those who bore it forward, and add an additional advantage to those the assailant had before in his greater show of vigour and activity, and his power of searching out the weaker parts of his enemy's position and throwing his troops in force upon them. History has reversed the Prussian theory, and proved afresh how powerful for victory

is the moral element in the soldiers' character. For, out of the opening events of 1866, and the vast encouragement the Prussians experienced in their first collisions with Benedek's army, has been evolved the most audacious and aggressive series of actions any nation ever fought. Certain Prussian writers have since the war of 1870-71 gone almost to the opposite extreme, and claimed absolute superiority for the offensive under all circumstances, forgetting that, against a stronger army, or even one perfectly equal in all other respects and well posted, it must inevitably be as dangerous as it proved when confidently tried by Napoleon's marshals against British troops under Wellington.

The various so-called "orders of battle" of which theoretical writers treat, believing that they see a close similarity in the dispositions of well-led armies from the days of the Grecians down to our own, are, so far as such similarity really exists, founded entirely on one or other of the moral elements already mentioned, above all, on the desire to gain the enemy's flank. The late General Winfield Scott, one of the few commanders who could boast that he had more than once seen the back of English infantry in fair fight, declared that this desire is so instinctive that it is impossible to array two bodies of disciplined troops against each other without one at least soon striving for this advantage. But so far as this and other like universal principles are applied to the actual drawing up of an army at any period in a special order of battle, the arrangements must in practice vary with the arms and discipline. This subject, in fact, forms part of that special art which treats of the handling of troops in the presence of the enemy, and falls under the head of "tactics," for which see the article WAR. The mechanism of battles must vary continually; the great leading principles we have spoken of cannot change.

See Jomini, *Traité des Grandes Opérations Militaires*; The Archduke Charles's *Strategy* (2d and 3d vols.); Rogniat, *Considérations de l'Art de la Guerre*; Clausewitz's work *On War*; Boguslawski's *Tactical Deductions from the War of 1870-71*; Scherff's *Studien*, "Die Schlacht;" above all, Napoleon's criticisms on other generals in his *Memoirs*. (C. C. C.)

BATTLE, a market-town in the county of Sussex, on the South-Eastern Railway, 56 miles from London. It is situated in a valley, and consists of one street. Its name is derived from the conflict in 1066, which insured to William the Norman the crown of England. The abbey founded by him forms a most magnificent pile of ruins, and the ancient gatehouse is still in good preservation. The place is now celebrated for its gunpowder manufactories. Population of the parish in 1871, 3495.

BATTUS, the founder of the Greek colony of Cyrene in Libya, whither he had been directed by the oracle at Delphi (about 650 B.C.). The Greeks who accompanied him were, like himself, natives of Thera (Santorin), and partly descended from the race of the Minyæ. The origin of the colony as told in Thera (*Herodotus*, iv. 150) was as follows:—

Grinus, king of that island, had gone attended by Battus and others to consult the oracle at Delphi, and was told by it to "found a city in Libya." They knew not where Libya was, and could take no action. Seven years after there fell a drought on Thera, and the oracle, being again questioned, repeated the command to found a town in Libya. Messengers were now sent to Crete to see if any one there knew where this district was. They met a fisherman, Corobius, who said that he had once been driven to Platea, an island of Libya, whither he agreed to conduct them. To make sure, they went with him; and having landed on Platea, they again, leaving Corobius there with provisions for some months, returned to Thera to collect colonists, of whom as many as two 50 oared galleys could convey set out with Battus as their leader. In Cyrene itself, however, a different story of the origin of the colony was told. Etearchus, it was said, king of Axus in Crete, having married a second wife, who persuaded him to get rid of Phronime, the daughter of his first wife, agreed with a merchant from Thera that he should take her in his ship and let her down into the sea. The merchant, true to the letter of his bargain, let her down, but with a rope about her by which he drew her up again, and took her to Thera, where she married