hypothesis," but all the time he keeps his mind open to receive and duly weigh fresh facts and other hypotheses, which may run counter to his own. Prof. Huxley drives this fact home by the use of homely illustrations: it is a matter of common observation that water sometimes freezes, or that wood floats upon water; but the observation does not become scientific until the exact conditions of the freezing, and the reason of the floating, are discovered and defined. From scientific knowledge to scientific reasoning is but a step, and the latter differs from ordinary reasoning in just the same way as scientific observation and experiment—that is, it strives to be accurate, and is not considered sound until it has been severely tested. Science and common sense are not opposed, as it is sometimes asserted, but the former is the latter perfected. Therefore, the way to science, says Prof. Huxley, lies through common knowledge: we must extend that knowledge by careful observation and experiment, and learn how to state the results of our investigations accurately, in general rules or laws of nature; finally, we must learn how to reason accurately from these rules, and thus arrive at rational explanations of natural phenomena, which may suffice for our guidance in life. We have dwelt on the introduction to Prof. Huxley's Introductory because it serves not only to show his method of treating his subject, but at the same time teaches the primary or fundamental truths of all scientific learning: in the second section he has introduced a multitude of facts, and has compressed the text for whole volumes into a few pages. There is, of course, nothing novel in the facts stated, but the manner of stating them is remarkable for its simplicity and forcefulness. Here and there we come upon passages which old students would do well to ponder, as in the short articles on "Suppositions or Hypotheses," in which Prof. Huxley, while pointing out that it is perfectly legitimate, and often extremely useful to make a supposition as to what we should see were it possible to carry our direct observations a step further, declares that we are bound to throw away an hypothesis without hesitation as soon as it is shown to be inconsistent with any part of the order of nature. His example of an hypothesis is a good one. If two persons are alone, and one is struck on the back it is a legitimate hypothesis for him to suppose that he was struck by the only other person present, because, in the first place, it explains the fact, and, secondly, because no other explanation is probable. The other person may suggest that the blow was only the result of fancy, or that an invisible spirit was the striking agent. Either hypothesis is improbable, because, in the ordinary course of nature fancies of the kind do not occur, nor do spirits strike blows. Hence, the latter hypotheses are illegitimate, while the former is legitimate—a "good working hypothesis," to be thrown aside when, and only when, a more probable explanation of the blow is forthcoming. In the affairs of everyday life we are constantly inventing hypotheses; we believe a man on the hypothesis that he is always truthful; we gave him credit on the hypothesis that he is solvent, and the hypotheses are perfectly legitimate. Hypotheses are just as legitimate and necessary in science as in common life, only we must be careful to regard them as a means, and not as an end, and hold ourselves ready to discard them the moment they are shown to be antagonistic to the order of nature. It is easy to discriminate between a fact and an hypothesis. Up to the present time, no one has been able to get out of pure mercury anything but pure mercury—that is a fact; and it is a legitimate hypothesis to assert in consequence that mercury is a simple substance which cannot be broken up into others. It is not a fact, because just as a hundred and fifty years ago water was believed to be an element, so fifty years hence somebody may succeed in dissociating mercury, and prove as a fact that it is not a simple substance. The section treating of immaterial objects is necessarily a short one, a page and a half containing all that Prof. Huxley thinks it advisable to write on that branch, but that suffices to draw a clear distinction between sensations, emotions, thoughts, and things or objects. The little book, which might easily have been much better printed, will doubtless have, as it deserves, a large sale, and probably in future editions, the few errors it contains may be eliminated. Such expressions as "an universal" are pedantic, and the statement that gluten is the substance known in commerce as "maccaroni" is likely to lead to misconception, for maccaroni, though made from flour rich in gluten, is not exactly gluten pure and simple. These, however, are small errors in an excellent primer.

LIME has never been found in a native state; it is always united to an acid, as to the carbonic in chalk. By subjecting chalk or limestone to a red heat it is freed from the acid, and the lime is left in a state of purity.

THE COMING COMET.

In a letter to the Boston *Advertiser*, Professor Benjamin Pierce, of Cambridge, says that he is fully persuaded that the comet recently discovered by our eminent American Astronomer (Dr. Gould in South America), is a return of the wonderful comet of 1843, which has been considered as in many respects "the most interesting of any on record" (Cooper's Cometic Orbits). The first record of this comet is in 1770 before Christ, with an average period of about seven years. The subsequent visible and recorded returns are, 370 before Christ, 252 and 183 before Christ, and after Christ 336, 422, 533, 582, 708, 729, 882, 1077, 1106, 1208, 1313, 1362, 1382, 1402, 1454, 1491, 1511, 1528, 1668, 1689, 1702, 1843, and 1880."

The appearance of this comet in 1843 is thus described by Professor Pierce.

"About noon on the 28th of February, 1843, groups of people in many of the towns of New England, especially in Portland, Maine, collected at the corners of the streets, gazing up toward the sun. Protecting their eyes in the shadow of the houses, they saw a brilliant object close to the sun. Such a marvelous spectacle had never before been seen. A thoughtful sea captain Mr. Clark, brought out his sextant, and repeatedly measured the distance of the strange object from the limb of the sun. These unique observations are on record, and submitted to rigid criticism, attest the accuracy of the observer. In about a week from this time a wonderfully brilliant tail of a comet was seen skirting the horizon soon after sunset, and reaching more than one-third of the way round the sky. It was now a tail without a head, as it was at first head without tail; but they were members of the same comet. The best determination of its path was accomplished by the distinguished astronomer, Sears O. Walker. At its perihelion it passed nearer the sun than any known comet, with the single exception of that of 1680. Computed by Sir Isaac Newton, and in the discussion of which in the Principia he broached the first approximation to the true theory of the cometary tail. These two comets approached so close to the sun that it would seem quite possible that they touched its surface, or, at least, swept in nearer than the solar corona. It would not have been an absurd hypothesis, that they were ejected from the sun at the time of penetration, had it not been for the fact that the comet of 1680 was seen on its way down to the sun, and for the remarkable phenomenon which we are about to describe concerning the comet of 1843. It may be claimed, as a not impossible hypothesis, that each of these comets was at some former time the product of a solar eruption, in accordance with Buffon's theory of the origin of comets. It would only involve a force which would double the greater velocity given to the solar field of hydrogen. But a juster interpretation of the phehomenon, and one which avoids the necessity of an extravagant volcanic action, is to be found in the relation between the comets and the meteors. It is simply the spash of the falling meteors. In about an hour and a half the comet of 1843 like that of 1680, went round the sun from one side to the other. What would have become of the tail, which was reaching out about 100,000, 000 of miles from the sun to the earth's orbit? There have been those who have actually adopted the incredible, I may say the impossible, hypothesis that the tail rotated through this immense circuit, developing a centrifugal force which all the united powers of the universe could not have sustained. No! The comet practically left its tail behind it, and began to grow a new tail as it receded from the sun. There were thus two tails nearly side by side. The new tail was distinguished because it commenced at the head of the comet, whereas the old deserted tail began without any head at some distance from the nucleus, and extended further from the sun than the new tail. That such should be the phenomena of this comet was suggested by a geometer, without knowing that it had been actually observed. It was as veritable and honest a prediction as if it had been made previous to the observation. A double tail was observed on the first four nights after the comet's appearance at noonday. The visible separation of the two tails only lasted for a few days, because the earth passed almost at once into the plane of the comet's orbit, so that one tail eclipsed the other."

THE Imperial Oil Company, of London, Ont., have commenced tearing down Spencer's refinery. The best portions of the machinery from this and all the other refineries owned by the members of the company will be placed in the Victor Works. The idea is to make these latter works equal to all the others combined. A large parafine factory will also be built on the Victor grounds, and the works of Waterman Bros. closed down.