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AUGUST, 1885.

VOL. III., No. 2.

Kosmos.



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KOSMOS.

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NATURE.

“God taught me to read ;
He gave me the world for a book.”—*Anon.*

“When a bad man looks at a flower
He sends a chill to its little heart.”—*Parker.*

“To him, who in the love of Nature
Holds communion with her visible forms,
She speaks a various language.
For his gayer hours she has a voice of gladness,
And a smile, and eloquence of beauty ;
And she glides into his darker musings
With a mild and healing sympathy
That steals away their sadness
Ere he is aware.” —*Bryant.*

“I have described so much, and I die without ever having seen Switzerland, and the ocean, and so many other sights ; but the Ocean of Eternity I shall in no case fail to see.”—*Jean Paul Richter.*

“When our fellows forsake and wound us, the sky and the earth, and the little blooming trees, open their arms and take us into them ; the flowers press themselves to our wounded hearts, the streams mingle in our tears, and the breezes breathe coolness into our sighs.”—*Richter.*

COMPOSITE PICTURES.

THE traveller who in his journeys happens to come into contact with a people different in appearance from those with whom he has before been associated or acquainted, is struck with the similarity of all members of the race, and he writes home a vivid description of the general features of the inhabitants. To him all Japanese, all Germans, or all Italians are alike, appearing to be of the same color and facial expression, each one a typical representative of the race. "The reason of this is that, by short contacts with many individuals, he receives upon his retina, and has recorded upon his memory, a composite picture emphasizing only what is common to the race, and omitting the individualities." The same fact will be observed on a more limited scale by the likeness of members of the same family being apparent to a stranger but unnoticed by an intimate friend. The stranger at first observes the characteristics common, and neglects the differences. Most of us know the inability of man to discriminate between members of the *genus infans*, all babies being exactly alike; and the consummate art of discrimination common to all women, all babies being unlike, especially each one's own. Familiarity reveals the differences and distinctions which are unobserved by men.

The discrimination and the perception of similarity in all these cases, and in many others that can easily be recalled, are due to the principle above quoted. When pictures or images of objects are presented for the first time to us in quick succession, those characteristics which are common to all will be most strikingly impressed upon the mind, and the composite picture thus formed will be one combining all the common characteristics of the group, while peculiar characteristics and individual specialties will be but lightly impressed and be hidden by the prominent features.

At first sight the Greek alphabet presents a mass of letters all alike, all crooked; but familiarity reveals the differences, and the crooked signs soon become as distinctive as the English

letters. To the beginner on the violin the sounds scraped forth are most wearisome in their monotony; but patience and perseverance train the ear to distinction of tone and the hand to delicacy of execution, and the much-abused, but ambitious youth may turn out a Paganini. To the average man the shades of the different colors are all alike; but to the practised eye of the æsthetic woman each shade has its individuality. And so might examples be multiplied *ad infinitum* in every field of sense, but especially in objects of sight.

The same results have been developed in another manner, new to most of us, but so interesting as to be worth noticing. If a photographer were to take a negative and receive the impression not of one person, but of all the members of the same family, in quick succession, one exactly over the other, the family characteristics would be obtained, and a picture obtained, not of anyone in particular, but of all in common—it would be a true family likeness. Such pictures have been taken, and are called “composite pictures.” A late number of *Science* contained four cuts of composite pictures, taken in Washington, at the meeting of the National Academy of Sciences. No. 1 is a picture of twelve mathematicians, and presents the face of a typical American mathematician; No. 2 is that of sixteen naturalists; No. 3 that of thirty-one academicians, bearing a strong resemblance to No. 1; and No. 4 is that of twenty-six field-geologists. One of the pictures is said to bear a strong resemblance to a scientist who has been dead for some years, and another is an exact picture of a member of a notable mathematical family.

The art is yet in its infancy, but is being developed. It will be of great service in presenting typical representations to students in many departments of science, and it may be the means of revealing likenesses in objects hitherto unnoticed. A strange feeling must come over one as he sees before him a picture, not only of himself, but also of his brothers, sisters, father, and mother, and possibly a striking peculiarity recalling some of the family heirlooms, antique sketches of one's ancestors. When

perfected and made available for general work, the photographer will find a new and most interesting class of work opened up before him and his department become a most invaluable aid to botany, biology, and ethnology.

The conception of general terms may be explained now quite readily upon the principle of these experiments. Some philosophers have strenuously maintained that general terms or ideas are innate, that man is born with the conception of a general tree, a general horse, and all the general objects. Others have as vigorously contended that general ideas have no reality whatever in man's conceptions, that he cannot be conscious of any such idea as tree in general, that whenever the word tree is presented some particular tree is suggested. Can we not deduce an analogy from the composite pictures produced by the presentation of similar or related objects to the negative? Through the eye there are, day after day, presented to the brain images of trees, for example, which make a clearer and more distinctive image with each successive impression. The common characteristics will be combined into a picture or image like no tree in particular, but combining the characteristics most prevalent in all, it thus forming a composite tree, or general image, being the representation of a general term.

OISEAU ROCK, UPPER OTTAWA.

A WED by thine awful front,
 Bulwark of adamant,
 Reverent we gaze;
 Conscious that thou wert reared
 By Him whose powerful word
 Chaos and darkness heard—
 Th' Ancient of Days.

Hail, grand primeval Seer!
 Firm has thy stand been here:
 Through many a storm.

Long ere the pyramids
 Lifted their dizzy heads,
 Far from these dark'ning floods
 Rose up thy form.

Brief is the reign of kings,
 Swift as an insect's wings,
 To thy long day :
 Frail all the works of men,
 Thrones rise and fall again,
 Schools live and wax and wane,
 All pass away.

But thou remainest still,
 Set in this lasting hill ;
 Yet, e'en thy form
 (Like that of many a sage)
 Bears now the marks of age,
 Scarred by the blast and rage
 Of many a storm.

Oh, may that firmer Rock
 Which ne'er can feel the shock
 Of Time's dire arm,
 Be still my hiding place
 Through endless coming days—
 There joyful songs I'll raise,
 Fearing no harm.

—S. N. M.

PEMBROKE, ONT., *June 1st, 1885.*

To add further interest to the above poem from the pen of a well-known Victoria student, we add a few words of description of this giant sentinel on the banks of the Ottawa.

Oiseau Rock is a perpendicular wall of Laurentian gneiss, four hundred and ninety-five feet high, on the Quebec side of the Ottawa River, about twenty miles West of Pembroke. On its top is a beautiful little lake which never dries, and is almost

transparent in its clearness. The steamer sails close to the base of the rock on her daily trips from Pembroke to Des Joachims, a distance of about forty-five miles.

The "pinnacle" near the village is a hill about three hundred feet high, from whose top the spectator can take in a range of about three hundred square miles.

The rock material is the well-known trap, and is easily traced through all the stages of decay to the dark brown soil which becomes valuable for agricultural purposes. The poplar, black birch, wild cherry, evergreen, ironwood, and moosewood, are the chief forest productions now found growing on this strange pinnacle.

On its peak is a large glacial boulder of crystalline limestone, which at present is seven feet high and twenty-seven feet and a half around. This gives over three hundred cubic feet of solid limestone. With a specific gravity of 3 as compared with water, the weight of the boulder is over sixty thousand pounds.

COLERIDGE.

MR. LOWELL, at the unveiling of a bust of the poet Coleridge, in Westminster Abbey, delivered a short address, which, for clearness of expression, beauty of simile, and charity of criticism, is worthy of the man honored and also of the man honoring. Not having space to reproduce the article at full length, we clip a few striking sentences from the report as given by the London *Times*:—

"I shall naturally trust myself to judge him by his literary rather than by his metaphysical achievement. In the latter region I cannot help being reminded of the partiality he so often betrays for clouds, and see him, to use his own words, 'making the shifting clouds seem what you please,' or, 'a traveller go from mount to mount through cloudland, gorgeous land.' Or sometimes I think of him as an alchemist in search of the philosopher's stone, and stripping the lead, not only from his own roof,

but from that of the parish church itself, to quench the fiery thirst of alembic. He seems never to have given up the hope of finding in the imagination some universal solvent, some *magisterium majus*, by which the lead of scepticism should be transmuted into the pure gold of faith, or, at least, persuaded to believe itself so."

"He owed much to his own sympathetic and penetrative imagination. This was the lifted torch (to borrow his own words again) that bade the starry walls of passages, dark before to the apprehension of even the most intelligent reader, sparkle with a lustre, latent in them to be sure, but not all their own. As Johnson said of Burke, he wound into his subject like a serpent."

"He was not exact any more than Chapman. The molten material of his mind, too abundant for the capacity of the mould, overflowed it in gushes of fiery excess."

"No doubt we have in Coleridge the most striking example in literature of a great genius given in trust to a nerveless will and a fitful purpose. But I think the secret of his doing no more in poetry is to be found in the fact that the judgment, so far from being absent, grew to be there in excess. His critical sense rose like a forbidding apparition in the path of his poetic production. I have heard of a military engineer who knew so well how a bridge should be built that he could never build one. It certainly was not wholly indolence that was to blame in Coleridge's case, for, though he used to say early in life that he had no 'finger industry,' yet he left behind him a mass of correspondence, and his letters are generally long."

"Descriptive poets generally confuse us with multiplicity of detail; we cannot see their forests for their trees. Coleridge never errs in this way. With instinctive tact he touches the right chord of association, and is satisfied, as we also are. I should find it hard to explain the singular charm of his diction, there is so much nicety of art and purpose in it, whether for music or meaning. Nor does it need any explanation, for we all feel it. The words seem common words enough; but in the

order of them, in the choice, variety and position of the vowel sounds, they become magical. The most decrepit vocable in the language throws away its crutches to dance and sing at his piping."

"Coleridge's words have the unashamed nakedness of Scripture, of the Eden of diction ere the voluble serpent had entered it."

"The sun's rim dips, the stars rush out,
At one stride comes the dark;
With far-heard whisper, o'er the sea,
Off shot the spectre barque."

BLOOD-WONDERS.

BY PROF. LEONARD COHN, OF BRESLAU UNIVERSITY, GERMANY.

II.

SO much for the colors which owe their origin to the transportation and deposit of meteoric and other dusts. But of far greater natural and historic interest are those produced by microscopic organisms. If such a color is examined with the naked eye, it appears entirely homogeneous, bearing in it no characteristic that would point to the presence of plant or animal life; so that it is utterly impossible to distinguish it from an inorganic color resting upon chemical relations. The microscope first revealed the fact that these colors are due to an innumerable crowd of living organisms, which belong indiscriminately to the plant or animal kingdom, and which are of the most varied shape; while they have this property in common, that each individual, though invisible to the naked eye, yet bears within it that color which is reflected, but with much greater intensity, by the multitude.

A characteristic of these colors, and one which powerfully appeals to that love which men have for the wonderful, is their quick, often sudden appearance and disappearance, which is owing to the peculiar laws of development of these lower orders

of creation. It rests, in the first place, upon the short duration of the lives of individual beings, which in a few hours have completed a whole life's course. Hence in a brief space of time a single individual may have increased in geometrical proportion through several generations. It rests, in the second place, upon the dependence of the prosperity of these creatures upon certain external and indeterminate influences, which may increase their multiplication to the incredible, whilst a reverse of the same often annihilates whole generations at a stroke.

The kind of color depends naturally upon the color which the individual organisms possess. If these are colorless, the whole multitude will appear white through the reflection of the light. Most commonly there is, especially among microscopic plants, a green coloring, which can be referred to the chlorophyl, which is of such universal occurrence in the plant kingdom. This is also found in numerous microscopic animals of the class of *Infusoria*; so that both equally contribute to the green coloring of the water, as also to the production of green coatings on the surface. But if they are red, and have increased, as is frequently the case, to such immense masses as entirely to cover large surfaces, then they produce a uniform red, sometimes like to carmine, but more usually to blood, which often suddenly changes and again vanishes; and to the uninitiated, who cannot explain this occurrence, must present the appearance of a dread miracle.

In small lakes and fish-ponds certain red *Infusoria* (*Euglena sanguinea*) increase to such immense numbers that, when the sun attracts them to the surface, the water becomes covered through them with a slimy red coating, as if blood had been poured out over it. And so it was considered in innumerable instances in earlier times, and always looked upon as an ominous and dreadful event. This *Euglena sanguinea* is one of the smallest, as well as one of the neatest, creatures which can be imagined. It is like to a little fish with a sharp tail, and is painted a beautiful green and red, while a scarlet-red eye glitters in a head as clear as crystal. Yet this little animal, so

small that four of them placed side by side would not make up the width of a common hair, has often exerted an absolute sway over whole nations, and, as history shows, dismayed even warlike armies in the field.

In large seas a similar blood-red color extending over a wide area is produced by microscopic *plants*. These are fine and delicate fibres of a purple-red color, of the thickness at most of a single silk thread; and, in spite of their plant nature, gifted with the power of crawling hither and thither in the water, and of oscillating like a pendulum; hence their name—*Oscillaria*. These thread-like plantlets grow in millions at the bottoms of many seas and cover them with a thick down; but the sunshine exercises over them, as over all other plants, a peculiar attractive power, and causes them to rise up from the bottom of the water and collect upon the surface, as it were in order to sun themselves. The water then appears, through these *Oscillaria*, as if it were covered with foaming purple or dark blood. If the sunshine ceases, the plants sink again to the bottom, and the red color of the water vanishes. If the sun returns again, the sea will presently resume its bloody color. Not only was this phenomenon observed from the earliest to the latest times, but, as we remarked before, it is also not improbable that the Red Sea owes its name to these *Oscillaria*. The renowned naturalist, Ehrenberg, found, in the winter of 1823, an inlet of this sea which was covered as far as the eye could reach with a bloody foam, which was found, on microscopic investigation, to consist of innumerable bunches of these diminutive plants. Another account of this red color in the same sea was given later by a French traveller, Dupont, who had not previously heard of Ehrenberg's discovery. Since that time similar colors, caused by microscopic plants, have been observed in other seas in many parts of the world—in the Chinese Sea and in the Indian Ocean, on the coasts of California, as well as on those of Portugal. At the last-named place the sea was colored over a space of six square miles, and that by plants which were scarcely the one six-hundredth part

of a line in breadth, and of which, in each cubic line of seawater, there must have existed upwards of a hundred million individuals (*Protococcus atlanticus*).

Not only on the sea, but also on land, especially on walls and rocks, microscopic red-colored plants grow, the most common of which are known as bloody Pamella (*Pamella cruenta*). These have the peculiarity of drying up in hot weather to an almost imperceptible black crisp, which the inexperienced observer readily overlooks. In moist air, on the contrary, and in rain, they quickly swell out into a red jelly, which presents an appearance not unlike to that of thick blood. The common crowd, surprised by the extraordinary character of this appearance, at once concludes that it is blood rained from heaven, or that the earth has sweated blood.

One of the most remarkable appearances of which the old chronicles make mention, and, at the same time, one which has had the greatest influence upon the history of mankind, has only of late years found its natural explanation; I refer to the so-called *wonder of blood on food*. Already, at the time of Alexander the Great, according to the accounts of historians, this phenomenon was very widely observed, and was supposed by all to be followed by the most important and fatal consequences. For instance, when this great commander was besieging the city of Tyrus, a panic spread in his army because blood, as it was supposed, was found in the bread. The interpretation of the priest, however, quieted the soldiers. In case the blood had appeared on the outside of the bread it had then been ominous of misfortune to the besiegers, but since it was found within, it prophesied the destruction of the city. About the same time one hundred and seventy women were executed at Rome, because blood had been observed in the bread during a pestilence. They were pronounced guilty, because, as it was said, they had poisoned the bread and thereby caused the epidemic.

But, in the Middle Ages, a special importance was first uniformly attached to these phenomena, when the Roman Catholic

Church adopted the doctrine that by the consecration of the priest the Host was changed into the real body of Christ. Indeed, it is said that the general acceptance of this doctrine, which was so much combated in the Church itself in earlier times, is attributable to a wonderful circumstance which happened at Bolsena in the year 1264. When, namely, a priest at that place, who had hitherto doubted the reality of the transubstantiation, was blessing the food provided for the evening meal, there fell drops of blood upon his linen gown. This was looked upon as a decisive proof of the doctrine of transubstantiation, and for the glorification of the same, Pope Urban IV. ordained in the same year the feast of Corpus Christi, which, as is well known, is celebrated even to-day in the Roman Catholic Church with great ceremony. Since then the appearance of blood in bread, and especially in the consecrated wafer, has attracted the closest attention, and has been, for the most part, considered as a miracle pointing to some terrible crime.

The Jews, especially, who in the Host have ever been charged with the persecution and suffering of Christ, have, on numberless occasions, become propitiatory offerings. As early as the year 1290 it is said that a woman in Paris took the wafer from her mouth after communion and conveyed it to a Jew in consideration of a small bribe. The Jew boiled the wafer in water and pierced it, whereupon the water was colored entirely red. He afterwards confessed the deed and was burned, and from his house was built the church *Salvatoris del bolgente*.

In 1453 the Jews at Breslau bought nine hosts which a peasant had stolen from the church at Langenwiese; when the elders laid them on a linen cloth and struck them with wands, so much blood flowed from them that it colored the cloth almost entirely. At the instigation of a Franciscan, the Jews at Breslau were, on the second of May, imprisoned and tortured, and forty-one of them were burned together with the peasant; the rest were condemned to perpetual exile, while their goods were confiscated. Shortly after, a similar course of procedure was instituted against the Jews in several other places in this region. Only a

short time before, on account of a similar crime, the Emperor of Austria had on one day ordered two thousand Jews to be enclosed in a prison in order to be burnt alive.

Until the latest times all these marvellous accounts, found in the chronicles, of the appearance of blood on bread, and especially on the consecrated wafer, instances of which might be multiplied indefinitely, were regarded as pure deception; nor can it be denied that, in numerous instances, fanaticism, avarice and envy contributed in no small degree to the invention of an unmeaning fable, which had not the slightest foundation in fact. Yet there still remain some examples in which the presence of blood in bread was supposed to have been actually proved, and for these no natural explanation could be given until at Padua, in 1819, at Berlin, in 1848, and afterwards in many other places, accurate observations were made, which prove that, in reality, on certain kinds of food, especially on bread, a color bearing a striking resemblance to that of blood is frequently observed.

In August, 1819, there were found, on a plate of bread, at the house of a wealthy farmer near Padua, red spots resembling drops of blood. The bread, which was supposed to be spoiled, was thrown away; but on the following day the specks appeared on new bread. The priest was sent for to bless the place, but the colors grew daily more pronounced. Fasts, prayers, sacraments were in vain. Presently blood appeared on all kinds of food. Thousands flocked to the famous place, and were almost unanimously of the opinion that the circumstance was a punishment from God for the withholding of corn at the time of the last famine. However, an unprejudiced inquirer (Sette) showed that the colors consisted by no means of blood corpuscles, but were the product of vegetable organisms, and were closely related to the well-known, but sometimes strangely colored moulds, which appear on old and decomposing vegetable foods. By producing the same color in the house of the priest, he overcame the opinion that it could only occur in the house of one who had been guilty of an offence, and when it appeared later in the houses of a hundred different persons, the

people at length gave way to the conviction that they had in this case to do with a phenomenon, striking and rare, to be sure, but yet by no means supernatural or portentous. They even attempted to utilize the brilliant red coloring matter in the dyeing of silks, but it disappeared in January, 1820.

The most accurate information which we possess concerning the nature of these phenomena we owe to the renowned naturalist to whom I have already had occasion to refer—Ehrenberg—who, in the year 1848, through the aid of the microscope, revealed certain facts which throw considerable light on these hitherto mysterious appearances. He observed that the red colors are readily propagated in bread and many other foods, and there collect themselves gradually into lumps of red jelly, which, when moist, resemble thick or curdled blood; but, when the moisture has left them, present the appearance of black, dried-up blood. Under the microscope, Ehrenberg perceived that the red substance consisted of a colorless fluid in which innumerable minute red corpuscles reside. These were found to possess a trembling motion, from which fact Ehrenberg was induced to consider the corpuscles as animalculæ, and to apply to them the name of *wunder* or *purpur-Monaden* (*Monas prodigiosa*), while other scientists, as remarked above, look upon the red coloring matter as composed of fungous plants. On account of the infinitesimal dimensions of these organisms (there are upwards of thirty millions on the space of a square line), the question can scarcely be decided. This much, however, is certain, that these colors may be produced whenever foods are closed up in moist air; and this conclusion seems to be further corroborated by frequent recurrence of these phenomena in connection with the sacramental bread, which is usually kept in damp rooms in churches, where the conditions are specially favorable to the generation of the *Monas prodigiosa*.

In general, however, these phenomena must be considered among the rarer, although they have on different occasions, of late years, been produced artificially, and, among other places, in our own laboratories in Breslau.

According to a passage of Lucian, it is not improbable that the well-known Pythagorean prohibition of the use of beans as an article of food was called forth by the fact that, on cooked beans which were let stand, bloody drops were occasionally observed. Nor is it impossible that the Jewish custom of covering all foods on four particular days of the year, in order, as they said, to prevent drops of blood coming from heaven from falling upon them, may be referred to an actual observation of some of these phenomena. That the red corpuscles of the *Monas prodigiosa*, and the red microscopic plants and animals in general, should lend to water such a striking similarity to blood, must be considered all the less remarkable when we remember that even blood is, in itself, a liquid clear as water, and that it receives its coloring from an innumerable multitude of microscopic red balls which float within it, the so-called blood-corpuscles.

In this way has science succeeded in establishing as simple, every-day natural phenomena, all those marvellous appearances by means of which dim-eyed superstition and darker fanaticism in former times pursued their bloody work.

Thereby has science removed the wonder in which these phenomena were formerly wrapt. But, in its stead, the closer investigation of that invisible world has unveiled to us numberless and truly wonderful secrets. Here reigns a boundless and manifold life; the most beautiful forms and most remarkable developments appear in every quarter and at every moment. In such incalculable numbers are these minute creatures generated that their remains have a great share in the formation of the earth's crust. They build whole mountain-ranges; and with slow and noiseless, yet all-availing assiduity, do they rear, on the deep foundations of the sea-bottom, structures which, for grandeur of scale, put to shame the most elaborate works of man. Thus has Natural Science revealed to us a more genuine wonder than the superstitious fancy of earlier ages, which attached itself to superficial resemblances, could ever comprehend.—*Translated from the German by W. J. Chisholm, B.A.*

THE ORIGIN OF LIFE.

DARWIN does not discuss this subject in his great work, "The Origin of Species," but there rather admits the miraculous origin of life. On the last page of that work he says:—"There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one; and that, while this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning, endless forms most beautiful and most wonderful have been, and are being, evolved."

But though this concession—for we must regard it as such—is from Darwin, it is not of the Darwinists. It marks their first point of attack on their opponents. Those who believe that the nature of life requires for it a miraculous origin are by them alternately pitied and abused.

Schmidt declares that, in the above-quoted passage, Darwin has certainly been untrue to himself; and he agrees with Zöllner in saying: "The hypothesis of an act of creation (for the beginning of life) would not be a logical, but a merely arbitrary, limitation of the causal series, against which our intellect rebels by reason of its inherent craving for causality. . . . To hold the beginning of life as an arbitrary act of creation is to break with the whole theory of cognition."

Huxley speaks of a certain "good kind of people" who believe "that vital phenomena, and especially all questions with regard to the origin of vital phenomena, are questions quite apart from the ordinary run of enquiry, and are by their very nature placed out of our reach," and who say "that all these phenomena originated miraculously, or in some way totally different from the ordinary course of nature, and that therefore they conceive it futile, not to say presumptuous, to attempt to enquire into them." (Origin of Species.)

He then relates the story of Diogenes and the Sophist who demonstrated to him that all motion is an impossibility, and how Diogenes refuted him by getting up and walking round his tub.

Here he seems to admit his inability to meet the theoretical objections of this "good kind of people"; but he takes refuge in saying: "To all such sincere and earnest persons, I would only say that a question of this kind is not to be shelved upon theoretical or speculative grounds."

After the use of such language, we would naturally expect him to "get up and walk round his tub," by fabricating some plant or animal, or by furnishing evidence that, sometime in the past, they fabricated themselves; or, as Dawson drolly says, "took upon themselves the responsibility of living."

Huxley says we may have two kinds of evidence concerning the origin of life—*historical* and *experimental*. As to the former, he comes to the conclusion that the rocks furnish no traces of the first-created of living beings. With regard to the latter, we can probably not do better than quote his own words. He says: "I turn to the experimental side to see what evidence we have there. To enable us to say that we know anything about the experimental origination of organization and life, the investigator ought to be able to take inorganic matters, such as a carbonic acid, ammonia, water, and salines, in any sort of inorganic combination, and be able to build them up into proteine matter, and that proteine matter ought to begin to live in an organic form. That nobody has done as yet, and I suspect it will be a long while before anybody does do it. But the thing is by no means as impossible as it looks; for the researches of modern chemistry have shown us—I won't say the road towards it, but, if I may so say, they have shown us the finger-post pointing to the road which may lead to it."

Now, it seems to us that this is rather slight evidence on which to rest the conviction that life originated in obedience to natural laws. And it is our purpose here to give our reasons for believing that this can not possibly have taken place.

There are some things which, in their very nature, are infinite. Space and time are examples of these. We cannot possibly think of their being otherwise. To them there is no limit set—no boundary fixed. If we find it difficult to think of

unlimited space, it does not simplify our idea of it to think of a boundary in the far distance. For if there be a boundary that boundary must be of unlimited thickness, or there will be empty space beyond it. But now we have rendered our conception only the more complex, for we have to think both of unlimited space and of matter filling it. To think of time as limited is equally impossible.

Such, also, is the nature of life. Life is infinite in two respects. We believe that the soul has eternal (*i. e.* infinite) life. But it is in another sense that we wish to consider the *infinity of life*.

There is implanted in every living organism, when fully developed, a principle or energy affording it the means of propagating to infinity the race of which it is a member. This is an attribute of *all* life. And if we accept the theory of evolution, the thought of it is only the more wonderful. For then it is only rational to believe that there was once, conserved in a single speck of protoplasm, the energy which was to convert, or the principle which was to transform energy to convert, incalculable masses of inorganic matter into active bioplasm, to tinge the arctic snows with red, to cause earth, air, and water to teem with busy millions, to cover the mountain-side, and pave the ocean bed with tale-telling rocks—"the autobiography of the world"—to cause islands to spring up, dotting the face of the deep, to rear magnificent forests, and people them with their savage denizens; and, in its ever onward course, culminating in man, to cut down the forests and destroy their fierce inmates, to cultivate beautiful farms, to build cities, towers and pyramids, and, above all, to improve, govern and respect himself.

Wonderful it is to contemplate the development of the life-germ into the speaking, thinking man. But how incomparably more wonderful is the thought that from this germ may be developed an individual having power to perpetuate *to infinity* the race of which it is a member.

Small things may indeed grow to very great ones. The

minute ball of snow may, in the descent of a mountain, swell into the overwhelming avalanche. But now its power is gone. It has reached the foot of the mountain. There it lies—helpless and passive. Its energy—consisting merely in its position—is spent. It is dead.

Not so with the little germ. While it is growing—not swelling—into a mature organism, it is developing the power of producing others of its kind. And these will be of such a nature as again to produce others, and so on, and on, in unlimited and beautiful succession, until a single pair of individuals may have become the ancestors of a host numbering to millions of millions, as is, no doubt, already the case with such animals as the ant and moth.

Let us take as an example a kernel of wheat. Viewing it with respect to its possibilities, it is to us not merely a berry of starchy matter, but an inexhaustible storehouse of energy which may unfold through all the ages for the good of all.

But this energy is of a peculiar kind. It is as though we had before us a small wooden box, inside of which, when mature, are disclosed a number of smaller boxes. Placing beside these a supply of wood, they proceed to grow and develop, until, themselves opening, they each expose a similar number of small boxes, which, being supplied with wood, behave themselves just as their parent boxes. In other words, life is infinite; or, a living being contains in it that which is capable of development into its posterity through all eternity, should the conditions of life continue.

Is it at all possible that any quantity of material should arrange itself, or even be arranged, into such a magic box, unless directed by an omniscient mind—a mind not trammelled by the finite? In other words, can the infinite form itself, or be formed *by* the finite *from* the finite? We think not. We conceive it to be absolutely impossible. And, accordingly, we conceive it to be absolutely impossible that at any time life has originated under the blind guidance of natural laws.

An illustration may not be out of place. In order that a

pendulum, when once disturbed, may forever continue to swing, it is only necessary that the force of gravity act upon it. But that force is powerless to cause the pendulum to begin to oscillate. Are not the combined forces and resources of nature, while quite competent to sustain life, equally incapable of causing its origin?

J. N. FISH.

NOTES.

MR. E. R. L. GOULD, B.A., '81, who has for the past year been Professor of History and Economic Science in the Washington City College, has been appointed by the Secretary of the Interior of the United States a special agent of the Labor Bureau, to investigate in Belgium and Germany the causes of commercial depression and the possible methods of prevention. We hope later on to give some results of his work.

THE Committee in charge of the Ryerson Memorial Fund have issued a small pamphlet containing a statement of the fund. So far there is collected \$4,082.42, all of which, except some \$65, has been collected from the public schools of the Province. It is proposed to erect a bronze statue as soon as the fund is increased to \$6,000. The Chairman of the Committee is Dr. Hodgins; the Secretaries, Messrs. Jas. L. Hughes and Jas. Carlyle. All contributions should be addressed to Mr. Walter S. Lee, Treasurer, 70 Church Street, Toronto.

"ESSAYS, SPECULATIVE AND PRACTICAL." By Herbert Spencer. Price 15 cents, post free. J. Fitzgerald, Publisher, 393 Pearl Street, New York. "The disquisitions by the foremost English philosopher contained in this volume are among the best he has written; they will serve, for those who are unfamiliar with Mr. Spencer's writings, as a pleasing introduction to his philosophic system, and as admirable specimens of his literary style. They treat of 'Morals and Moral Sentiments,' 'Specialized Administration,' 'The Collective Wisdom,' 'Reasons for Dissenting from the Philosophy of Comte.'"

FRENCH POETS OF CANADA.

IN the summary review of the Literature of French Canada, which I had the honor of submitting to you at the general meeting of last year, I sketched the prominent position held by the French poets among their colleagues who cultivated the other fields of oratory, history, romance, polemics, essays and journalism. I might have added that their position was also the most ancient, in accordance with the general principle that all literatures have their beginnings in song. The first regular and consecutive poem that we find dates back as far as 1732, when Jean Taché published his "Tableau de la mer," written in well-sounding Alexandrines. Taché was a versatile man,—notary, tradesman and shipper,—and his descendants, inheritors of an honored name, have been faithful to his traditions. At about the same time there appeared a serio-comic poem, modelled somewhat on Boileau's "Lutrin," and treating of certain ecclesiastical controversies and troubles that occurred in 1728. The author was Abbé Etienne Marchand, curé of Boucherville from 1732 to 1774, and, as we shall see later on, he too can boast of a namesake who has successfully cultivated the comic muse. After the publication of this work, there is an interval of silence covering exactly one hundred years. This was the momentous epoch of Indian wars, of the conquest, of the American invasion, and of the bitter struggle for constitutional rights that raged betwixt the victors and the vanquished. Epigrams, satires and political dithyrambs abound, chiefly after the establishment of a journal, *Le Canadien*, in 1806; but nothing has come down to us of that serene character which peace and prosperity alone can produce. It was only in 1830 that a volume of epistles and miscellaneous poems was put forth by Michel Bibaud, who may be termed the father of French Canadian verse, as he was the first of French Canadian historians. The work is very unequal, as are all the other productions of this eccentric writer, but it is not at all devoid of interest.

Singularly enough, it was another historian who followed in his footsteps, and Garneau's superior talents at once gave a form and inspiration to the national poetry. All the compositions of this gifted man, the first of which appeared in 1835, are of a high order of merit, but I shall mention only his "Dernier Huron," because it contains an image of the most original and pathetic beauty. The poet represents the last of the Hurons standing on a hillock and marshalling the phantoms of his lost warriors. Suddenly, he fancies that a shadow passes before him, and the bones of the buried braves seem to rattle under his feet, and the Indian blood bubbles in his veins. But, alas! it was all a mockery; at the foot of the hill he saw only the scythe of the mower:—

"Perfide illus'on! Au pied de la colline
C'est l'acier du faucheur!"

It is an exquisite contrast. Garneau derived the idea of his poem from a painting by a native artist, Plamondon of Tariolin, the last of the pure-blood of the Hurons of Lorette. To this picture was awarded the first prize in a competition established by the Literary and Historical Society of Quebec, in 1838, and was purchased by Lord Durham, at that time Governor-General.

The biographer of Garneau may be regarded as his poetical successor. M. Chauveau, the distinguished President of the Royal Society, has not produced much verse, although I learn with pleasure that he is at present bestowing his leisure upon an elaborate poem of a religious character; but the little that we have is worthy of himself, and I can assign no higher praise. His ode (1861) to Donnacona, the chief of a Quebec tribe, treacherously captured and conveyed to France by Jacques Cartier, is full of spirit, and the first stanza presents a noble picture:—

"Stadaconé dormait sur son fier promontoire;
Ormes et pins, forêt silencieuse et noire,
Protégeaient son sommeil.
Le roi Donnacona, dans son palais d'écorce,
Attendait, méditant sur sa gloire et sa force,
Le retour du soleil."

Garneau and Chauveau bring us down to 1850, when the greatest of French-Canadian poets steps upon the scene and opens the galaxy that has gone on multiplying and brightening until our day. Octave Crémazie, born at Quebec in 1830, followed the calling of a bookseller. His poems appeared between 1852 and 1862, in which year he was involved in financial ruin and took refuge in France, where he died of a broken heart in 1878. In this place, last year, I expressed the hope that a national monument would be set up to the memory of Crémazie in the shape of a complete edition of his works. I am pleased to say that my hope has been fulfilled by the publication at Montreal of a splendid volume, which every Canadian lover of letters should have on his book-shelves. The character of Crémazie's inspiration is sublimity. His thought soars on broad and sweeping pinions; his images are grand and salient; and, when he strikes the minor key of national regret and disappointment, the effect is deeply pathetic. I am convinced that, if his life had not been blasted, and he had continued to write in freedom of mind and amid the associations of his childhood and native land, he would have created poems not unworthy to rank with those of the best writers of contemporary France. The "Chaunt of the Old Soldier," composed on the arrival, in 1855, of the French corvette, *La Capricieuse*, sent out by Napoleon III. to open commercial relations between France and Canada, is simply a masterpiece. The blind and tottering veteran, hearing the sound of cannon on the river, and fondly imagining that it heralded the return of the French fleet, is led to the ramparts by his son, and breaks out in a thrilling lamentation on being told that it is the Red Cross of England streaming from the mizzen. But his confidence remains unshaken, and day after day he repairs to the same spot, in the hope that his old companions in arms will yet come back from over the sea. The time arrives at last when he is no longer seen on the heights, and we are told that he has died in the arms of his son, murmuring: "They will return, but I shall not be there." Then we have the poet's outburst:—

“ Tu l’as dit, ô vieillard ! La France est revenue !
 Au sommet de nos murs, voyez-vous dans la nue,
 Son noble pavillon dérouler sa splendeur ?
 Ah ! ce jour glorieux, où les Français, nos frères,
 Sont venus pour nous voir, du pays de nos pères,
 Sera le plus aimé de nos jours de bonheur.”

And a shadow is seen on the wall, wavering in the breeze. It is the old soldier standing at his post to assist at the glorious scene. Nor he alone.

“ Tous les vieux Canadiens moissonnés par la guerre,
 Abandonnent aussi leur couche funéraire,
 Pour voir réaliser leurs rêves les plus beaux.
 Et puis on entendit, le soir, sur chaque rive,
 Se mêler, au doux bruit de l’onde fugitive,
 Un long chant de bonheur qui sortait des tombeaux.”

Equally powerful and majestic is “*Le Drapeau de Carillon*,” an ode addressed to the lily-flag of Royal France which floated on the main bastion of Fort Carillon, or Ticonderoga, on the day when Montcalm achieved a brilliant victory over Abercrombie and his gallant Highlanders. That flag is religiously preserved at Quebec by M. Baillaigé, who is expected to display it in the procession of St. Jean Baptiste Day, which will take place in Montreal on the 24th of June. Superior even to the two pieces just mentioned is the “*Promenade des Trois Mois*,” a weird fantasy, wherein the dialogue between the worm and the corpse is replete with terrible thoughts of death and the dread Hereafter.

Next in merit to Crémazie, and *hæud longo intervallo*, is M. Fréchette, President for the year of the French Section of the Royal Society. Of all Canadian poets he is the best known to English readers, because of his adequate knowledge of our language, his social relations with our people, and the circumstance of his having received the Monthyon award of the French Academy, an honor somewhat akin to the Newdegate Prize. M. Fréchette is a very careful writer, chiselling his verses according to the most approved Horatian rule. The flowers of his youthful genius were gathered in a small volume,

entitled "Mes Loisirs," which at once established his reputation. This was followed by "Pel Mel," a work of richer promise and riper fruit. The equipment with which he presented himself before the French Academy was two little collections appropriately called "Fleurs Boréales" and "Oiseaux de Neige." He has written constantly ever since, and I happen to know that he has ready two important volumes, containing a series of narrative poems designed to celebrate the principal events of the History of Canada from the beginning of the Colony. The poet excels in this species of composition, and from the few examples lately published, such as "1870," "Notre Histoire, Le Drapeau Fantôme," and others, we may expect the most valuable contributions yet made to the Literature of French Canada. M. Fréchette plays with success on many notes. His verse, always perfect in form, breathes strength and tenderness, while the thought is always thoroughly limpid. He is a master of the sonnet, in which frame some of his prettiest conceits are enshrined. Among his lyrical efforts "La Découverte du Mississippi," is, perhaps, the best, and I think that he is himself of that opinion. His vision of the romantic figures that passed along the mighty river in the heroic days of discovery and exploration is very poetical, and the contrast between the ancient wilderness and the progress of to-day is set forth with power. Victor Hugo could not have written more splendid strophes than these:—

"Où, deux siècles ont fui. La solitude vierge
N'est plus là ! Du progrès le flot montant submerge
Les vestiges derniers d'un passé qui finit.
Où le désert dormait grandit la métropole ;
Et le fleuve asservi courbe sa large épaule
Sous l'arche aux piliers de granit.

Plus de forêts sans fin ; la vapeur les sillonne !
L'astre des jours nouveaux sur tous les points rayonne ;
L'enfant de la nature est évangélisé ;
Le soc du laboureur fertilise la plaine,
Et le surplus doré de sa gerbe trop pleine
Nourrit le vieux monde épuisé."

M. Pamphile Lemay now deserves our attention. In 1865 he published his "Essair Poétiques," which included his remarkable translation of Longfellow's "Evangeline," revised and re-edited by him in 1870. This work is sufficient of itself to establish any writer's reputation. In 1867 appeared "La Découverte du Canada," a poem which was crowned by Laval University and further honored by a gold medal. In 1869, his "Hymne National" deserved another gold medal. In 1875, "Les Vengeances" saw the light. These poems are all more or less lengthy, but in 1879 M. Lemay collected his shorter and more fugitive pieces in a book, entitled "Une Gerbe." He has since given forth a volume of "Fables," replete with a quiet philosophy. The qualities of this poet's talent are grace and tenderness. His versification is always correct, his diction chastened, and his imagery well balanced and refined. He has an eye for Nature, and is particularly happy in the treatment of domestic and religious subjects.

M. Benjamin Sulte has, of late, neglected the Muse in favor of historical research, but his single volume, "Les Laurentiennes," is quite sufficient to ensure him a prominent place among the French poets. He excels in song writing, and his work has a distinctly national stamp from the circumstance that he gives expression to the thoughts and aspirations of the people. Among his best efforts I may mention "La Patineuse," "Les Fondateurs" and "La Cloche."

It is a curious instance of the blending of races in the Province of Quebec, that one of the rising young French poets should bear the thoroughly English name of William Chapman. His contribution is denominated "Les Quebecquoises," which, although rather juvenile here and there, even in the author's own estimation, is a production full of possibilities and promise. M. Chapman is a conscientious, painstaking writer, as severe to himself as any critic could be; and these qualities, supporting undoubtedly original talents, must secure the young poet a brilliant future. I would particularly call attention to his odes on matters of historical and national interest, such as those to

“Dollard des Ormeaux,” “La Bataille de Ste. Foye,” “Chateauguay” and “Cadieux.”

Another poet with a foreign name, a good round Irish name, is James Donnelly. From a line in his impassioned address to Ireland, I should fancy he was born in the Emerald Isle. If so, his mastery of the French language, and his skilful handling of the intricacies of French versification, are remarkable. M. Donnelly has the poetic instinct, and it is a pity that he does not produce more.

Several clergymen figure among the poets of French Canada, but I have room for the mention of only one, Abbé Gingras, *curé* of St. Edouard de Lotbinière, in the district of Quebec. The very title of his little volume is poetic—“Au Foyer de mon Presbytère.” The Abbé writes rapidly and is not sufficiently addicted to the use of the file; but he has a fresh, un-hackneyed turn of mind, and his sentiments are truly elevated. As might be expected of a celibate priest, he treats of subjects that are out of the common, and is debarred from touching on that tender passion which is the most poetical outcome of the human heart. His work has, therefore, the enforced advantage of novelty, of which he makes abundant use. His thoughts on the churchyard and on a child dying without baptism are original and awe-inspiring.

M. Félix Marchand, fellow of the Royal Society and member of the Provincial Parliament for the county of St. Johns, has devoted himself almost exclusively to comedy, both in prose and verse. Of the first I need not speak, except to say that his work evinces a knowledge of human nature, a gift of gentle satire, and a sense of sly humor, which readily raise it out of the groove of the commonplace. These qualities are heightened when presented in metrical form. “Les Faux Brillants” is a comedy in five acts, and “Un Bonheur en attire un Autre” is another in one act. Both of them are very happy conceptions, and the ravelling and unravelling of the amusing plot in both cases display an amount of technical skill rarely to be met with in this very difficult kind of composition.

The number of minor poets, whose works are more or less ephemeral and cast in varying degrees of excellence, is very large, and the bare enumeration would fill a lengthy paragraph. M. Sulte has counted no less than 175 names. These writings were originally consigned to the columns of newspapers or the pages of magazines, and have never been collected except on one or two occasions. Among the writers of this class I may cite Eustache Prudhomme, formerly a notary of Montreal, who published many elegant pieces some twenty years ago, but has since gone out of sight. Judge Routhier, one of the best prose writers in this province, has also published a number of poems, the Ode on Canada in the nineteenth century being specially worthy of note. J. Lenoir, of Montreal, was cut off in his prime, just as his talent was maturing. His apostrophe to the Church of Notre Dame of Montreal is set in broad lines. Then we have Fiset, of Quebec; Poisson, of Arthabaska; Alfred Garneau, of Ottawa, son of the poet and historian; Achille Fréchette, of Ottawa; and Evanturel, of Quebec.

The time and space at my command do not allow of any further extension of this study. My paper has been essentially revisional and not critical, and hence I have been spared the labor of finding fault. But even if I had gone into analysis, I should still hold that the names which I have cited are those of genuine poets, who have published works of real merit, many of them destined to live as long as the French language survives in America, and as long as the French Canadians preserve their patriotism and their intellectual autonomy. All the elements have been touched upon in their poetry—their history, enlivened by romance and consecrated by affliction; their nationality, maintained in spite of all the disintegrating influences of conquest; their religion, homely and primitive as in the Brittany and Normandy of the Middle Ages; their social life, adorned by courtesy, inspired by cheerfulness, and stamped with a simple, old-fashioned sense of honor.

JOHN LESPERANCE, F.R.S.C.

THE SUN IS BLUE.

THERE is, we may remember, a passage in which Plato inquires what would be the thoughts of a man who, having lived from infancy under the roof of a cavern, where the light outside was inferred only by its shadows, was brought for the first time into the full splendors of the sun. We may have enjoyed the metaphor without thinking that it has any physical application to ourselves, who appear to have no roof over our heads, and to see the sun's face daily; while the fact is, that if we do not see that we have a roof over our heads in our atmosphere, and do not think of it as one, it is because it seems so transparent and colorless.

Now, I wish to ask your attention to considerations in some degree novel, which appear to me to show that it is not transparent, as it appears, and that this seeming colorlessness is a sort of delusion of our senses, owing to which we have never in all our lives seen the true color of the sun, which is in reality blue rather than white, as it looks; so that this air all about and above us is acting like a colored glass roof over our heads, or a sort of optical sieve, holding back the excess of blue in the original sunlight, and letting only the white sift down to us. I will first ask you, then, to consider that this seeming colorlessness of the air may be a delusion of our senses, due to habit, which has never given us anything else to compare it with.

If that cave had been lit by sunshine coming through a reddish glass in its roof, would the perpetual dweller in it ever have had an idea but that the sun was red? How is he to know that the glass is "colored," if he has never in his life anything to compare it with? How can he have any idea but that this is the sum of all the sun's radiations (corresponding to our idea of white or colorless light)? Will not the habit of his life confirm him in the idea that the sun is red? and will he not think that there is no color in the glass, so long as he cannot go outside to see? Has this any suggestion for us, who have none of us ever been outside our crystal roof to see? We must.

all acknowledge in the abstract, that habit is equally strong in us, whether we dwell in a cave or under the sky; that what we have thought from infancy will probably appear the sole possible explanation; and that, if we want to break its chain, we should put ourselves, at least in imagination, under conditions where it no longer binds us.

The Challenger has dredged from the bottom of the ocean fishes which live habitually at great depths, and whose enormous eyes tell of the correspondingly faint light which must have descended to them through the seemingly transparent water. It will not be so futile a speculation as it may at first seem, to put ourselves in imagination in the condition of creatures under the sea, and ask what the sun may appear to be to them; for, if the fish who had never risen above the ocean-floor were an intelligent being, might *he* not plausibly reason that the dim greenish light of his heaven—which is all he has ever known—was the full splendor of the sun, shining through a medium which all his experience shows is transparent? We ourselves are, in very fact, living at the floor of a great aerial sea, whose billows roll hundreds of miles above our heads. Is it not, at any rate, conceivable that we may have been led into a like fallacy from judging only by what we see at the bottom? May we not, that is, have been led into the fallacy of assuming that the intervening medium above us is colorless because the light which comes through it is so?

I freely admit that all men, educated or ignorant, appear to have the evidence of their senses that the air is colorless, and that pure sunlight is white; so that, if I venture to ask you to listen to considerations which have lately been brought forward to show that it is the sun which is blue, and the air really acts like an orange veil, or like a sieve which picks out the blue and leaves the white, I do so in the confidence that I may appeal to you on other grounds than those I could submit to the primitive man, who has his senses alone to trust to; for the educated intelligence possesses those senses equally, and, in addition, the ability to interpret them by the light of reason; and before this audience it is to that interpretation that I address myself.

Permit me a material illustration. You see through this glass, which may typify the intervening medium of air or water, a circle of white light, which may represent the enfeebled disk of the sun when so viewed. Is this intervening glass colored or not? It seems nearly colorless; but have we any right to conclude that it is so because it seems so? Are we not *taking it for granted* that the original light which we see through it is white, and that the glass is colorless because the light seems unaltered? and is not an appeal to be made here from sense to reason, which, in the educated observer, recalls that white light is made of various colors, and that whether the original light is really white and the glass transparent, or the glass really colored, and so *making* the white, is to be decided only by experiment, by taking away the possibly deceptive medium? I can take away this glass, which was not colorless, but of a deep orange, and you see that the original light was not white, but intensely blue. If we could take the atmosphere away between us and the sun, how can we say that the same result might not follow? To make the meaning of our illustration clearer, observe that this blueness is not a pure spectral blue. It has in it red, yellow, blue, and all the colors which make up white, but blue in superabundance; so that, though the white is, so to say, latent there, the dominant effect is blue. The glass colored veil does not put anything *in*, but acts, I repeat, like a sieve straining *out* the blue, and letting through to us the white light which was there in the bluishness; and so may not our air do so too?

I think we already begin to see that it is, at any rate, conceivable that we *may* have been hitherto under a delusion about the true color of the sun, though of course this is not proving that we have been so. And it will, at any rate, I hope, be evident that here is a question raised which ought to be settled; for the blueness of the sun, if proven, evidently affects our present knowledge in many ways, and will modify our present views in optics, in meteorology, and in numerous other things—in optics, because we should find that white light is *not* the sum

of the sun's radiations, but only of those dregs of them which have filtered down to us; in meteorology, because it is suggested that the temperature of the globe, and the condition of man on it, depend in part on a curious selective action of our air, which picks out parts of the solar heat (for instance, that connected with its blue light), and holds them back, letting other selected portions come to us, and so, altering the conditions on which this heat by which we live depends; in other ways innumerable, because, as we know, the sun's heat and light are facts of such central importance, that they affect almost every part of scientific knowledge.

It may be asked, What suggested the idea that the sun may be blue rather than any other color? My own attention was first directed this way many years ago, when measuring the heat and light from different parts of the sun's disk. It is known that the sun has an atmosphere of its own, which tempers its heat, and by cutting off certain radiations, and not others, produces the spectral lines we are all familiar with. These lines we customarily study in connection with the absorbing vapors of sodium, iron, and so forth, which produce them; but my own attention was particularly given to the regions of absorption, or to the color it caused; and I found that the sun's body must be deeply bluish, and that it would shed blue light, except for this apparently colorless solar atmosphere which really plays the part of a reddish veil, letting a little of the blue appear on the centre of the sun's disk where it is thinnest, and staining the edge red, so that to delicate tests the centre of the sun is a pale aqua-marine, and its edge a garnet. The effect I found to be so important, that, if this all but invisible solar atmosphere were diminished by but a third part, the temperature of the British Islands would rise above that of the torrid zone; and this directed my attention to the great practical importance of studying the action of our own terrestrial atmosphere on the sun, and the antecedent probability that our own air was also and independently making the really blue sun into an apparently white one. We actually

know, then, beyond conjecture, by a comparison of the sun's atmosphere where it is thickest, and where it is thinnest, that an apparently colorless atmosphere *can* have such an effect; and analogous observations which I have carried on for many years, but do not now detail, show that the atmosphere of our own planet, this seemingly clear air in which we exist like creatures at the bottom of the sea, does do so. We look up through our own air as through something so limpid in its purity, that it appears scarcely matter at all; and we are apt to forget the enormous mass of what seems of such lightness, but which really presses with nearly a ton to each square foot, so that the weight of all the buildings in this great city, for instance, is less than that of the air above them.

I hope shortly to describe the method of proof that it, too, has been acting like an optical sieve, holding back the blue; but it may naturally be asked, Can our senses have so entirely deceived us that they give no hint of this truth, if it be one? Is the appeal wholly to recondite scientific methods, and are there no indications, at least, which we may gather for ourselves? I think there are, even to our unaided eyes, indications that the seemingly transparent air really acts as an orange medium, and keeps the blue light back in the upper sky.

If I hold this piece of glass before my eyes, it seems colorless and transparent; but it is proved not to be so by looking through it edgewise, when the light, by traversing a greater extent, brings out its true color, which is yellow. Every one knows this in every-day experience. We shall not get the color of the ocean by looking at it in a wine-glass, but by gazing through a great depth of it; and so it is with the air. If we look directly up, we look through where it is thinnest; but if we look horizontally through it towards the horizon, through great thicknesses, as at sunrise or sunset, is it not true that this air, where we see its real color most plainly, makes the sun look very plainly yellow or orange? We not only see here, in humid English skies, the "orange sunset waning slow," but most of us, in these days of travel, can perfectly testify that

the clearest heavens the earth affords, the rosy tint on the snows of Mont Blanc, forerunning the dawn, or the warm glow of the sun as he sets in Egyptian skies, show this most clearly—show that the atmosphere holds back the blue rays by preference, and lets the orange through.

If next we ask, What has become of the blue that it has stopped? does not that very blue of the mid-day sky relate the rest of the story—that blue which Professor Tyndall has told us is due to the presence of innumerable fine particles in the air, which act selectively on the solar waves, diffusing the blue light towards us? I hope it will be understood that Professor Tyndall is in no way responsible for my own inferences; but I think it is safe, at least, to say that the sky is not self-luminous, and that, since it can only be shining blue at the expense of the sun, all the light this sky sends us has been taken by our atmosphere away from the direct solar beam, which would grow both brighter and bluer if this were restored to it.—*Prof. S. P. Langley.*

ANIMAL INSTINCT.

DID there ever exist in any former period of the world what, so far as I know, does certainly not exist now—any animal with dispositions to enter on a new career, thought of and imagined for the first time by itself, unconnected with any organs already fitted for and appropriate to the purpose? Even the highest acquirements of the dog, under highly artificial conditions of existence, and under the guidance of persistent “interferences with nature,” are nothing but the special education of original instincts. In the almost human caution of the old and well-trained pointer when approaching game, we see simply a development of the habit of all predatory animals to pause when close upon an unseen prey—a pause requisite to verify the intimations of smell by the sense of sight, and also for preparing the final spring. It is true that man “selects,” but he can only select out of what is already there. The train-

ing and direction which he gives to the promptings of instinct may properly be described as the result of experience in the animal under instruction; and it is undoubtedly true that within certain limits (which, however, are after all very narrow), these results do tend to become hereditary. But there is nothing really analogous in nature to the artificial processes of training to which man subjects the animals which are capable of domestication. Or if there be anything analogous—if animals by themselves can school themselves by gradual effort into the development of new powers—if the habits and powers which are now purely innate and instinctive were once less innate and more deliberate—then it will follow that the earlier faculties of animals have been the higher, and that the later faculties are the lower in the scale of intelligence. This is hardly consistent with the accepted idea of evolution,—which is founded on the conception of an unfolding or development from the lower to the higher, from the simple to the complex, from the instinctive to the rational. My own belief is, that whatever of truth there is in the doctrine of evolution is to be found in this conception, which, so far as we can see, does seem to be embodied in the history of organic life. I can therefore see no light in this new explanation to account for the existence of instincts which are certainly antecedent to all individual experience—the explanation, namely, that they are due to the experience of progenitors “organized in the race.” It involves assumptions contrary to the analogies of nature, and at variance with the fundamental facts, which are the best, and indeed the only, basis of the theory of evolution. There is no probability—there is hardly any plausibility—in the supposition that experience has had, in past times, some connection with instinct which it has ceased to have in the present day. The uniformity of nature has, indeed, often been asserted in a sense in which it is not true, and used in support of arguments which it will not sustain. All things have certainly not continued as they are since the beginning. There was a time when animal life, and with it animal instincts,

began to be. But we have no reason whatever to suppose that the nature of instinct then or since has ever been different from its nature now. On the contrary, as we have in existing nature examples of it in infinite variety, from the very lowest to the very highest forms of organization, and as the same phenomena are everywhere repeated, we have the best reason to conclude that, in the past, animal instinct has ever been what we now see it to be—congenital, innate, and wholly independent of experience.

And indeed, when we come to think about it, we shall find that the theory of experience assumes the pre-existence of the very powers for which it professes to account. The very lowest of the faculties by which experience is acquired is the faculty of imitation. But the desire to imitate must be as instinctive as the organs are hereditary by which imitation is effected. Then follow in their order all the higher faculties by which the lessons of experience are put together—so that what has been in the past is made the basis of anticipation as to what will be in the future. This is the essential process by which experience is acquired, and every step in that process assumes the pre-existence of mental tendencies and of mental powers which are purely instinctive and innate. To account for instinct by experience is nothing but an Irish bull. It denies the existence of things which are nevertheless assumed in the very terms of the denial: it elevates into a cause that which must in its nature be a consequence, and a consequence, too, of the very cause which is denied. Congenital instincts, and hereditary powers, and pre-established harmonies, are the origin of all experience, and without them no one step in experience could ever be gained. The questions raised when a young Dipper, which had never before even seen water, dives and swims with perfect ease, are questions which the theory of organized experience does not even tend to solve; on the contrary, it is a theory which leaves those questions precisely where they were, except in so far as it may tend to obscure them by obvious confusions of thought.—*The Duke of Argyll.*

QUEER FLOWERS.

THERE are certain very queer flowers which take advantage of the stupidity of flies by actually imprisoning them (without writ of *habeas corpus*) in a strong inner chamber, until they have duly performed the penal servitude of fertilization enjoined upon them by the inexorable blossom. The South European birthwort, a very lurid-looking and fly-enticing flower, has a sort of cornucopia-shaped tube, lined with long hairs, which all point inward, and so allow small midges to creep down readily enough, after the fashion of an eel-buck or lobster-pot. "Sed revocare gradum, superasque evadere ad auras,"—to get out again is the great difficulty. Try as they will, the little prisoners can't crawl back upward against the downward-pointing hairs. Accordingly they are forced, by circumstances over which they have no control, to walk aimlessly up and down their prison yard, fertilizing the little knobby surface of the seed-vessel with pollen brought from another flower. But as soon as the seeds are all impregnated, the stamens begin to shed their pollen, and dust over the gnats with the copious powder. Then the hairs all wither up, and the gnats, released from their lobster-pot prison, fly away once more on the same fool's errand. Before doing so, however, they make a good meal off the pollen that covers the floor, though they still carry away a great many grains on their own wings and bodies.

One might imagine that after a single experience of the sort the midges would have sense enough to avoid birthwort in future; but your midge has really no more intelligence than your human drunkard, or gambler, or opium-eater. He flies straight off to the very next birthwort he sees, conveys to it the pollen from the last trap he visited, and gets confined once more in the inner chamber, till the plant is prepared to let him out again on ticket-of-leave of short duration. Thus, like an habitual criminal, he spends almost all his time in getting from one gaol into another. His confinement, however, is not soli-

tary, but is mitigated by congenial intercourse with the ladies and gentlemen of his own kind.

A very similar but much larger fly-cage is set by our own common wild arum, or cuckoo pint. This familiar big spring flower exhales a disagreeable fleshy odor, which, by its meat-like flavor, attracts a tiny midge with beautiful iridescent wings and a very poetical name, *Psychoda*. As in most other cases where flies are specially invited, the color of the cuckoo pint is usually a dull and somewhat livid purple. A palisade of hairs closes the neck of the funnel-shaped blossom, and repeats the lobster-pot tactics of the entirely unconnected South European birthwort. The little flies, entering by this narrow and stockaded door, fertilize the future red berries with pollen brought from their last prison, and are then rewarded for their pains by a tiny drop of honey, which slowly oozes from the middle of each embryo fruitlet as soon as it is duly impregnated. Afterward, the pollen is shed upon their backs by the bursting of the pollen-bags; the hairs wither up, and open the previously barricaded exit, and the midges issue forth in search of a new prison and a second drop of honey.

This is all strange enough; but, stranger still, I strongly suspect the arum of deliberately hocussing its nectar. I have often seen dozens of these tiny flies rolling together in an advanced stage of apparent intoxication upon the pollen-covered floor of an arum chamber; and the evidences of drunkenness are so clear and numerous that I incline to believe the plant actually makes them drunk in order to ensure their staggering about in the pollen and carrying a good supply of it to the next blossom visited. It is a curious fact that these two totally unrelated plants (birthwort and arum) should have hit upon the very same device to attract insects of the same class, though not the same species. The trap must have been independently developed in the two cases, and could only have succeeded with such very stupid, unintelligent creatures as the flies and midges.

From plants that imprison insects to plants that devour insects alive is a natural transition. The giant who keeps a

dungeon is first cousin to the ogre who swallows down his captives entire. And yet the subject is really too serious a one for jesting; there is something too awful and appalling in this contest of the unconscious and insentient with the living and feeling, of a lower vegetable form of life with a higher animated form, that it always makes me shudder slightly to think of it. Do you remember Victor Hugo's terrible description (I think it is in "Ouatre-Vingt-Treize") of the duel between the great gun which has got loose from its chains on a ship in a storm, and the men who try to recapture it? Do you remember how the gun lunges, and tilts, and evades, and charges, exactly as if it were a living, sentient creature; and yet all the while the full horror of the thing depends upon the very fact that it is nothing more than a piece of lifeless, senseless metal, driven about on its wheels irresponsibly by the fury of the storm? Well, that description is awful and horrible enough; but it yet lacks one element of awesomeness which is present in the insect-eating plants, and that is the clear evidence of deliberate design and adaptation. When a crumbling cliff falls and crushes to death the creatures on the beach beneath it, we see in their fate only the accidental working of the fixed and unintentional laws of nature; but when a plant is so constructed with minute cunning and deceptive imitativeness, that it continually and of malice prepense lures on the living insect, generation after generation, to a lingering death in its unconscious arms, there seems to be a sort of fiendish, impersonal cruelty about its action which sadly militates against all our pretty platitudes about the beauty and perfection of living beings. It is quite a relief that we are able nowadays to shelve off the responsibility upon a dead materialistic law like natural selection or survival of the fittest. Hartman's "Unconscious" stands modern naturalists in good stead *vice* the personal interference of the mediæval or Miltonic Devil, absent on leave.

On most English peaty patches there grows a little, reddish-leaved, odd-looking plant, known as sundew. It is but an inconspicuous small weed, and yet literary and scientific honors

have been heaped upon its head to an extent almost unknown in the case of any other member of the British floral commonwealth. Mr. Swinburne has addressed an ode to it, and Mr. Darwin has written a learned book about it. Its portrait has been sketched by innumerable artists, and its biography narrated by innumerable authors. And all this attention has been showered upon it, not because it is beautiful, or good, or modest, or retiring; but simply and solely because it is atrociously and deliberately wicked. Like the late Mr. Peace and the heroes of the Newgate Calendar, it owes its vogue entirely to its murderous propensities. Sundew, in fact, is the best known and most easily accessible of the carnivorous and insectivorous plants.

The leaf of the sundew is round and flat, and it is covered by a number of small red glands, which act as the attractive advertisement to the misguided midges. Their knobby ends are covered with a glutinous secretion, which glistens like honey in the sunlight, and so gains for the plant its common English name. But the moment a hapless fly, attracted by hopes of meat or nectar, settles quietly in its midst, on hospitable thoughts intent, the viscid liquid holds him tight immediately and clogs his legs and wings, so that he is snared exactly as a peregrine is snared with bird-lime. Then the leaf with all its "red-lipped mouths" (I will own up that the expression is Mr. Swinburne's, *ubi supra*) closes over him slowly but surely, and crushes him by folding its edges inward gradually toward the centre. The fly often lingers long with ineffectual struggles, while the cruel crawling leaf pours forth a digestive fluid—a vegetable juice, as it were—and dissolves him alive piecemeal in its hundred clutching suckers. I have seen this mute tragedy enacted a thousand times over on the bogs and moorlands; and though I often try to release the fresh flies from their ghastly living, but inanimate prison, it is impossible to go round all the plants on a whole common, like a philodipterous Howard, ameliorating the condition of all the victims of misplaced confidence in the good intentions of the treacherous sundew.—*Selected.*

COLORS IN NATURE.

ONE, on looking on nature, must feel the influence of every phase that presents itself. The woods, the mountains, the waters, the clouds, all, either by their magnitude or by their infinite variety of form and color, leave the imprint of their respective greatness. In an article necessarily confined, I will pass the lofty, the broad, and the deep, and dwell only upon the effects of color that are ever associated with them.

There are but three primary colors (red, blue, and yellow), and these, by their various combinations, produce what are called secondary and tertiary colors. And two of the primary colors produce a secondary; thus, a union of red and blue produces purple; red and yellow, orange; blue and yellow, green; the tertiaries are in like manner composed of a union of any two of the secondaries. Now it is by the law of contrast that a color becomes enhanced; thus, red becomes heightened by being contrasted with green. The sweet-pea blossom looks much prettier when on its own stem, fanned with little greenish-yellow leaves, than when it is separated from them, and by our hands combined with other huss. There are flowers that in themselves possess the full complement of Nature's palette. Take for example the pansy. Now we know how varied these beautiful little flowers are, varying indeed from deep purple to the palest yellow and often white, yet they all, no matter what variety they may assume, possess the complementary to their native tint. What I mean is this: if the greater portion of the pansy be purple, you will see somewhere lurking near a rich yellow, the deeper the purple the deeper the yellow, and if the purple inclines to blue, the yellow will approximate to orange. In the paler varieties, those of faint yellow, you will see the tender tints of purple, faint it is true they may seem, but they are nevertheless there.

And it is this peculiar association of colors that makes the pansy so great a favorite. And what is true of one flower is equally true of all. I selected the pansy because it was the

easiest medium to illustrate my ideas. The red rose, no matter how deep or pale its hue, is also beautifully endowed with the charming complementary in its leaves: the pollen, of a rich yellow, usurps the centre, and towards the junction of the petals a tint of purple may be found—the yellow and the white species are more tenderly marked in their combinations; yet they all possess a glorious illustration of the law of harmony and contrast. The poets of all ages have enlivened their pages with these sweet little offerings from the hands of Nature.

Before closing let me say that the effect of color upon the mind is analogous to that of sound. We speak of bright, lively colors, of sober and grey ones, that certain combinations do produce a pleasant sensation and others a grave, nay, even a dreary one. Nature gives us all, and from her inexhaustible store, where every hue of color may be found, and every choice be made, we can select for our edification or pleasure that choice which at that time pleases us best.—*W. A. Sherwood, in Educational Weekly.*

THE circulation of gold in the world has decreased during the last year \$52,000,000; silver circulation has increased \$42,000,000, and the paper money in circulation has increased \$112,000,000. The decrease in the circulation of gold is caused by a diminished production and increased demand for that metal for use in the arts and for ornamentation.

THE President of the United States, at the suggestion of Prof. Langley and other scientists who were engaged in taking solar observations from Mount Whitney, in Southern California, has set apart one hundred square miles, including the mountain, for the exclusive purpose of scientific investigation.

SELDOM was any knowledge given to keep, but to impart; the grace of this rich jewel is lost in concealment.—*Bishop J. Hall.*

MUTABILITY of temper and inconsistency with ourselves is the greatest weakness of human nature.—*Addison.*

CONVERSATION.

IN nine cases out of ten, on the part of those who give themselves up to nonsensical games, there will be no desire for anything of an ennobling nature. If we habitually neglect to cultivate our minds, we can hope for nothing but intellectual inferiority, and inability to converse with ease and elegance. What is there more enjoyable than a brilliant, witty conversation, enlivened by an occasional pun and sparkling repartee? It is true that we all cannot excel in this delightful accomplishment, any more than we can all excel in any branch of learning or business; but we can, at least, use the talents that we have, whether they be one, two, or five.

Though conversation, in its better part
May be esteemed a gift, and not an art,
Yet much depends, as in the tiller's toil,
On culture and the sowing of the soil.

It is said that the celebrated Samuel Johnson for a long time looked upon conversation as the chief amusement. He told Sir Joshua Reynolds that he had always made it a rule to talk upon every occasion as well as he could. "He had thus obtained a mastery over his weapons which made him one of the most accomplished conversational gladiators." A great responsibility is laid upon us to improve the mind. We should ascertain its various faculties and susceptibilities, and earnestly strive to make as much progress as possible. We have the power of introspection, and should not fail to make good use of it. Of people who are negligent in this respect, it has been well said: "Thus multitudes live and die as truly strangers to themselves as to countries of which they have heard the name, but which human foot has never trodden." A ready talker may not have any better natural ability than one who is "slow of speech," but, on account of being able to express his thoughts in an intelligible and forceful style, he is looked upon as belonging to the "aristocracy of intellect," while the other is relegated to the region of intellectual mediocrity.—*T. C. B. Fraser.*

COLD COMFORT—THE HOPE OF THE EVOLUTIONIST.

MEN say, in the course of the eras—
 For the date 'tis not easy to know,
 But we think we may fix it as near as
 A billion of æons or so—
 That all our intelligent Aryans
 (The globe growing woefully cold)
 Will slowly revert to barbarians,
 And shelter in caves as of old.

When Colonies crumble asunder,
 When the Empire of England is o'er,
 When Sweetness and Light have gone under,
 When Savages come to the fore,
 When no longer historians languish—
 To mark how the remnant may strive,
 The Darwinian will smother his anguish—
 He knows that the Fittest survive!

When all that is wooden must perish,
 Cabs, tram-cars of happier days,
 And archives we solemnly cherish
 Are kindled to furnish a blaze,
 When Nihilists fail from their mission,
 And when, in the perishing State,
 The head of the last Opposition,
 Arises in final debate,

And says, "It's a national crisis;
 Let Party dissension go freeze,
 A hundred of feet where the ice is
 Down yonder in tropical seas.
 If taxing our caves is intended,
 We take it our duty is clear:
 We vote for the Bill, unamended,"
 And the House is too chilly to cheer!—

Then, Prospero, triumph no longer,
Then, Caliban, live and prevail,
Then, speed to the arm that is stronger,
Then woe to the arm that is frail!
But, though Duty and Justice be sleeping,
Though Plunder and Anarchy thrive,
Till Death takes the Stars in his keeping,
As now, shall the Fittest survive!

—*Longman's Magazine.*

NEW DISCOVERIES.

SEVERAL more ruined cave and cliff cities have been discovered in Arizona by the Western Geological Survey. The most remarkable was a village of sixty-five underground dwellings situated near the summit of one of the volcanic foothills in the San Juan region. The surface stratum of the hill had become hardened by exposure, and formed the common roof for the entire community. The dwellings were all alike. They had no intercommunication beneath the surface, and were only accessible by means of square holes leading from the surface by a vertical shaft to the floor of the main room of the dwelling. Foot-rests—holes at convenient distance—along the sides of the shaft served the purposes of a stairway. Descending the shaft, the explorers found themselves at the side of an oval-shaped, arched-roofed room, about twenty feet in its smallest diameter. At the ends in the side opposite the entrance, low doorways connected the main room with smaller rooms, the whole suite or dwelling consisting of four apartments. One of the smaller rooms had its floor excavated to a depth of two or three feet below those of the other rooms, and is supposed to have served the purpose of a store-room or cellar. A shaft about eighteen inches square, extending to the surface of the ground, formed the chimney. Many domestic utensils were found.—*Selected.*

THE SPIDER'S THREAD.

IN a recent lecture at Boston, Mass., Professor Wood dealt with the phenomena of spider life. The female is larger and much fiercer than the male, who, while paying his addresses, is in constant peril, frequently losing some of his legs. In one tribe the female is 1,300 times as large as the male. The spider's thread is made up of innumerable small threads or fibres, one of these threads being estimated to be one two-millionth of a hair in thickness. Three kinds of thread are spun: one of great strength, for the radiating or spoke lines of the web. The cross lines, or what a sailor might call the ratlines, are finer and are tenacious—that is, they have upon them little specks or globules of a very sticky gum. These specks are put on with even interspaces. They are set quite thickly along the line, and are what, in the first instance, catch and hold the legs or wings of the fly. Once caught in this fashion, the prey is held secure by threads flung over it somewhat in the manner of a lasso. The third kind of silk is that which the spider throws out in a mass of flood, by which it suddenly envelopes any prey of which it is somewhat afraid, as, for example, a wasp. A scientific experimenter once drew out from the body of a single spider 3,480 yards of thread or spider silk—a length little short of three miles. Silk may be woven of spider's thread, and it is more glossy and brilliant than that of the silkworm, being of a golden color. An enthusiastic entomologist is said to have secured enough of it for the weaving of a suit of clothes for Louis XIV.

It has been the plan of my life to follow my convictions at whatever personal cost to myself.—*Garfield.*

KNOWLEDGE is in every country the surest basis of happiness.—*Washington's First Annual Address.*

GREAT is truth, great is liberty, great is humanity, and they must and will prevail.—*John Adams.*

CHAFF.

THE fiery charger—a red-headed hotel clerk.

THE Revised Version will throw much light on Sheology.

OUR characters should be like pianos—grand, upright, and square.

MOST people are like an egg, too phull of themselves to hold anything else.

MARWOOD, the London hangman, when asked what was good for a cold, replied, "I never knew Marwood's drops to fail."

IT is said of Bret Harte that he has become so lazy that he would probably allow himself to be kicked without any attempt at resistance. He might possibly protest, but not unless he had his mouth already open.

IF you are troubled with sleeplessness take a long walk on an empty stomach, then retire on a few crackers, be wakened sharp at the point of six, and rise on the spur of the moment. You will feel better—at least you will feel.

A YOUNG man may be able to add his fraction to the sum of fashionable attractions—divide the attentions of half a dozen young ladies and multiply words *ad infinitum*—and yet not be a mathematician, or possess the smallest function of a mathematician.

WHEN you get married you must get your wife into the habit of getting up in the morning, getting on a fire, and getting you your breakfast, so that you can get to work in good time. She may get a little sulky at first, but will soon get over it and get accustomed to the plan. Do not forget this.

"THE question of employing Col. Porteous in connection with the French work was discussed. It was pointed out that 100 families per month, or 1,200 families annually, could be reached in this way, and that it was largely through them that the Gospel could be circulated throughout Lower Canada." The foregoing

telegram was sent to the *Globe* from its correspondent at the Montreal Methodist Conference in June. At first reading one is apt to wonder whether the assistance of the Salvation Army or of the American reserve of Colonels has been accepted; but a moment's reflection suggests a printer's joke, and that *col-porteurs* was intended.

MADAME RUMOR was mistaken. Doctor A did not marry Madame B, to whom he had paid sufficient attention to give rise to such an opinion; but married a beauty of eighteen years, he having attained the biblical age allowed to man. The three happened to meet shortly after Christmas—the marriage having taken place on that day. During the conversation the bride remarked that she had received no Christmas presents that year—her wedding presents being sent the day before. The Doctor, in a playful manner, said, "My dear, you forget receiving me." Whereupon Mrs. A beamed a most appreciative smile upon her lord and master. And Madame B, reclining in her chair and languidly plying her fan, added, "Yes, my dear Mrs. A, you must not forget that present. You know antiquities are all the rage just now."

THE RISE AND FALL OF A SPRING POET.—Fame allowed me, and the desire to rise in the world of letters seized me. An idea hit me and I pursued it. I sprang at the opportunity, and was at once struck by the force and power of the subject that confronted me. I struggled manfully, overpowered more and more by the thoughts that thronged upon me. At last the end was reached, and the result was, "Spring poetry—a Lay." Breathlessly I awaited the final stroke of fate. I had made the venture, and I hung to the hope with lively expectations. Hope deferred made my heart sick. At last in suspense I was cut down by fate, baffled and beaten. I felt it sore, for I had run into debt, trusting and being trusted. I had dropped into poetry, but therein had fallen into error, and had fallen flat. Here I am, still lying, sick and sore of lays, and odes, and idyls, an example of

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