METALLIC BODIES.

Albuminum	Al.	13·7	Magnesium	Mg.	12·2
Antimony	Sb.	129·	Manganese	Mn.	27·6
Arsenic	As.	75·	Mercury	Hg.	100·
Barium	Ba.	68·5	Nickel	Ni.	29·6
Bismuth	Bi.	213	Platinum	Pt.	98·7
Cadmium	Cd.	56·	Potassium	K.	39·2
Calcium	Ca.	20.	Silver	Ag.	108·1
Chromium	Cr.	26·7	Sodium	Na.	23·
Cobalt	Co.	29·5	Strontium	Sr.	43 8
Copper	Cu.	31·7	Tin	Sn.	59·
Gold	Au.	107·	Uranium	U.	60·
Iron	Fe.	28·	Zinc	Zn.	32·6
Lead	Pb.	103 7			

The remaining twenty-seven are of slight importance.

NON-METALLIC BODIES.

Boron	B.	10·9	Iodine	I.	127·1
Bromine	Br.	80·	Nitrogen	N.	14·
Carbon	C.	6·	Oxygen	O.	8·
Chlorine	Cl.	35·5	Phosphorus	P.	32·
Fluorine	F.	18·9	Silicon	Si.	21·3
Hydrogen	H.	1·	Sulphur	S.	16·

Selenium, of slight importance.

The elements of matters, when combining with one another to form new compounds, do not unite in any or every proportion, but follow certain fixed laws, and unite in certain fixed proportions, *and no other*. Perhaps it would be as well to remark here, that the young chemist must not confound a mechanical mixture with a chemical one; for instance, common salt and sugar, if dissolved in water, are only mixed mechanically; the properties of each still remain the same, as they may be separated from one another by a simple process which we shall give in our next paper; but if sulphuric acid be added to the salt, the properties of both the acid and salt become changed, resulting in a new compound called sulphate of soda; this power or force which bodies have of uniting with one another, is called *chemical attraction* or *affinity*. Water is composed of two gases, oxygen and hydrogen. Eight parts by weight of oxygen, if united with one of hydrogen, produce water, eight parts of oxygen will not combine with two, three, or four parts of hydrogen, and if more than one part of hydrogen be added, the overplus will still remain unchanged.

NOTE.—Having regard only to the wants of young chemists in this paper, it seems desirable that the information imparted be conveyed in the most interesting and profitable form, and this object is most unquestionably attained by approaching chemistry in the way of analyses, as it is also the most natural way. The progress of the student in acquiring sound chemical information will be rapid and agreeable, unlike the fleeting stores of theoretical knowledge which mere lectures convey. These views are not peculiar; they are now both advocated and practiced by the College of Chemistry, and by all other public laboratories in the United Kingdom.

PASTIMES.

CRICKET.

It is our intention to devote an occasional column to Parlour and Out-door pastimes, and we think we cannot do better than commence the series with a few hints, more especially intended for the benefit of young players of the noble game indicated above. We are delighted to observe that cricket is obtaining an ever-increasing popularity amongst us. It is the very best of our out-door games, and beyond the pleasurable excitement of playing to win, there is in it a real genuine amount of moral training. It teaches boys to be fair and straightforward in their dealings with each other; puts them in good temper with themselves and their fellows; encourages the timid, and represses the bold and incautious—teaches them, in fact to be gentlemen in their play as well as in their homes—teaches them self-reliance and self-control; quickness of eye and dexterity of hand; nimbleness of foot and activity of body; bravery, forbearance, and a spirit of honourable rivalry—without which neither the game of Cricket nor the game of life can be successfully played.

CRICKETING REQUISITES.

All that are absolutely necessary to play a game of cricket, are bats, stumps, and a ball, and we advise all who intend purchasing to pay a fair price and secure a really serviceable article. Bats, balls, &c., by the best makers can be readily obtained at numerous stores in most of our large towns and cities.

HINTS.

Batting. A good batsman must be wary, and, at the same time, bold. Timid players seldom make good scores. Let your position be easy, upright and graceful Keep your feet well together, hold your bat firmly, but not too tightly, watch the ball and be prepared to block, cut, or hit to leg, as it may be necessary. The great art of batting is to time the ball; that is, to meet it and strike it at the most favourable moment, and so play it with the best chance of success. Don't be afraid of hitting at straight balls, but beware of "shooters," that, instead of rising from the pitch, shoot close along the ground. The best thing you can do with them is to block them. Many a run is got from a sharp block, especially when the bat is inclined a little to the right or left. Play forward at balls that pitch short of the crease, and be careful of long-hops, or balls that bound twice or thrice on the ground "sneaks," or calls that roll heavily and rather slowly all the way; "lobbers," or full-pitched slows; and "breakbacks," or balls that are apparently wide of the wicket, and suddenly turn in and take down a stump. Hard hitting is not always the most successful style of play, and if you attempt a great cut without being perfectly firm on your legs, you will miss more than you hit, and very probably get a "duck's egg" (which is represented by the 0) instead of a good score.

Bowling is not easy to teach in books, for almost every player has his own peculiar style. The first great requisite for a good bowler is to bowl straight to the wicket. Now, whether you adopt the fast round-arm, or the slow under-hand plan, you must study the action of the batsman, and so accommodate your style to his as to produce the best result—that is, the fall of the wicket. Hold the ball slightly between your fingers, not in the palm, across the seam, and stand up right at the start. Take a short run of four or five paces, and pitch the ball as near as you can to the crease, and if you find that the batsman runs in to the ball, pitch shorter and shorter. Thus if he miss he will be bowled—if the ball is straight—or stumped before he can get back again to his ground. Always avoid long hops, for they are easy to hit. But a long hop or a slow is sometimes effective if you want the striker to put up a catch. The leg stump being the most difficult to defend, bowl rather towards it. Vary your style occasionally, and learn to give the ball a screw or twist as it leaves your hand. Of round-arm and under-hand bowling, the last is easier to learn, but the first is most effective, when straight. In all bowling, however, you must be active and sharp-sighted, never losing any opportunity that presents itself. Some bowlers swing the body a good deal; others only swing the arm. The latter plan is the best, as by it you can vary your pace without giving the batsman warning. Straight bowling is not difficult to hit, but if you can twist your ball, so that it turns in to the wicket after the pitch, that style is very effective. Always bowl with an object, and never simply at random. Make up your mind to take a wicket, and your hand will generally follow its leader, your head. Various dodges are adopted by professional bowlers, which cannot well be described in print; and here let me say that half-an-hour's instruction from a good cricketer will be more useful to a young bowler than a whole volume of written directions.

To watch for *catches* is among the first of the fielder's duties. Look well to the ball as it descends, and take it with both hands, drawing them down a little, so that you may break the sting of the ball, and at the same time hold it firmly. It is better to be before than behind a ball, for you can always run forward better than backward. As soon as the ball touches the palm, grasp it firmly, for neither the palm nor the fingers will of themselves hold it.

Stopping a ball should be done with the hands rather than the feet. As soon as you touch the ball, lift it up with a sort of throwing motion, and deliver it immediately. All young cricketers should practice long stopping; after which they may try their skill at wicket-keeping. A good wicket keeper should be able to catch or stop a ball with either hand.

Throwing-in should be sure and sharp. Not at your greatest swiftness always, but with such celerity and certainty as will send the ball point-blank to the wicket-keeper or bowler. Lose no time between seizing the ball and throwing it in. When the ball is running along the grass, endeavour to get before rather than to run after it. Some players throw it with a long hop; but that plan is not nearly so effective as a good, but not too high, catch into the wicket. When the ball bounds out of your hands, it is better to "put it up," and catch it again, than to entirely drop it.

Fielding, to be well done, should be done thoroughly. Every player should act as though the whole success of the game depended on him alone. Stand easily—not in the old fashioned way, with your hands on your knees, but in a natural, wide-awake manner, with hands ready for a catch, and feet prepared for a run. Attend to the directions of your captain, and do the best for your side. The position of all the players in the field has already been given.

SCIENTIFIC AND USEFUL.

Mr. C. J. Richardson, in a letter in the *Times*, says his boiler at Woolwich Dockyard has shown that petroleum is 60 per cent. more powerful than the best coal as steam fuel, that it can be burnt with perfect ease, and without the slightest danger.

It is, perhaps, not generally known to our readers that a piece of blotting-paper, crumpled together to make it firm, and just wetted, will take ink out of mahogany. Rub the spot hard with the wetted paper, when it instantly disappears; and the white mark from the operation may be immediately removed by rubbing the table with a cloth.

CRIB-BITING.—A correspondent of the *Field* says, a mare was cured of cribbiting as follows:—Her manger was taken away altogether, and her corn for every day in the week was placed on the ground. Next week her feed was placed one brick high from the ground, next week two bricks high, and so on, increasing a brick in height every week until her feed was placed as high as the manger; then the manger was replaced, and the mare has never cribbed since.

It is found that the quantity of heat which would raise one pound of water one degree Fahrenheit in temperature, is exactly equal to what would be generated if a pound weight, after having fallen through a height of seven hundred and seventy-two feet, had its moving force destroyed by collision with the earth. Conversely, the amount of heat necessary to raise a pound of water one degree in temperature, would, if all applied mechanically, be competent to raise a pound weight seven hundred and seventy-two feet high; or, it would raise seven hundred and seventy-two pounds, one foot high.

STEAM OMNIBUS.—An omnibus drawn by a steam engine is running regularly on the high road between Nantes and Niort. After long experiments and repeated improvements, the inventor has succeeded in making his engine run as well on common roads as others do on rails. It is perfectly under the driver's command, and can be stopped and started with the utmost ease. The roads from Nantes to Niort present several rather steep hills, which the engine with its omnibus ascends and descends with the utmost facility and safety. The engine weighs about 7 tons, with its provision of water and coals; it is 16 ft. 5 in. long, and 6ft. 11 in wide.—*Galignani*.

WORTH KNOWING.—A correspondent of the *Builder* says about four years ago he took an old country house infested with rats, mice and flies. He stuffed every rat and mouse hole with chlorid of lime. He threw it on the quarry floors of the dairy and cellars. He kept saucers of it under the chests of drawers, or some other convenient piece of furniture; in every nursery, bed, or dressing-room. An ornamental glass vase held a quantity at the foot of each staircase. Stables, cow-sheds, pigsties, all had their dose; and the result was that he thoroughly routed his enemies; and if the rats, more impudent than all the rest, did make renewed attacks upon the dairy, in about twelve months (when probably from repeating cleansing and flushing all traces of the chloride had vanished), a handful of fresh chloride again routed them. Last year was a great one for wasps; but they wouldn't face the chloride. And all this comfort cost only eightpence. Housewives should take care not to place the chloride in their china pantries, or in too close proximity to bright steel wares, or the result will be that their gilded china will be reduced to plain, and their bright steel fenders to rusty iron in no time.

THE CAUSE OF DEW.—You may have noticed the deposition of moisture on a pitcher of ice-cold water on a summer's day; and in this familiar fact we have an illustration of the simple provision by which, during even the long droughts of summer, the plants receive a partial supply of water sufficient at least to sustain their life. The explanation of the dew upon the pitcher is very simple. The layer of air in contact with its cold mass is rapidly cooled, and when it can no longer hold all the moisture it contains, the excess is deposited in drops on the surface. Exchange now the pitcher for the earth, and you have an explanation of the immediate cause of dew. After sunset the earth, like the pitcher, cools down the layer of atmosphere immediately in contact with it, to such a degree that the whole of the vapour can no longer retain its aëriform condition. As a necessary result, a portion is condensed and deposited on the surface, and this is what we call dew.

DETECTION OF FIRES IN SHIPS.—An exhibition of an interesting character was lately made at Blackwall, the object being to indicate and announce the presence of fire. An indicator, with an alarm bell, was placed in a part of the building supposed to represent the captain's cabin, connected with a battery, with wires leading to the calorimeters fixed in the hold and other parts of the vessel. Some of these wires also led to the water apparatus placed in the well of the ship. The first experiment was made by increasing the water in the hold, and immediately upon its rising a few inches the alarm-bell was rung, and the indicator showed that the cause of the alarm was from "water;" the continual increase of water caused the indicator again to show "water two feet." The second experiment