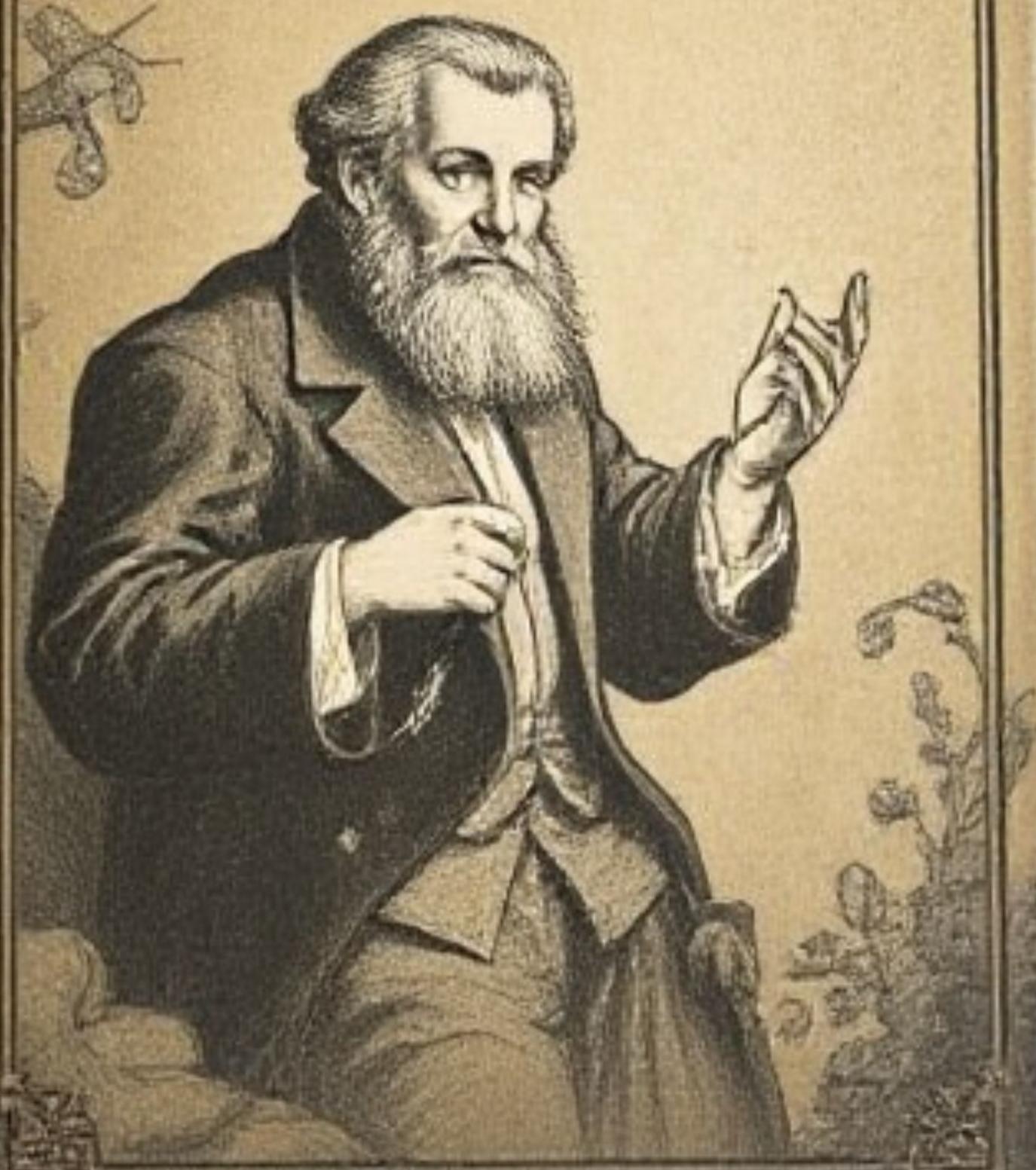


# LETTERS ON NATURAL MAGIC

*Mysteries and Wonders for Sir Walter Scott*



In this collection of letters, I delve into the wonders of natural magic, an enchanting subject that merges the wonders of science with the mysteries of the supernatural. Addressed to Sir Walter Scott, Bart., these letters aim to explore the phenomena that often defy conventional scientific understanding but remain deeply fascinating. Scott, a man celebrated for his literary works that captivate the imagination, is an ideal recipient for these musings on the magical aspects of nature.

It is with great pleasure that I pen this first letter to you, a distinguished gentleman of literary renown. I find myself compelled to share with you the profound allure of natural magic, a realm where the ordinary and the extraordinary intertwine. Natural magic, as you might conceive, is not a mere product of fanciful imagination but rather an exploration of nature's hidden wonders, those phenomena that defy straightforward scientific explanation yet captivate the mind and spirit.

Consider, for instance, the phenomenon of bioluminescence. This remarkable ability of certain organisms to produce light is a spectacle of nature's magic. From the glowing algae that illuminate the waves of the sea to the fireflies that enchant our summer nights, bioluminescence is a vivid reminder of the mysteries that nature holds. The scientific principles behind it—chemical reactions involving luciferin and luciferase—are fascinating, yet the sheer beauty and ethereal quality of the light produced evoke a sense of wonder that transcends the empirical.

In this second letter, I turn our attention to the botanical world, where the magic of nature is no less remarkable. Plants, those silent witnesses to the passage of time, exhibit behaviors and characteristics that are as enchanting as they are instructive.

Take, for instance, the phenomenon of plant movement. The sensitive *Mimosa pudica*, or "touch-me-not," responds to touch by folding its leaves—a mechanism that appears almost animated. Similarly, the Venus flytrap's sudden snap to capture prey seems like an act of cunning intelligence. These are not merely mechanical responses but rather intricate adaptations that reveal a depth of interaction with the environment that can be perceived as magical.

Moreover, the concept of "plant communication," where plants release chemical signals to warn neighbors of threats or attract pollinators, further emphasizes the complexity and interconnectedness of life. Such interactions, while explainable through science, possess a poetic elegance that feels deeply magical.

As we gaze upward to the heavens, we encounter another domain where natural magic manifests. The celestial realm, with its stars, planets, and cosmic events, has been a source of wonder and inspiration for humanity throughout history.

The aurora borealis, or northern lights, is a prime example of celestial magic. The shimmering curtains of green, pink, and violet dancing across the Arctic skies are the result of charged particles from the sun interacting with Earth's magnetic field. This scientific explanation does little to diminish the awe-inspiring beauty of the spectacle. The auroras remind us of the grandeur of the universe and our place within it.

Similarly, the periodic appearance of comets and meteor showers brings a sense of wonderment. The predictable yet breathtaking displays of shooting stars ignite the imagination and invoke a sense of timelessness, connecting us to the ancient traditions of stargazers and dreamers.

In this letter, let us explore the magical aspects of animal behavior, where nature reveals its astonishing creativity. The world of animals is rife with phenomena that challenge our understanding and inspire a sense of wonder.

Consider the migration of monarch butterflies, which travel thousands of miles across continents to reach their breeding grounds. Their journey, guided by an intricate sense of direction and timing, seems almost miraculous. The ability of birds to navigate using the Earth's magnetic field or the remarkable camouflage abilities of the cuttlefish further illustrate the extraordinary capabilities embedded in the natural world.

These behaviors, while grounded in biological processes, often appear to defy the limits of our understanding. They evoke a sense of magic not unlike that found in your celebrated tales, where the line between the natural and the supernatural blurs.

Natural phenomena often captivate our imaginations and stir a sense of wonder that transcends mere scientific curiosity. While the principles behind these phenomena can be explained through scientific inquiry, their beauty and the sense of magic they evoke can be profoundly enchanting. This essay explores several examples of natural phenomena that illustrate the intersection of science and wonder, demonstrating how the ordinary becomes extraordinary when viewed through the lens of natural magic.

One of the most captivating examples of natural magic is bioluminescence. This phenomenon occurs when certain organisms produce light through a chemical reaction within their bodies. The most familiar instances of bioluminescence are fireflies and bioluminescent algae, but this magical light is also present in a range of marine life, including jellyfish and deep-sea fish.

The chemical process behind bioluminescence involves a light-emitting molecule called luciferin and an enzyme called luciferase. When these substances react with oxygen, light is produced. While the scientific explanation for this process is well understood, the sight of glowing algae illuminating ocean waves or the soft, flickering light of fireflies creates an experience that feels otherworldly. The beauty and mystery of these glowing creatures invite us to marvel at the hidden wonders of the natural world.

The aurora borealis, or northern lights, is another mesmerizing natural phenomenon that combines scientific explanation with an enchanting spectacle. This stunning display occurs when charged particles from the sun interact with Earth's magnetic field, causing them to emit light as they collide with atmospheric gases. The result is a breathtaking array of colors dancing across the polar skies, ranging from green to pink and violet.

The science behind the aurora is fascinating, involving complex interactions between solar wind and Earth's magnetosphere. Yet, the sheer majesty and ethereal beauty of the auroras inspire a sense of magic and wonder that transcends scientific explanations. The northern lights remind us of the grandeur and mystery of the universe, offering a glimpse into the celestial dance that shapes our world.

In the plant kingdom, natural magic reveals itself through extraordinary movements and responses that seem almost animated. The *Mimosa pudica*, commonly known as the touch-me-not plant, is famous for its rapid leaf-folding response to touch. This movement is a defense mechanism designed to deter herbivores and reduce water loss.

Similarly, the Venus flytrap captures the imagination with its remarkable mechanism for trapping prey. The plant's modified leaves, which resemble jaws lined with spines, snap shut when triggered by the movement of unsuspecting insects. While these behaviors are scientifically explainable through plant physiology and mechanics, they possess an inherent magic that evokes a sense of wonder and curiosity.

Celestial phenomena, such as comets and meteor showers, offer a magical connection to the cosmos. Comets, with their glowing comas and trailing tails, travel through our solar system in elliptical orbits. When they approach the sun, they release gas and dust, creating a luminous display that can be seen from Earth. The sight of a comet streaking across the night sky feels like a visit from a distant world, carrying with it a sense of cosmic wonder.

Meteor showers, caused by the Earth passing through the debris left by comets, provide another spectacular display. As meteoroids enter Earth's atmosphere and burn up, they create streaks of light that seem to fall from the heavens. Watching a meteor shower can be a profound experience, connecting us to the vastness of space and the beauty of the universe.

Animal behavior often reveals remarkable adaptations and responses that inspire awe and fascination. The migration of monarch butterflies, for example, is a phenomenon that combines instinct and navigation skills to undertake an extraordinary journey across continents. The butterflies' ability to travel thousands of miles to their breeding grounds, guided by an internal sense of direction, feels almost magical.

Similarly, the cuttlefish's ability to change color and texture for camouflage is a demonstration of nature's ingenuity. This remarkable adaptation allows the cuttlefish to blend seamlessly with its surroundings, evoking a sense of enchantment and marvel.

The plant kingdom is a realm of wonder and mystery, where life unfolds in ways that can seem almost magical. From intricate movements to sophisticated chemical signals, plants exhibit behaviors and adaptations that fascinate and inspire. This exploration into the mysteries of plant life reveals how nature's ingenuity often transcends our understanding, offering glimpses into the hidden wonders of the natural world.

Plants, though immobile, display a range of dynamic behaviors that challenge our perception of their stationary existence. One of the most intriguing examples is the *Mimosa pudica*, commonly known as the touch-me-not plant. This plant reacts to touch by folding its leaves and drooping its stems. This response, known as thigmonasty, is a defense mechanism designed to deter herbivores and reduce water loss. The rapid movement of the plant's leaves, which occurs within seconds, is driven by changes in turgor pressure within specialized cells called pulvini.

Similarly, the Venus flytrap (*Dionaea muscipula*) demonstrates a form of movement that seems almost animated. Its modified leaves form a trap with lobes that snap shut when triggered by the movement of prey. This fascinating adaptation enables the plant to capture and digest insects, providing essential nutrients. The quick and precise action of the Venus flytrap highlights the complexity of plant responses and their ability to interact with their environment in surprising ways.

Plant communication is another area where the magical and the scientific intersect. Plants engage in a form of signaling that allows them to interact with their environment and other organisms. One notable example is the release of volatile organic compounds (VOCs) by plants in response to herbivory. When a plant is under attack, it can release VOCs to attract predators and parasitoids that prey on the herbivores.

Additionally, plants can communicate through underground networks known as mycorrhizal networks. These fungal networks, sometimes referred to as the "Wood Wide Web," connect the root systems of different plants, allowing them to exchange nutrients and information. This underground communication system reveals a hidden layer of interaction and cooperation among plant communities, showcasing the sophisticated and interconnected nature of plant life.

Plants exhibit a remarkable array of adaptations that enable them to thrive in diverse environments. One such adaptation is the development of succulent tissues in plants like cacti and aloe vera. These plants have evolved to store water in specialized tissues, allowing them to survive in arid conditions. The ability to conserve and store water is a testament to the resilience and resourcefulness of plants in adapting to challenging environments.

Another fascinating adaptation is the presence of carnivorous plants, such as the pitcher plant and the sundew. These plants have evolved to capture and digest insects and other small animals to supplement their nutrient intake. The intricate structures of these plants, from the tubular traps of pitcher plants to the sticky glandular hairs of sundews, highlight the diverse strategies plants employ to meet their nutritional needs.

The process of flowering is one of the most enchanting aspects of plant life. Flowers are not only visually stunning but also play a crucial role in plant reproduction. The intricate structures and vibrant colors of flowers are designed to attract pollinators, such as bees, butterflies, and birds. The symbiotic relationship between flowers and pollinators is a prime example of nature's elegance and efficiency.

Plants have developed various mechanisms to ensure successful pollination. Some flowers produce nectar to reward pollinators, while others use scent and color to attract them. Additionally, many plants have evolved specialized structures to facilitate the transfer of pollen. The diversity of flowering mechanisms and the beauty of floral displays underscore the intricate and magical aspects of plant reproduction.

The growth patterns of plants also reveal a sense of magic and wonder. The Fibonacci sequence, a mathematical pattern found in nature, is evident in the arrangement of leaves, petals, and seeds in many plants. This sequence, where each number is the sum of the two preceding ones, results in spirals and patterns that are both aesthetically pleasing and efficient for maximizing space and resources.

Furthermore, the phenomenon of phototropism, where plants grow toward light, demonstrates the remarkable ability of plants to adapt to their environment. This growth response ensures that plants can maximize their exposure to sunlight, which is essential for photosynthesis. The coordinated and purposeful growth of plants towards light reveals a hidden intelligence and responsiveness that adds to the enchantment of plant life.

The celestial realm has long fascinated humanity, captivating our imaginations with its vastness and beauty. From the twinkling stars to the dazzling displays of the aurora borealis, celestial phenomena evoke a sense of wonder and mystery that transcends the limits of scientific understanding. This exploration of celestial phenomena reveals how the science behind these events enhances their allure, creating a bridge between the empirical and the enchanting.

The aurora borealis, or northern lights, is one of the most mesmerizing celestial phenomena. This natural light display occurs in the polar regions and is the result of interactions between charged particles from the sun and Earth's magnetic field. When these particles collide with gases in the Earth's atmosphere, they produce light in various colors, ranging from green to pink and violet.

The scientific explanation behind the auroras involves complex processes within Earth's magnetosphere. However, the ethereal beauty of the auroras—spanning across the night sky in shimmering curtains—creates a sense of magic that transcends the scientific details. The aurora borealis is not just a display of natural forces; it is a visual symphony that evokes a profound connection to the cosmos.

Comets are another celestial phenomenon that evokes wonder and enchantment. These icy bodies from the outer solar system develop glowing comas and tails as they approach the sun. The heat causes the comet's ices to vaporize, releasing gas and dust that create a luminous cloud around the nucleus. This glowing coma, along with the trailing tail, can be seen from Earth as the comet travels across the sky.

The unpredictability and rarity of cometary appearances add to their allure. Historical records of comets have often been associated with omens and significant events, enhancing their mystical reputation. Modern science provides explanations for their orbits and behavior, yet the sight of a comet sweeping across the night sky remains a breathtaking and magical experience, connecting us to ancient astronomical traditions.

Meteor showers are another celestial spectacle that captures the imagination. These events occur when Earth passes through the debris left behind by comets. As meteoroids enter Earth's atmosphere and burn up, they create streaks of light known as "shooting stars." The intense brightness and frequency of meteors during a shower can create a dazzling display that seems almost supernatural.

The science behind meteor showers involves understanding the orbital paths of comets and the resulting debris fields. Despite this scientific knowledge, the experience of watching meteors streak across the sky—especially during a peak shower—can evoke a sense of wonder and cosmic connection. Meteor showers remind us of the dynamic and ever-changing nature of the universe.

Star clusters and nebulae offer a glimpse into the birth and evolution of stars, showcasing the stunning beauty of the universe. Star clusters, such as the Pleiades, are groups of stars that formed from the same molecular cloud and are bound together by gravity. These clusters often display intricate patterns and varying colors, creating a celestial tapestry that enchants stargazers.

Nebulae, on the other hand, are vast clouds of gas and dust where new stars are born. The intricate shapes and vivid colors of nebulae, such as the Orion Nebula or the Eagle Nebula, result from the interaction of stellar radiation with the surrounding material. These cosmic nurseries present a visual feast that highlights the beauty of star formation and the grand scale of the universe.

Eclipses, both solar and lunar, offer spectacular celestial events that captivate observers. A solar eclipse occurs when the moon passes between Earth and the sun, temporarily blocking out the sun's light. A total solar eclipse, where the moon completely covers the sun, creates an awe-inspiring experience as the sky darkens and the sun's corona becomes visible.

Lunar eclipses occur when Earth passes between the sun and the moon, causing the moon to darken and sometimes take on a reddish hue. The science behind eclipses involves understanding the orbits and alignments of celestial bodies. Yet, the sight of the moon casting a shadow over the sun or taking on a reddish tint remains a powerful and magical experience, connecting observers to the celestial mechanics that govern our world.

Planetary alignments occur when planets in our solar system appear to line up from Earth's perspective. These alignments can create striking visual arrangements in the night sky and offer opportunities to observe multiple planets at once. Such events highlight the dynamic nature of our solar system and the relative motions of its constituent bodies.

While planetary alignments are predictable based on orbital mechanics, their rarity and the alignment of planets create a sense of wonder. Observing planets lined up in the night sky provides a reminder of the vastness and complexity of the solar system, inviting us to contemplate our place within it.

The natural world is filled with intriguing and often perplexing examples of animal behavior that captivate our curiosity and imagination. From the intricate migration patterns of birds to the astonishing camouflage of cuttlefish, the diverse ways in which animals interact with their environment reveal a fascinating tapestry of life. This exploration into the enigmatic world of animal behavior highlights how these behaviors, while grounded in evolutionary adaptation and survival, often evoke a sense of wonder and mystery.

One of the most remarkable examples of animal behavior is migration. Many species undertake long journeys across continents or oceans, often with remarkable precision. The monarch butterfly, for instance, migrates thousands of miles from North America to central Mexico, following a route that spans several generations. The ability of these butterflies to navigate such vast distances and find their way to specific locations is a testament to nature's complexity and elegance.

Bird migration provides another example of this marvel. Birds like the Arctic Tern embark on a yearly migration that takes them from their breeding grounds in the Arctic to their wintering grounds in the Antarctic. This incredible journey, often spanning over 70,000 kilometers, is guided by a combination of environmental cues, such as the Earth's magnetic field and the position of the sun. The precision and endurance of migratory animals highlight an extraordinary adaptation that combines innate ability with environmental awareness.

Animal communication encompasses a wide range of behaviors used to convey information, establish social bonds, and coordinate activities. In many species, communication is complex and can involve vocalizations, visual signals, and even chemical cues. For example, honeybees use a "waggle dance" to communicate the location of food sources to other members of the hive. The dance involves specific movements that encode information about the direction and distance of the food, showcasing an advanced form of symbolic communication.

Similarly, elephants are known for their sophisticated vocalizations and infrasound communication. Elephants produce low-frequency sounds that can travel long distances, allowing them to communicate over several kilometers. This form of communication is used for coordinating movements, maintaining social bonds, and even warning of potential threats. The ability of elephants to convey such complex information through sound adds to the enigmatic nature of their social interactions.

Camouflage and mimicry are fascinating aspects of animal behavior that involve adaptation to avoid predators or increase hunting success. The cuttlefish, for example, is renowned for its ability to change color and texture to blend seamlessly with its surroundings. This remarkable skill allows the cuttlefish to remain hidden from predators and prey, showcasing an advanced form of camouflage.

Mimicry is another intriguing behavior, where animals imitate the appearance or behavior of other species to gain an advantage. The owl butterfly, for instance, has eye-like patterns on its wings that mimic the eyes of an owl. This visual mimicry helps deter potential predators by creating the illusion of a larger and more threatening animal. The complexity and effectiveness of mimicry strategies highlight the intricacies of evolutionary adaptation.

Tool use in animals is a behavior that reflects cognitive abilities and problem-solving skills. The use of tools has been observed in several species, including primates, birds, and even marine animals. One well-known example is the use of sticks by chimpanzees to extract termites from mounds. This behavior demonstrates not only the ability to use objects as tools but also an understanding of how to manipulate them to achieve a specific goal.

In the avian world, New Caledonian crows have been observed using tools to access food. These crows fashion sticks into hooks to retrieve insects from crevices, displaying an impressive level of ingenuity and planning. The ability of animals to use tools in such varied and complex ways underscores the cognitive and behavioral richness of the animal kingdom.

Social structures in animal groups reveal fascinating aspects of behavior and organization.

Many species exhibit intricate social systems that include hierarchies, cooperative behaviors, and role specialization. For example, in ant colonies, there is a highly organized division of labor, with different ants performing specific tasks such as foraging, nursing, or defending the colony. This complex social structure ensures the survival and efficiency of the colony.

Similarly, in wolf packs, social hierarchies are established through a combination of dominance displays and cooperative behaviors. The pack structure includes alpha individuals who lead and make decisions, while other members support hunting, caregiving, and territory defense. The intricate dynamics of social structures in animal groups highlight the diverse ways in which species organize themselves and interact with one another.

Reproductive behaviors in the animal kingdom are diverse and often involve elaborate rituals and displays. For example, the courtship displays of the peacock are renowned for their visual splendor. The male peacock spreads its vibrant tail feathers and performs intricate dances to attract females, showcasing a stunning display of beauty and elegance.

It was discovered by Sir Humphrey Davy, that this gas could be safely taken into the lungs, and that it was capable of supporting respiration for a few minutes. In making this experiment he was surprised to find that it produced a singular species of intoxication, which he thus describes: "I breathed," says he, "three quarts of oxide from and into a silk bag for more than half a minute without previously closing my nose or exhausting my lungs. The first inspiration caused a slight degree of giddiness. This was succeeded by an uncommon sense of fulness in the head, accompanied with loss of distinct sensation and voluntary power, a feeling analogous to that produced in the first stage of intoxication, but unattended by pleasurable sensations."

In describing the effects of another experiment, he says, "Having previously closed my nostrils and exhausted my lungs, I breathed four quarts of nitrous oxide from and into a silk bag. The first feelings were similar to those produced in the last experiment, but in less than half a minute, the respiration being continued, they diminished gradually, and were succeeded by a highly pleasurable thrilling, particularly in the chest and the extremities. The objects around me became dazzling, and my hearing more acute. Towards the last respiration the thrilling increased, the sense of muscular power became greater, and at last an irresistible propensity to action was indulged in. I recollect but indistinctly what followed; I knew that my motions were varied and violent. These effects very rarely ceased after respiration. In ten minutes I had recovered my natural state of mind. The thrilling in the extremities continued longer than the other sensations. This experiment was made in the morning; no languor or exhaustion was consequent, my feelings through the day were as usual, and I passed the night in undisturbed repose."

In the marine world, the reproductive behavior of seahorses is equally fascinating. In seahorses, it is the males that become pregnant, carrying the eggs in a specialized brood pouch. This unique reproductive strategy involves intricate courtship and mating rituals, as well as a complex physiological process that allows the male to nurture and release the offspring.

In giving an account of another experiment with this gas, Sir Humphrey thus describes his feelings: "Immediately after my return from a long journey, being fatigued, I respired nine quarts of nitrous oxide, having been precisely thirtythree days without breathing any. The feelings were different from those I had experienced on former experiments. After the first six or seven respirations, I gradually began to lose the perception of external things, and a vivid and intense recollection of some former experiments passed through my mind, so that I called out, 'What an annoying concatenation of ideas!'"

Another experiment made by the same distinguished chemist was attended by still more remarkable results. He was shut up in an airtight breathing-box, having a capacity of about nine and a half cubic feet, and he allowed himself to be habituated to the excitement of the gas, which was gradually introduced. After having undergone this operation for an hour and a quarter, during which eighty quarts of gas were thrown in, he came out of the box and began to respire twenty quarts of unmixed nitrous oxide. "A thrilling," says he, "extending from the chest to the extremities, was almost immediately produced. I felt a sense of tangible extension highly pleasurable in every kind; my visible impressions were dazzling and apparently magnified; I heard distinctly every sound in the room, and I was perfectly aware of my situation.

By degrees, as the pleasurable sensation increased, I lost all connexion with external things; trains of vivid visible images rapidly passed through my mind, and were connected with words in such a manner as to produce perceptions perfectly novel. I existed in a world of newly connected and newly modified ideas. When I was awakened from this same delirious trance by who took the bag from my mouth, indignation and pride were the first feelings produced by the sight of the persons about me. My emotions were enthusiastic and sublime, and for a moment I walked round the room, perfectly regardless of what was said to me. As I recovered my former state of mind, I felt an inclination to communicate the discoveries I had made during the experiment. I endeavoured to recall the ideas; they were feeble and indistinct. One recollection of terms, however, presented itself, and with the most intense belief and prophetic manner I exclaimed to Dr. Kinglake, 'Nothing exists but thoughts; the universe is composed of impressions, ideas, pleasures, and pains!'"

These remarkable properties induced several persons to repeat the experiment of breathing this exhilarating medicine. Its effects were, as might have been expected, various in different individuals; but its general effect was to produce in the gravest and most phlegmatic the highest degree of exhilaration and happiness unaccompanied with languor or depression. In some it created an irresistible disposition to laugh, and in others a propensity to muscular exertion. In some it impaired the intellectual functions, and in several it had no sensible effect, even when it was breathed in the purest state, and in considerable quantities. It would be an inquiry of no slight interest to ascertain the influence of this gas over persons of various bodily temperaments, and upon minds varying in their intellectual and moral character.

Although Sir Humphrey Davy experienced no unpleasant effects from the inhalation of the nitrous oxide, yet such effects are undoubtedly produced; and there is reason to believe that even permanent changes in the constitution may be induced by the operation of this remarkable stimulant. Two very interesting cases of this kind presented themselves to Professor Silliman, of Yale College, when the nitrous oxide was administered to some of his pupils. The students had been in the habit, for several years, of preparing this gas, and administering it to one another, and these two cases were the only remarkable ones which deserved to be recorded. We shall describe them in Professor Silliman's own words:—

"A gentleman, about nineteen years of age, of a sanguine temperament, and cheerful temper, and in the most perfect health, inhaled the usual quantity of the nitrous oxide, when prepared in the ordinary manner. Immediately his feelings were uncommonly elevated, so that, as he expressed it, he could not refrain from dancing and shouting. Indeed to such a degree was he excited, that he was thrown into a frightful fit of delirium, and his exertions became so violent, that after a while he sank to the earth exhausted, and there remained, until having by quiet in some degree recovered his strength, he again arose, only to renew the most convulsive muscular efforts, and the most piercing screams and cries; within a few moments, overpowered by the intensity of the paroxysm, he again fell to the ground, apparently senseless, and panting vehemently.

The long continuance and violence of the affection alarmed his companions, and they ran for professional assistance. They were, however, encouraged by the person to whom they applied to hope that he would come out of his trance without injury; but for the space of two hours these symptoms continued; he was perfectly unconscious of what he was doing, and was in every respect like a maniac. He states, however, that his feelings vibrated between perfect happiness and the most consummate misery. In the course of the afternoon, and after the first violent effects had subsided, he was compelled to lie down two or three times from excessive fatigue, although he was immediately aroused upon any one's entering the room. The effects remained in a degree for three or four days, accompanied by a hoarseness, which he attributed to the exertion made while under the immediate influence of the gas. This case should produce a degree of caution, especially in persons of a sanguine temperament, whom, much more frequently than others, we have seen painfully, and even alarmingly affected."

The other case described by Professor Silliman was that of a man of mature age, and of a grave and respectable character. "For nearly two years previous to his taking the gas, his health had been very delicate, and his mind frequently gloomy and depressed. This was peculiarly the case for a few days immediately preceding that time; and his general state of health was such, that he was obliged almost entirely to discontinue his studies, and was about to have recourse to medical assistance. In this state of bodily and mental debility, he inspired about three quarts of nitrous oxide. The consequences were, an astonishing invigoration of his whole system, and the most exquisite perceptions of delight. These were manifested by an uncommon disposition for pleasantries and mirth, and by extraordinary muscular power.

The effects of the gas were felt without diminution for at least thirty hours, and in a greater or less degree for more than a week. "But the most remarkable effect was that upon the organs of taste. Antecedently to taking the gas, he exhibited no peculiar choice in the articles of food, but immediately subsequent to that event, he manifested a taste for such things only as were sweet, and for several days ate nothing but sweet cake. Indeed this singular taste was carried to such excess, that he used sugar and molasses, not only upon his bread and butter, and lighter food, but upon his meat and vegetables. This he continues to do even at the present time; and although eight weeks have elapsed since he inspired the gas, he is still found pouring molasses over beef, fish, poultry, potatoes, cabbage, or whatever animal or vegetable food is placed before him. "His health and spirits since that time have been uniformly good, and he attributes the restoration of his strength and mental energy to the influence of the nitrous oxide. He is entirely regular in his mind, and now experiences no uncommon exhilaration, but is habitually cheerful, while before he was as habitually grave, and even to a degree gloomy."