quartz pebbles, amounting to probably fifty, which we presume were used for the same purpose, and seem to be common with this class of struthious or running birds.

In Madagascar the remains of another large bird have been found, belonging to the same type. Here their eggs have been found in a good state of preservation, some of which are more than a foot in diameter and will hold over two gallons. They occur in the mud of swamps, and the natives find them by probing with long iron rods.

It is a remarkable fact that remains of giant land birds of nearly the same character have been found occupying areas widely separated. We may mention the Moa of New Zealand, the *Epyornis* of Madagascar and the *Dromornis* of Australia. These are strictly land birds, without the ability to fly or swim, and the widely separated areas in which they are found can only be accounted for on the supposition that these regions were once united and that subsequent geological changes have covered the intervening area with seas. Even in the Eocene strata of New Mexico the remains of large wingless birds have been found. These great struthious birds seem to have begun their existence far back in the Tertiary era, and in time had a wide geographical range. Their remains are found in nearly every continent, and on many of the islands, which may indicate the vast changes that have taken place in the land surface of the globe since their advent.

A story comes from Berlin that the Ornithological Society of Germany has discovered the Moa alive on the north island of New Zealand, but at this writing it lacks confirmation.

ADDITIONAL EXTINCT FORMS.

A Monster Deer.—In late geological times there appeared in Ireland, England and the Continent a gigantic deer, popularly known as the "Irish Elk." It seems to have been more numerous in Ireland than elsewhere. Its remains are found there in great abundance. It was a veritable deer, but of enormous size. It stood twelve or fourteen feet high, and its horns measured twelve feet from tip to tip. The skull and horns weighed nearly one hundred pounds. The vertebrae of the neck were necessarily large in order to support the vast horns. It must have had a vigorous circulation, for it doubtless shed its horns annually, as do other deer, and the osseous matter of which they were composed must have been drawn from the blood and carried by arteries to the head. In the bed of an old lake, now filled with peat, more than one hundred heads of this monster were found, which indicates, to some extent, the vast numbers that once inhabited the Green Isle.

The Early Horse.—The horse cannot properly be classed among monsters, yet its early history, obtained from the leaves of the Great Stone Book, is full of interest, and may properly be noted here. The horse made its appearance in Eocene times. The earliest remains are known as *Eohippus*, or dawn horse. Then, in the next succeeding age, the Miocene, we have *Meshippus*, and toward its close *Miohippus*. After this come *Protohippus* and *Pliohippus*, both in the Pliocene period, and *Equus* in Quaternary times. The early forms were not larger than a fox, and what is still more singular, they had in front four perfect toes and three behind. This was especially true of *Orohippus*. In *Eohippus*, or dawn horse, there are rudiments of a fifth toe. In *Meshippus* the fourth toe is wanting, except a small splint bone, which is not found in *Protohippus*. In *Pliohippus* but one toe is found, which is slightly split, and a small splint bone, which is found on each side of the leg, as in the modern horse. *Equus*, or the recent horse, has one solid toe. In the early horse the ulna and the fibula were free, that is, they were two distinct bones, but as we ascend in the species they begin to unite, or become soldered together, and finally become one bone. It seems strange that the progenitors of the horse tribe were little larger than house cats, and had three or four or five distinct toes on each foot. But the geological record shows this to be true beyond doubt. *Meshippus* and *Miohippus* were about the size of a sheep, and *Protohippus* was about the size of an ass. From these forms have been evolved the present noble animal so useful to man. The remains of forty species have been found, some of the later rivaling in size the horse of to-day.

A Strange Animal.—The Miocene and Pliocene strata of Germany, France, Greece, Asia Minor, and some other regions furnish us with the remains of a strange animal called the *Dinotherium*. It derives its name from the Greek, "deinos," terrible, and "therion," beast. The animal when full grown was probably eighteen or twenty feet long, and of elephantine proportions. The head alone was nearly four feet long. It had two enormous tusks in the lower jaw turning down like those of a walrus. It also had a trunk similar to the elephant. The jaws had five molar teeth on each side. The animal partook of the character of the elephant, hippopotamus, tapir, and the dugong. It probably lived in the water, or was at least amphibious. Its great curving tusks would serve not only to dig up the roots of plants at the bottoms of lakes, rivers or shallow seas, but also assist it in climbing banks to the dry land, or, as some naturalists believe, to hook into the earth on the margin of streams while its ponderous body remained in the water, and in which position the animal rested or slept.

A Monster Covered with Wool.—The Tertiary period has yielded the remains of a singular animal known as the Woolly Rhinoceros. It attained a length of twelve or more feet, with corresponding height. It supported two large horns, one on its muzzle and the second just back of the first. It was stoutly built, and must have been able to defend itself against the attacks of other animals. Doubtless the *Mastodon* found it no trifling foe. The body of the Woolly Rhinoceros has been found intact in the frozen soil in Siberia, where it was probably overwhelmed by a downrush of snow and ice from overcanopying vapors thousands of years ago, and has been preserved in the ice to the present day. The animal had long hair or wool, which formed a complete covering for its body and legs, and even its feet. The skin itself was smooth, and did not lie in folds or wrinkles, as is common with the modern Rhinoceros.

Ancient Whales.—In the Eocene period a large cetacean made its appearance in vast numbers. It was

between the Whale and the Seal in its relations. The teeth were yoke-like in appearance, from which the animal derived its name, *Zeuglodon*—Greek, "zeugle," yoke, and "odont," tooth—being apparently yoked in pairs. It attained a length of seventy or eighty feet, with vertebrae a foot or more in diameter. Their remains are found in some of the Southern States. In places its bones are so numerous that they have been used to construct fences. It would seem that vast numbers had been stranded by some great tidal wave, or other cause, on the shores of the Mexican Gulf. This great whale-like monster probably disappeared before the close of the Miocene period.

The Early Fishes.—The first Fishes made their appearance near the close of the Upper Silurian age. But they were generally quite different in appearance to those now living. In the Devonian, which was pre-eminently the age of Fishes, there was a fish that was covered with bony plates and swam by means of wing-like fins. Another was covered with bony plates in front, but its tail was bare and was used for locomotion. Some were covered with shields of rhomboidal plates. Others had blade-like teeth, and some had teeth like the claws of an animal, while others had mouths paved with rounded teeth like cobble stones. In these early Fishes the tail fin was vertebrated, and they possessed many characteristics of reptiles. Afterward a separation seems to have taken place, and one branch developed into true Fishes and the other into Reptiles. The first Fishes were air-breathers, and appear as the connecting link between Fishes and Reptiles. It must be confessed, however, that the Shark family known as *Selachians* were among the first Fishes, and differed but little from the modern Sharks known as *Squalodonts*. In Tertiary times huge Sharks were the chief rulers of the seas. The phosphate beds of South Carolina contain vast numbers of their remains. We have in our possession a tooth that would nearly cover an ordinary printed page. It is six inches long and five inches wide, and it is said that some are even larger. Think of a monster that could carry two or three hundred such teeth in its mouth! It probably represents a creature one hundred or more feet in length. At one time they must have been sufficiently numerous to nearly clear the seas of other forms of animal life.

A Remarkable Sirenian.—The most remarkable of the Sirenia family is what is known as *Steller's Sea-cow*. It was so called because it was first discovered by the German naturalist Steller, who, in company with Bering, a captain of the Russian navy, with his vessel and crew, was cast away on Bering Island, where the latter died in 1741. Steller saw it alive during his long enforced residence on the island, and became familiar with its habits. He says the Sea-cows fed in the shallow water along the shore, and collected in herds like cattle. They ate the seaweeds that grew there, raising their heads above the water every few minutes to obtain fresh air. They were slow in their movements and mild and inoffensive in disposition. In color they were dark brown, sometimes spotted, and when full grown reached a length of thirty-five feet. They seemed much attached to each other, and when one was harpooned the others tried to rescue it. In Steller's time the animal was limited to two islands, and seems to have entirely disappeared about 1780. They were exterminated for their flesh and hides. The body was very large, requiring forty men to drag it from the water. Sirenian remains have been found from the Eocene period to the present time.

FOREGLOWS AND AFTERGLOWS.

By Dr. J. G. MCPHERSON, F.R.S.E.

MEN do not wonder at the adoration by the savage of the sun; for to the untutored mind the majesty of that orb eclipses all. Among created things the sun is like a god, shedding on its way of glory, beauty, life and joy in unlimited profusion. To the eye of the artist nothing in nature can compare to a sunrise or sunset in certain seasons. And to educated theists the sun is the

"Creator's crest upon His azure shield the heavens."

By the sun's benignant beams of light and heat the earth rejoices to-day, as it has ever done since, by the divine fiat, it became the center of our system. The world's unwithered countenance is bright as at creation's day. The sun is always the joy-inspiring element in nature—the source of the rainbow colors on the dark cloud. And no man has more beautifully described the sun than did the poet king of Israel in those oft-admired words: "The sun, which is as a bridegroom coming out of his chamber, and rejoiceth as a strong man to run a race. His going forth is from the end of the heaven, and his circuit unto the ends of it; and there is nothing hid from the heat thereof."

This suggests sunrise. The powerful king of day rejoices as he steps upon the earth over the dewy mountain tops, bathing all in light and spreading gladness and deep joy before him. The lessening cloud, the kindling azure and the mountain's brow, illumined with golden streaks, mark his approach; he is encompassed with bright beams as he throws his unutterable love upon the clouds, "the beauteous robes of heaven." Soon he touches the green leaves all a-tremble with gold light. Aslant the dew-bright earth and colored air he looks in boundless majesty abroad, lightening the rocks and hills and streams that gleam from afar. From universal gloom—horribly pictured by Byron in "Darkness"—he clothes all in bright beauty, proving himself to be "of all material beings first and best." Yet the material glory is infinitely intensified when it is clothed in light by the imagination and irradiated by the poetic spirit. Over Christopher North's soul a gorgeous sunrise had ever an enchanting spell. And to the poetic mind of the philosophic genius, Prof. Ferrier, the changing colors of sunrise suggested a very apt illustration of the dark theory of the "Becoming," as laid down in mere skeleton form by the Greek philosopher Heraclitus. The dawn steals gradually over the earth and sky; and never at any moment can we say that the degree of light and color is definite and fixed. It is continually changing. It is continually becoming stronger and stronger; and yet at no instant can we say or think: here one degree of clearness or color ends, and here a higher degree of clearness or color begins. In truth,

none of the changes have either any end or any beginning, so imperceptibly are they run away into each other. The reason tells the eye that, even for the shortest time that can be named or conceived, the observer never sees any abiding color, any color which truly *is*. Within the millionth part of a second the varied glory of the eastern heavens has undergone an incalculable series of mutations. The eye seems to arrest the fleeting pageant and to give it some continuance; but the reason says it is only a series of fleeting colors, no one of which *is*. As the circle is traced by a pencil moving continuously in a straight line and out of it at the same time, or as the acceleration of a falling stone is produced by the velocity being fixed and increasing at the same instant, so the gorgeous lights and colors of sunrise proceed from a blending of fixity and non-fixity. They illustrate the philosophy of the Becoming instead of the Being.

But glorious and educating and inspiring as is the sunrise in itself in many cases, there is occasionally something very remarkable that is connected with it. Rare is it, but how charming when witnessed, though till very recently it was all but unexplained. This is the *foreglow*. It is in no respects so splendid as the afterglows succeeding sunset; but because of its rarity, its beauty is enhanced. We remember a foreglow most vividly which was seen at our Strathmore Manse in January, 1893. Our bedroom window looked due west; we slept with the blind drawn. On our table was an ordinary leaf diary, with the hours of sunrise and sunset daily marked. On that morning we were struck, just after the darkness was fading away, with a slight coloring all along the western horizon. The skeleton branches of the trees stood out strangely against it. The coloring gradually increased, and the roseate hue stretched higher. The old well-known faces that we used to conjure up out of the thin blended boughs became more lifelike as the cheeks flushed. The fine old copper beech (eight feet in circumference before it breaks off into three commanding limbs), the gauzy-sprigged birches, the gnarled elms, and the holly, that alone by its green leaves showed signs of life, stood finely out against the light roseate belt of western sky. There was rare warmth on a winter morning to cheer a half despairing soul, tired out with the long hours of oil reading, and pierced to the heart by the never-ceasing rimes; yet we could not understand it. We went to the room opposite to watch the sunrise; for we had observed on the diary that the appearance of the sun would not be for a few minutes. There were streaks of light in the east above the horizon, but no color was visible. That hectic flush, slight, yet well marked, which was deepening in the western heavens, had no counterpart in the east, except the colorless light which marked the sun's near approach. As soon as the sun's rays shot up into the eastern clouds, and his orb appeared above the horizon, the western sky paled, the color left it, as if ashamed of its assumed glory. A foreglow like that we have very rarely seen; and its existence was a puzzle to us, till we studied Mr. John Aitken's explanation of the afterglows after sunset. We have never come across any of his descriptions of a foreglow, and, of course, across no explanation of the curious phenomenon. The western heavens were colored with fairly bright roseate hues, while the eastern horizon was only silvery bright before the sun rose; whereas, after the sun rose and colored the eastern hills and clouds, the western sky resumed its leaden gray and colorless appearance. Why was that? What is the explanation?

The varied phenomena attending an afterglow are capable of giving a clearer explanation of the foreglow; and to the sunset and the appearances that follow in its train we now turn. This is advisable, for during many months of the year one can witness the gorgeous afterglows, and study what we are to say in explanation; whereas it is not an easy matter to secure a good foreglow with decided varying effects. One is always struck with the resplendent brilliancy of the autumn sunsets. Some nine years ago these were exceptionally grand, and in due course something will be said about this. But for our examination of an afterglow we have selected a September day in 1893, because one could examine it more carefully with the gentler lights and colors.

A glorious sunset has always had a charm for the lover of nature's beauties. The zenith spreads its canopy of sapphire, and not a breath creeps through the rosy air. A magnificent array of clouds of numberless shapes comes smartly into view. Some, far off, are voyaging their sun-bright paths in silvery folds; others float in golden groups; some masses are embroidered with burning crimson; others are like "islands all lovely in an emerald sea." Over the glowing sky are splendid colorings. The flood of rosy light looks as if a great conflagration were below the horizon. We wended our way up to the high road between Kirriemuir and Blairgowrie to get a full view of the whole sky. The setting sun shone upon the back of certain long trailing clouds which were much nearer to the observer than a range behind; and the front of these were darkly glowing, with the fringes brilliantly golden, while the front of those behind was sparkingly bright. In the time we have taken to make these jottings the sun had disappeared over the western hills, and his place was full of spokes of living light. Looking eastward, we observed on the horizon the base of the northern limb of a beautiful rainbow, almost upright, and only a few degrees in length, produced, no doubt, by the refracted rays through the moist atmosphere in the west. Gradually it melted into thin air, and a hectic flush began to visit the eastern horizon.

Soon in the west the light faded, and piles of cold, neutral tinted cloud encanopied the semicircle of pale light. The belt of cloud above the hills, which before stood out as if brushed with liquid gold, was now chillingly dark. But out of the east there came a lovely flush, and the general sky was presently flamboyant with afterglow. The front set of clouds was darker except on the edges, the red being on the clouds behind; the horizon in the east being particularly rich with dark red hues. Ten minutes after the sun sunk, the eastern glow rose and reddened all the back clouds, but the front clouds were still gray. The effect was very fine in contrast. The fleecy clouds in the zenith became transparently light red as they stretched over to reach the silver-streaked west. But the front clouds, that were coming east by the gentle and balmy western breeze, were dark gray, without any roseate

hues. The last of the swallows were seen flying high up as if in the gauzy clouds. Close to the southern horizon there was a deep band of red unclouded sky, against which the wooded Sierras looked black and somber. The new moon was just appearing upright against a slightly less bright opening in the sky, which, with the shrill cry of an owl in the copse, had a mystic effect on the scene. In five minutes more the rosy coloring left the eastern horizon; but, when the clouds opened in the west, the flushed sky was then magically displayed. Again, in the north, east, and south a richly roseate belt was marked between 50° and 10° of elevation. Gradually the back clouds in the zenith (very thin) became slightly reddened, but the front clouds then were uncolored as before. As the coloring of the upper zenith clouds wandered to the west, where a flush of glowing was seen in the back clouds, the red in the east gradually waned. The varying shades of the different kinds of blue were now beautifully seen from the pale blue at the horizon to the deep azure of the zenith. Half an hour after sunset there was no red in any part except a lingering flush in the sky behind the western clouds. But, strange to say, within the next ten minutes a second glow commenced, very feeble, still discernible. The north and east warmed up slightly with a slight tinge of rosy red. Gradually the under clouds, about 50° above the western horizon, became slightly red beneath, the back ones being dark—the reverse of what was seen before. Fifty minutes after sunset the east was still slightly flushed, as was part of the open sky in the west, whereas the open sky in the southwest was of a pale bluish-green hue. Soon the colors collapsed, and the peaceful reign of the later twilight possessed the land. The temperature was 58° Fahr., far too high for a gorgeous display. (This will be afterward explained.) The grass was perfectly dry, and there were no symptoms of dew, also against brilliancy in the afterglow.

Now why was the eastern horizon so flushed with crimson when the sun had sunk in the west, and silvery light alone was seen in the opening of the sky above where the sun had disappeared? Similarly, why was it that in the foreglow that belted the western horizon there was a rich roseate color, while in the east, before sunrise, there were only light silvery streaks that indicated the sun's approach? Why should there be red colors in the least expected places—especially such an immense variety and wealth of reds? Mr. John Aitken, F.R.S., has devoted considerable attention to this subject, both in this country and in the south of France. What we cannot so easily determine here, where the skies are so generally cloudy, and the temperature so variable, he easily discovered in sunny France; for there the different sunset effects repeat themselves evening after evening in cloudless skies and with equable climate.

Some are of opinion that the varied colors are due to an excess of water vapor in the atmosphere, the sun's rays being colored as they pass through the vapor. But he is of opinion that, though moisture in the form of vapor particles (formed by the dust particles attracting the moisture in the air) increases and intensifies the colors, yet atmospheric dust is essential for the production of the afterglows. And he was the more convinced of this by the very remarkable and beautiful sunsets which occurred ten years ago, after the tremendous eruption at Krakatoa, in the Straits of Sunda. There was then ejected an enormous quantity of fine dust. Mr. Verbeek, a high authority on the subject, computed that no less than 70,000 cubic yards of dust actually fell round the volcano itself. This will give an idea of the enormous quantity of fine dust that was showered into the atmosphere all over the world. So long as that vast amount of dust remained in the air did the sunsets and afterglows display an exceptional wealth of coloring. All observers were struck with the vividly brilliant red colors in all shades and tints. Now, if dust is the cause of these glowing colors, there must be somewhere the blue complementary coloring, seeing that the dust acts as a disperser and not an absorber of the sun's component rays. The minute particles of dust in the atmosphere arrest the rays and scatter them in all directions; they are so small, however, that they cannot arrest and scatter all; their power is limited to the perfecting of the rays at the blue end of the spectrum, while the red rays pass on unarrested. There, therefore, ought to be somewhere in the sky a display of the colors of the blue end of the spectrum; and these are found in numberless shades from the full blue in the zenith to the greenish blue near the horizon. In fact, the wonderful greenness sometimes appears in a clear space in the lower sky, more intensified when contrasted with a rose-colored cloud or haze alongside of it. Dust, then, is the main cause of the glowing colors attending sunset; for none of the colors are destroyed—only sifted out and sorted in a marvelous way. If there were no fine particles of dust in the upper strata, the sunset effect would be whiter; if there were no large particles of dust, there would be no coloring at all. If there were no dust particles in the air, the light would simply pass through into space without revealing itself, and the moment the sun disappeared there would be total darkness, as when a candle is blown out in moonless midnight. The very existence of our twilight depends on the dust in the air, and its length depends on the amount and extent of the dust particles.

We saw that soon after sunset, though the western sky was silvery, the sky near the eastern horizon was flushed with red. That is due to the sun's rays being deprived of all except the red in their passage horizontally through so much of the atmosphere, and these red rays falling on the large particles low down in the eastern heavens illuminated them with red light. This red light near the eastern horizon would be much redder if it were not for the great amount of blue light reflected by the particles from the sky overhead. But how have the particles been increased in size in the east? Because, as the sun was sinking, but before its rays failed to illumine the heavens, the temperature of the air began to fall. This cooling made the dust particles seize the water vapor to form fog particles of a larger size. The particles in the east first lose the sun's heat, and first become cool; and the rays of light are then best sifted, producing a more distinct and darker red. As the sun dipped lower the particles overhead became a turn larger, and thereby better reflected the red rays. Accordingly the roseate bands in the east

spread over to the zenith and passed over to the west, producing in a few minutes a universal transformation glow. Before, however, the ruddy flush reaches the zenith, the polariscope could display the redness even then, though unseen by the unassisted eye. From this we see that the crimson, seen in the east shortly after sunset, ascends in gradually paling hues, by reason of the interference of the strong deep blue overhead, then stretches overhead on to the west, where again it becomes more golden, mixed in an aurora-like glow.

The variety in the colors and the difference of their intensity depend, too, upon the two sets of dust particles in the air. To produce the full effect often witnessed, there must be, besides the ordinary dust particles, small crystals floating in the air, which increase the reflection from their surfaces. These crystals shine far more brilliantly when suspended in the air between the observer and the sun than in any other position, and there is generally a sufficient number to produce this glorious result. The light reflected by the large quantities of ordinary kinds of dust is the chief cause of the red glow in the south, north and east; the crystals enhance the western glow effects. In winter sunsets, the winter-clad dust particles get frozen, and the red light streams with rare brilliancy, causing all red-dish and colored objects to glow with a strange brightness. Dead beech leaves, which in ordinary are not noticed in a marked degree, shine out as deeply red as those of the blood-stained maple. All the red tiled roofs or red sandstone gables of the houses shine out brightly, as if painted with vermilion. When afterward we find that there has been a heavy deposit of dew, we can account, by the sudden change of temperature after sunset, for some of the brilliancy of the coloring; then the air glows with a strange light as of the northern dawn. From all this it is clear that though the coloring of sunset is produced by the direct rays of the sun, the afterglow is produced by reflection or rather radiation from the illuminated particles near the horizon.

But we can satisfy ourselves still more by another consideration that the afterglow is only a reflection of the sunset colors on the horizon by the same particles as shown by the direct sunlight before. Every one knows that daylight is far brighter than lamplight, yet it is not so easy to realize the full difference. Bring a lighted lamp into the room about sunset, without drawing down the window blind. The room does not seem to be any better lighted. One experiment was made where the window looked to the west. As the sun sinks, note how the lamp begins to light up a wider and wider area in the room, until the room seems lighted by the lamp alone, while we can still see our way about in the lawn outside. Similarly, if we keep in view the vast scale of brilliancy to be met with at sunset, we can see that what is dark at one time and under certain conditions may really appear brilliantly illuminated a short time afterward under different conditions. If a small area of the brilliantly clear western sky were projected by means of a mirror upon the eastern, the eastern, which looked bright before, would, alongside the reflection of the western, look black. A cloud on a bright sky may look black; but remove the white sky, and we find the cloud is brilliantly lighted up. No red glow is observed overhead by the naked eye, while the polariscope can detect it, so that the red must be there. When conditions change, the red becomes visible. We imagine that in the afterglow the red overhead has increased; but in reality it has decreased, for the stars are becoming more and more numerous, showing that the daylight has been decreasing all the time.

To keep the eye from being bewildered with the afterglow, let the setting sun shine into your room so as to paint an image of the window on the wall opposite. A bright orange light may be observed in the picture, while the little clouds in it are lighted up with the same hue. As the sun sinks, the color deepens in the picture, and the clouds then glow with a fine red light. After the sun ceases to shine on the clouds, their brilliancy gradually wanes, until at last they appear to be black; yet if you look out, you will find the sky in the east and overhead flushing with crimson. After a time, the clouds in the picture lose their black appearance, and their western edges again glow with a rich light, very much as at first, except that the sharp outlines have become hazy. This shows that the illumination was from the western sky, as the clouds were far too low to be lighted up by the direct rays of the sun. The hazy outlines, too, give evidence of the indirect light which illuminates them.

Without the dust particles there would be no foreglows or afterglows—no dawn, no twilight. Sudden light and sudden darkness would daily startle man and beast. There would be no coloring either in the morning or evening. The charms of sunrise and sunset would be gone. Strange that the grandeur of the heavens in sunrise foreglows and sunset afterglows depends for its existence on dust particles and water vapor!

It has long been supposed that the coloring of earth and sky at sunrise and sunset is more gorgeous when observed from the top of a mountain than at its base; but Mr. Aitken's careful and repeated observations at the Rigi Kulm (6,000 feet), in Switzerland, all point the other way. For several days he took accurate notes of the observations, and the weather was uniformly favorable; but on none of the days did he see any display of color; indeed, he was particularly struck with the want of it. Grays predominated over other colors. Now during that time, he was afterward told by trustworthy observers, the sunsets a mile below, from Lucerne, were remarkably fine for color effects. The coloring must, therefore, have been produced by the more dusty lower air. This supposition is supported by other observations. On the mountain top the near cumulus clouds were always snowy white, while it was only the distant ones that were tarnished yellow, showing that it required a great distance at that elevation to give even a slight coloring. There seems, therefore, to be very good reasons for supposing that the coloring at sunrise and sunset will be more brilliant when seen from the valley than from the mountain top.

We cannot help lingering fondly on this charming subject, just as the sun lingers in the production of the afterglows instead of suddenly finishing its work. We have to witness the sunsets at Ballahulish to be assured that Waller Paton really imitated nature in the characteristic bronze tints of his richly painted

landscapes; and never can we forget the May afterglows at Bridge-of-Allan, where, recruiting after a long illness, we were spellbound by their fresh and invigorating grandeur. Then, of course, we were more susceptible to the magical power of Nature. The air was full of music. The thrush rivaled all the songsters of the grove in pouring forth, in his varied movements, his passionate love song. Oh, for the power of Richard Jefferies to put in words what we saw and felt! The trees were being clothed with their fresh foliage; the green being unscorched, the brown being unbronzed. Peace reigned supreme, and Nature reposed in rosy sleep. The full moon was shining in the east with borrowed, reflected light, for already the sun was below the horizon. The clouds were tinged with light red from the eastern horizon all over the zenith, but in the west they had more of a neutral tint; while below the rich, roseate, fairy-like light clothed all the trees with a golden sheen. And behind all there seemed to be manifested a Spirit to which our own spirit thrilled in ecstasy. Such a scene of glory must elevate the moral tone of any man who is not soulless. The conception of the Divinities above the material phenomena to purify, to hallow, and to calm the human spirit. Then we discern that science becomes possessed of heavenly light, and "by that light really see light."

Nature's self, which is the breath of God,
Or His pure word by miracle revealed.

—Gentleman's Magazine.

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