Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- [x] Coloured covers/ Couverture de couleur
- [ ] Covers damaged/ Couverture endommagée
- [ ] Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- [ ] Cover title missing/ Le titre de couverture manque
- [ ] Coloured maps/ Cartes géographiques en couleur
- [ ] Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- [ ] Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- [ ] Bound with other material/ Relié avec d'autres documents
- [ ] Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- [ ] Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

- [ ] Coloured pages/ Pages de couleur
- [ ] Pages damaged/ Pages endommagées
- [ ] Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- [x] Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- [ ] Pages detached/ Pages détachées
- [x] Showthrough/ Transparence
- [ ] Quality of print varies/ Qualité inégale de l'impression
- [x] Continuous pagination/ Pagination continue
- [ ] Includes index(es)/ Comprend un (des) index

  Title on header taken from:/ Le titre de l'en-tête provient:

- [ ] Title page of issue/ Page de titre de la livraison
- [ ] Caption of issue/ Titre de départ de la livraison
- [ ] Masthead/ Générique (périodiques) de la livraison

- [ ] Additional comments:/ Commentaires supplémentaires:

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
						✓					

OCTOBER, 1885. VOL. III., No. 4.

Kosmos.

SCIENCE ASSOCIATION:
VICTORIA UNIVERSITY - - COBOURG, ONT.

CONTENTS.

Kosmos (formerly *V. P. Journal*) is a monthly journal published at the beginning of each month, and is devoted to Science, Literature, Education, and the popular treatment of subjects of social, intellectual, and moral importance. It has been established and is controlled by the Science Association of Victoria University, which is composed largely of graduates, but is not restricted to either local or sectarian interests. Subscriptions may commence with any month. Extras to subscribers, 10 cents.

All business communications, addresses, changes, and all matters in reference to advertising, subscriptions, &c., should be addressed to

E. H. KOYL, Business Manager,
COBOURG, Ont.

Correspondence, manuscripts, and similar communications should be addressed to

THE EDITOR, KOSMOS,
Box 300, COBOURG, Ont.

$1.00 PER YEAR, -- 15c. PER COPY.

KOSMOS.

VOL. III.] OCTOBER, 1885. [NO. 4.

THE UNDISCOVERED COUNTRY.

COULD we but know
The land that ends our dark, uncertain travel,
Where lie those happier hills and meadows low,—
Ah, if beyond the spirit's inmost cavil
Aught of that country could we surely know,
Who would not go?

Might we but hear
The hovering angels' high imagined chorus,
Or catch betimes, with wakeful eyes and clear,
One radiant vista of the realm before us,—
With one rapt moment given to see and hear,
Ah, who would fear?

Were we quite sure
To find thee, peerless friend, who left us lonely,
Or, there, by some celestial stream as pure,
To gaze in eyes that here were lovelit only,—
This weary mortal coil, were we quite sure,
Who would endure?

—*Edmund J. Stedman.*

THE THEISTIC COROLLARY OF EVOLUTION.

BY LEONARD WOOLSEY BACON.

"I gave my heart to seek and search out by wisdom concerning all things that are done under heaven: this sore travail hath God given to the sons of men to be exercised therewith."—Ecclesiastes i. 13.

IT needs no great attainment in the intelligent use of the Scriptures to recognize that whatever of divine wisdom is communicated to us through this book of the "Preacher," is conveyed by means of the experiences and speculations of a most studious man. Whether the book be regarded as the actual writing of Solomon, or (as is more likely) of some much later poet speaking in the character of Solomon, it delineates before us a vain endeavor to solve the problem of the universe by wisdom; and the blasé despair with which the writer gives up the inquiry at last, acknowledges that it is too much for him, and that further study does no good, and settles down at last in the conviction (which is the real lesson of the book) that he must leave all to the wisdom and justice of God. This "conclusion of the whole matter" is that which well rewards us for following him through his epicurean experiments and conjectures, and his pessimist despair. But, on his way to this conclusion he lets fall many a nugget of worldly wisdom, many a shrewd, sometimes cynical, observation on men or society; in his old-world aphorisms we see the reflections of many a modern experience. In undertaking to get a theory that shall include all phenomena, he differs not at all from our very latest philosophers, and there is solid and sober truth in him when he looks on the universe, with its unsolved problems, as God's invitation to our inquiries —the task divinely set for the schooling of our reason. It is the justification of philosophy, even in its most futile labors.

These score of centuries of toilsome speculations, in which each school has achieved so little, except to refute the rest, have, at least, not put scorn on the divine invitation to human inquiry. They have done their task at the great problem, even though the "sore travail" of accounting for the facts of

the universe still remains, and is likely to give exercise to our posterity, as it has to our forefathers. Let us hope that they may be not less wise than the Hebrew "Preacher," who, when he had come to the end of his studies without reaching the solutions of his questions, founded "the conclusion of the whole matter" in "fearing God and keeping his commandments."

That theory of the universe which, at the present day, in the English-speaking countries, is most in vogue, is known as Evolutionism.

It is only as a theory of the universe that I propose to regard it this evening. As a doctrine of natural history, of more or less extended application, it has wide approval on the part of many scientific men, who either have no interest in it, anyway, as an explanation of the system of the universe, or very decidedly repudiate it. But it is only in this latter relation—as a theory of the universe—that the doctrine of evolution greatly concerns me as a theologian. The question of the origin of the vegetable and animal species by development and survival is one of fascinating interest, but has, as I conceive, none but incidental bearing on any important religious question. The theory of evolution as an explanation of the universe is another matter. It is, in terms, a denial of the creation of the world, in any sense, a negation of God, or, as its propounders would prefer to say, an ignoring of God. But I beg you all to observe that, distinctly hostile as this system is to the teaching of the Scriptures, and even to the very essence of all religion, it is no part of our present argument to controvert it directly, but only to state it, mainly following the most conspicuous of its English apostles, Mr. Spencer; and then to point out an inevitable corollary from it, which seems to me to have been curiously overlooked, both by its advocates and by its antagonists. Evolutionism, then, is that theory of the universe which finds all the facts of the universe—past, present and future—to be fully accounted for by the existence of matter, uncreatable, indestructible, capable of indefinite variation and form, but incapable of varying in amount; and the existence of motion,

also invariable in amount, but capable of being changed, not in direction only, but also in other modes of motion, such as heat, light, electricity, vegetable and animal life, thought, emotion and volition. Given matter and motion (and these, it is claimed, *are* given, both being essentially uncreated), by successive stages the universe will come to be as it is, with its planetary and sidereal systems, with its geologic structure, with its plant life, and its animal life, each working up from the lowest to the highest orders, with man and his faculties, with society from its rudimentary barbarism up to the highly organized and complicated forms of civilization; that the whole order of things as known to me would thus—we will not say *be made*, for that would imply some power from without impressed upon the chaos; we will not say *grow*, for that would imply some principle of life within it—but that out of mere atomic matter and motion would automatically *come of itself* the whole order of the heavens and the earth, including all life and humanity in history and society. In favor of this view are to be alleged a great mass of unquestionable scientific facts: 1. All those astronomical facts which tend to confirm the nebular hypothesis—a hypothesis which itself gains strength by being adopted into this larger system or theory. 2. The modern demonstrations of the conservation and correlation of forces, which prove that heat, light, sound, chemical reaction, electricity, magnetism, are all different forms of the same force; that each may be transmuted into motion, and motion into each, and each into every other. 3. The proofs of a close mutual connection between physical motion in these mutually interchangeable forms, and vegetable and animal growth, and muscular power, and even mental action. 4. The facts, already many and oppressive, and steadily accumulating, though always falling short of conclusive proof, which draw us more and more to the belief of the origin of new species by development from former species. These undisputed facts, among others, combine with the charm which we all find in connecting diverse truths together in a simple and unique system, to give to the system of evolutionism its unquestionable currency and

vogue at the present day. On the other hand, this system has some grave difficulties to contend with: 1. To begin with, there is the difficulty of the starting point. How matter can be eternal without being infinite; how it can be self-existent without being existent anywhere, is a metaphysical difficulty which soon becomes a mathematical one. For the first conditions of evolution require that the mass of unformed matter should have both surface and centre, and immensity has neither. Again, the system of evolution must make a beginning in time. It needs vast cycles of time in which to have wrought the universe, but not too much time; if you give it eternity you kill it. And how can it make a beginning in time? How is it to start without being started?—the old question of *primum mobile*. Then, 2, is the question about the beginning of life, which at the first is, doubtless, very feeble, very rudimentary, hardly perceptible, but which, after all, does have to begin before it can exist. The notion that matter, if only you grind it fine enough, make it moist enough, stir it long enough, keep it warm enough, and not too warm, will somehow or other begin to live of its own accord, without the introduction of any germ of life from without, is a notion which it is not easy to prove or to believe, and which it requires a certain measure of audacity to enunciate. It is easy to resolve the results of life into heat and motion, but not to transmute heat and motion into life, except by the agency of life itself. 3. There is the grave difficulty about the beginning of mental action—thought, emotion, volition. Just where we are to find the point at which mental action begins it may not be easy to show. No doubt we see signs of what look like it very low in the animal scale. But it is none the less certain that it begins somewhere in the system of nature; and how thought, emotion, volition—the attributes of the mind—should first come into the universe of themselves, when there has been no mind in the universe before, is another of those grave difficulties which beset the theory of evolution considered as a way of accounting for the universe. And it must, in all fairness, be borne in mind in considering

these and other difficulties, that this theory of the universe is no stronger than its weakest link. Let it be conceded that at the beginning of motion, of life, of mind, or at any other point, it requires to be supplemented by a feather's weight of aid from outside, and it is no longer an adequate theory of the universe. It has gone to pieces, and become nothing more than a very interesting and valuable series of observations in physics and physiology. I have stated these among the difficulties that beset the theory of evolution, over against the mass of scientific facts that are alleged in favor of it, as being essential to a just statement of the subject. Let me once more remind you that I am not now controverting the theory of evolution, but only setting it forth with a view to some of the inferences to be drawn from it. For the purposes of the argument, we waive all these difficulties. For the time being, we accept the theory of evolution. We suppose the volume of matter, vast but not infinite, and the quantum of motion eternally constant in amount, beginning its plastic work before all calculated ages. We will try to suppose (as Mr. Spencer demands, see "First Principles," sec. 82,) that motion is transformed into life, and into mental action, just as into heat, and light and electricity; that "motion, heat, light, chemical affinity, etc., are alike transformable into each other, and into sensation, emotion, thought—these, in their turn being directly or indirectly retransformable into the original shapes." "How this metamorphosis takes place—how a force existing as motion, heat or light, can become a mode of consciousness; how it is possible for aërial vibrations to generate the sensations we call sound, or for the forces liberated by chemical change in the brain to give rise to emotion, these are mysteries which it is impossible to fathom. But they are not profounder mysteries than the transformations of the physical forces into each other." (Sec. 82, *ad fin.*) The statements of this representative philosopher leave nothing to be desired in point of distinctness and perspicuity.

Those actions which we are accustomed to speak of as mental —thought, emotion, volition—are, according to him, simply

modes of physical motion like heat, light, and electricity. They are "each transformable into the other," and then "retransformable into the original shapes." Each manifestion of force can be interpreted *only* as the effect of some antecedent force; no matter whether it be an inorganic action, an animal movement, a thought, or a feeling. (Sec. 84.) This, then, is the final achievement of evolution, when at last moving matter—which, without any agency of life from without itself, has of itself begun to live—does at last, without any agency of thought or reason from outside itself, begin of itself to think, to reason, to love, to hope. I said a few minutes ago that, under the system of evolutionism, when at last it has reached the point at which all the forms of mental action are accounted for as simply and solely other forms of physical motion, its account of the known and actual universe is complete. It has said its last word. But not so concerning the possible future universe. Evolutionism has not half done itself justice in speaking of the possibilities which it involves. It has "lacked a sacred bard," and either told

> "In mournful numbers
> Life is but an empty dream,"

or, in the language of its latest expounder on the psychological side, Dr. Maudsley, "bewails itself in pessimistic vaticinations of the inevitable future diminution of solar heat and light, and consequent decline of development and degeneration of all things," until at last a frozen earth, incapable of cultivation, is left without energy to produce a living particle of any sort, and so death itself is dead (Essay on "Body and Will"); or, in the words of its chief apostle, Mr. Spencer, declares it to be "beyond doubt" that we are "manifestly progressing towards omnipresent death," forced to "contemplate, as the outcome of things, a universe of extinct suns, round which circle planets devoid of life." (So Mr. Spencer—First Principles, Sec. 136, cf. Sec. 141.) But evolution should be ashamed of such cowardly foreboding in its disciples. There are fairer prospects before the universe than it has ever known, if only the work of development that

has gone so far shall go farther in the same line. Out of the one unvarying fund of motion in the universe—unvarying in amount, but infinitely convertible and reconvertible in form—how little, thus far, has been transformed into the highest form—the form of thought, emotion, and volition! What splendid progress still remains to be accomplished, until the various correlated forces of the world—the motion, gravitation, light, heat, electricity, chemical action, and vegetable and animal life—shall all have been transmuted into their equivalents in mathematical and metaphysical reasoning, in imagination of beauty and sublimity, in far-seeing contrivance of means to ends, in meditation of righteousness and holiness, in tender mercy, in long-suffering, in forgiveness, in love; for by the very "first principles" of evolution all these same mental acts are measurable by their equivalents in foot-pounds; and just as it is conceivable and probable that the total forces of the universe once existed in the sole form of molecular motion, so it is not only conceivable, but wholly possible, that all these forces may by-and-by be transmuted into the sole form of mental action—nay, more: since matter itself is known to us only as a mode of force, being manifested simply by equivalents of resistance or of gravitation, it results that matter also is capable of being commuted into the various correlated modes of motion, of which mental action is one; and thus that the whole universe may come to exist as a spiritual being, as thought, emotion, volition, wisdom, love, might.

This is the splendid consummation of the system of evolution: That, given the senseless and shapeless nebula, with its aimless whirl of atoms, out of which have been evolved already the order of the heavens, the structure of the earth, the chemical and mechanical forces, the ranks of vegetable and animal life, and, finally, the forms of spiritual activity, it is capable of taking on altogether this spiritual form, no atom's weight of force being lost, but all being securely transmuted into spiritual forms, into thought, emotion, volition, wisdom, love, and might, which are again reconvertible into their former shapes of physi-

cal, vegetable, and animal existence—into matter and force. And now I ask your consideration of one more inference from this system, which is the one I had in view when I announced the subject of this sermon, "A Corollary of Evolution." It is this: According to the principles of evolution, the original form in which the universe existed from eternity may have been the spiritual form—thought, emotion, volition, wisdom, love, might, omniscience, omnipotence, and infinite benevolence—a form perfectly convertible into gravitation, motion, light, and heat. And against the supposition that the original form of the universe was that of spiritual existence there is, under the system of evolution, no reasonable presumption or probability, and no just objection, except that it is orthodox. Some hasty and inconsiderate philosopher may object off-hand that it is contrary to the known course of evolution; that the higher forms of motion, like thought and feeling, should precede the lower, such as heat, light, and vegetation; that, in fact, the lower forms always precede the higher in course of development. But the answer is obvious: that this objector has forgotten to what scale his "known course of evolution" has been mapped; that what he knows of the course of evolution does not really represent a curve long enough to furnish the elements for computing the course of nature. He dreams that his paltry millions or billions or trillions of years make rather a long time from which to estimate the rest, whereas they are only a tick of the clock. He speaks of *the* course of evolution, as if there might not have been a score of successive and diverse courses of evolution, from the nebula back to the nebula again, since time began. He speaks of time; we are speaking of that which was before time—from eternity, concerning which his science and his speculation are alike confessedly and hopelessly at fault. He has relegated it all to the Unknowable. He has to deal with two elements, and only two, that make up the universe—matter and force; both of them variable, convertible, and reconvertible in form; both of them indestructible and uncreatable in essence. As they cannot cease to be, so they cannot begin to be. *Unless*

they are from eternity, the system of evolution, as an explanation of the universe, is impossible; and *if* they are from eternity, the system of evolution is likewise confessedly impossible. The only hypothesis which can save this elaborate system—the fruit of such toil of thinking, the object of such magnificent contributions out of the treasury of science—from utter self-destruction is that hypothesis the possibility of which is a corollary of the system itself: that from the beginning, or ever the earth and the world were made, the forces of the universe lay hidden in that mental form to which they are correlated—in eternal and infinite wisdom, love, and power. There, in limitless foreknowledge, was marshalled the order of the steadfast stars; there the massy architecture of the earth was planned; there tender mercy took counsel with unfathomed wisdom over creatures that were yet to be, and cared for the fall of the sparrows and the cry of the fledgling ravens; there the contemplation of a wise design "did behold our substance, yet being unperfect, and in its book all our members were written, which in continuance were fashioned, when as yet there was none of them." It is evolution that teaches us that this *may* have been, and if it may have been, then it *must* have been. The necessary premise of the system, its inevitable consequence, is this, which already "by faith we know": "In the beginning God created the heavens and the earth." It is "the conclusion of the whole matter," the same now as the day when "Ecclesiastes, or the Preacher," "gave his heart to seek and search out by wisdom concerning all things that are done under heaven." For now, as then and ever, science is religious, even though the scientific man may be materialist and atheist. O timid fellow Christian and theologian! does not this argument rebuke our unworthy fears of what materialism can do? So, often, the defenders of religious and spiritual truth have seemed to be seriously concerned that men were framing theories and systems of simple materialism, in which was place for neither God nor soul of man, but which derived all spiritual and mental facts from merely physical causes; thus building a bridge, from the

material side, over that great gulf between matter and spirit which thought and knowledge have always found impassable. Be not afraid! God is not mocked. There can be no bridge from the material over to the spiritual that is not, in every sense, just as much a bridge from the spiritual over to the material. Whatever line of reasoning deduces mind from matter, makes plain that matter may be the creation of mind. There is no breach that materialism can make in the defences of religion that may not become a sallyport for our sorties and reprisals.

A REMARKABLE POEM.

(Meditations of a Hindoo Prince and Sceptic.)

BY A. C. LYALL.

ALL the world over, I wonder, in lands that I never have trod,
Are the people eternally seeking for the signs and steps of a God?
Westward across the ocean, and northward ayont the snow,
Do they all stand gazing, as ever, and what do the wisest know?

Here, in this mystical India, the deities hover and swarm
Like the wild bees heard in the tree-tops, or the gusts of a gathering storm;
In the air men hear their voices, their feet on the rocks are seen,
Yet we all say, "Whence is the message and what may the wonders mean?"

A million shrines stand open, and ever the censer swings,
And they bow to a mystic symbol, or the figures of ancient kings;
And the incense rises ever, and rises the endless cry
Of those who are heavy laden, and of cowards loth to die.

For the destiny drives us together, like deer in a pass of the hills,
Above is the sky, and around us the sound and the shot that kills;
Pushed by a power we see not, and struck by a hand unknown,
We pray to the trees for shelter and press our lips to a stone.

The trees wave a shadowy answer, and the rock frowns hollow and grim,
And the form and nod of the demon are caught in the twilight dim;
And we look to the sunlight falling afar on the mountain crest,
Is there never a path runs upward to a refuge there and a rest?

The path, ah! who has shown it, and which is the faithful guide?
The haven, ah! who has known it? for steep is the mountain side,
For ever the shot strikes surely, and ever the wasted breath
Of the praying multitude rises whose answer is only death.

Here are the tombs of my kinsfolk, the first of an ancient name,
Chiefs who were slain on the warfield, and women who died in flame;
They are gods, these kings of the foretime, they are spirits who guard our race—
Ever I watch and worship; they sit with a marble face.

And the myriad idols around me, and the legion of muttering priests,
The revels and rites unholy, the sacrilegious feasts!
What have they wrung from the silence? Hath even a whisper come
Of the secret—Whence and Whither? Alas! for the gods are dumb.

Shall I list to the words of the English, who come from the uttermost sea?
"The secret, hath it been told you, and what is your message to me?"
It has nought but the wide-world story how the earth and the heavens began,
How the Gods are glad and angry, and a Deity once was a man.

I had thought, "Perchance in the cities where the rulers of India dwell,
Whose orders flash from the far land, who girdle the earth with a spell,
They have fathomed the depths we float on, or measured the unknown main—"
Sadly they turn from the venture, and say that the quest is vain.

Is life, then, a dream and delusion, and where shall the dreamer awake?
Is the world seen like shadows on water, and what if the mirror break?
Shall it pass, as a camp that is struck, as a tent that is gathered and gone
From the sands that were lamp-lit at eve, and at morning are level and lone?

Is there nought in the heaven above, whence the levin are hurled,
But the wind that is swept around us by the rush of the rolling world?
The wind that shall scatter my ashes, and bear me silence and sleep
With the dirge, and the sounds of lamenting, and voices of women who weep.

IMMORTALITY AND MODERN THOUGHT.

BY PROF. JOSEPH LE CONTE.

IT will be admitted, we think, that the tendencies of modern science are materialistic. This is especially true of biology. In fact, to many the doctrine of the correlation of vital with physical force, and the doctrine of derivative origin of species, seem little short of a demonstration of materialism. Thus materialism has become a fashion of thought; but, like all fashions, it has run into excess, which must be followed by reaction. We believe that the reaction has already commenced. Science sees now, more clearly than ever before, its own limits. It acknowledges its impotence to bridge the chasm between the physical and the psychical. We pass from physical to chemical, and from chemical to vital, without break. All is motion, and nothing more; also, in the region of the vital, we pass from sense-impression through nerve-thrill to brain-changes, and still we find only motions. But when, just here, there emerge consciousness, thought, will, the relation of these to brain-changes is just as unimaginable as the appearance of the genii when Aladdin's lamp is rubbed.

It is impossible to emphasize this point too strongly. Suppose a living brain be exposed to an observer, with infinitely perfect senses. Such an observer would see, could see, only molecular movements. But the subject knows nothing of all this. His experiences are of a totally different order, viz., consciousness, thought, etc. Viewed from the *outside* there is nothing but motions; viewed from the *inside* nothing but thought, etc.;—from the one side only material phenomena; from the other only psychical phenomena. May we not generalize this fact? May we not extend it to nature also? From the *outside* we find nothing but motion. From the *inside* there must be consciousness, thought, etc.,—in a word, God. To bridge this chasm, whether in nature or the brain, science is impotent. As to what is on the other side of material phenomena, she is *agnostic*, but cannot be materialistic.

Admitting, then, in man, a world of phenomena, which cannot be construed in terms of motion, and which, for convenience, we group under the name "spirit," is the group permanent? Is the spirit immortal? On this subject science can say absolutely nothing. The field is, therefore, open for evidence from any quarter, and of any degree. Some of these evidences, though not given by science, are at least suggested by lines of scientific thought. A few of these we briefly mention.

1. We have said that consciousness and thought lie behind material phenomena, in nature and in the human brain. In the one case we call it God, the divine Spirit; in the other, the spirit of man. Now, does not this identity, or similarity of relation to material phenomena, imply, or at least suggest, *similarity of nature*, and therefore immortality for the spirit of man?

2. Individual human life passes through its little cycle of changes, and quickly closes in death. If this be all, then, *for the individual*, when all is done, it is precisely as if it had never been. "Yes," answers the Comtist, "for the individual, but not for humanity." Every human life leaves a residuum, which enters into the life and growth of humanity. It is a glorious and unselfish religion thus to merge one's self into the only true object of worship—humanity. But, alas! the cycle of humanity also closes; and for humanity, too, when all is done, it will be precisely as if it had never been. "But the earth—the cosmos—abides." Yes, but only a little longer. Science declares that the cycle of the cosmos must also close. And then, when all is done, after all this process of evolution reaching upward to find its completion in man—after all the yearnings, hopes, struggles, and triumphs of man, what is the outcome? It is precisely as if the cosmos had never been. It is all literally "a tale told by an idiot, full of sound and fury, signifying nothing." Not only heart, but reason, revolts against such a final outcome. If we believe that reason underlies the phenomena of the cosmos, we cannot accept such a

result. We cannot believe that the cosmos has no intelligible end. But what intelligible end is there conceivable, unless something is finally attained, which is not involved in a cycle, *i.e.*, unless man is immortal.

3. There are three primary divisions of our psychical nature, viz., sense, intellect, and will. There are three corresponding processes in making a complete rational philosophy, viz.:— (1) Instreaming of impressions of the external world through the senses (facts); (2) Elaboration of these into a consistent whole by the intellect (knowledge); (3) Outgoing of this knowledge in activity (conduct). Now a true working theory of life must satisfy all these. But scientific men are apt to think that only (1) and (2) are necessary; that true facts elaborated into consistent theory is all we need care for. Theologians, on the contrary, seem to think only (2) and (3) necessary: they elaborate a theory of life consistent with itself, and apparently satisfactory in its application to conduct, but are less careful to test its harmony with facts derived from the senses. But all three are necessary. The first furnishes the material, the second constructs the building, the third tests its suitableness for human habitation. All admit that successful application to art is the best test of true theory. But conduct is the art, corresponding to our theory of life, and, therefore, *the test of its truth.* Now, is not immortality, as an element of our theory of life, in the highest degree conducive of right conduct? Is not this a useful, yea a necessary, element in a working hypothesis?

4. But, it may be objected, animals, too, have brains; in them, too, we find evidences of something like consciousness and thought. Are they, too, immortal? If so, where shall we stop? We pass down by sliding-scale, without break, to the lowest verge of life. Shall we stop here? No: for vital is transmissible into physical forces. Thus all is immortal or none. Thus the hope of immortality vanishes, as it were, by evaporation.

This objection, though serious, is, we think, not fatal. To

make our view clear, we use an illustration from biology. May we not imagine that in animals spirit is in embryo in the womb of Nature, unconscious of self, and incapable of independent life; and that in man it came to birth—a separate spirit—individual, conscious of self, and capable of independent life, on a new and higher plane? According to this view, geological time is the process of gestation, evolution is the process of development, and the appearance of man the act of birth.—*Science.*

PENCILLINGS FROM PRINCE EDWARD COUNTY.

AS I have been spending the greater part of my summer vacation in this county, I wish to briefly introduce to the many readers of our deservedly popular journal some points of interest within its boundaries.

Prince Edward County, once undoubtedly an island, now a peninsula, is soon to become an artificial island by the cutting of the Murray Bay Canal across the short and narrow isthmus which connects this county with the eastern part of Northumberland. Its length from west to east is about sixty miles, and breadth very irregular, varying from twenty-five to two miles. The geological formation is entirely limestone, covered with an exceedingly fertile soil, which, though thin in many places, bears fabulous crops of the famous Bay Barley. Nearly every acre in the county can be brought under cultivation. The inhabitants are mostly the descendants of U. E. Loyalists, and Americanisms in speech and customs are quite noticeable. The loyalty of the early settlers was evinced not only in the name of the county, but also in the names of the townships: Ameliasburg, Sophiasburg, North and South Marysburg were named in honor of the princesses royal of George the Third's family.

The configuration of the county precludes the possibility of long rivers, but the long and deeply-indented coast-line facing Lake Ontario on the west and south, and the Bay of Quinte (pray don't say *kan-tay*, but *kwin-tee*) on the north and east,

places every hamlet within a couple hours' drive of a wharf or commodious harbor. The consequent facilities with which agricultural products can be shipped, and goods brought into the county, places the farming community in a decidedly advantageous position.

Until very recently this county would have furnished Ruskin with his ideal elysium, in one respect at any rate, for it is not more than half a decade since that the snort of the iron-horse was unknown within its limits.

The first place of interest which I will notice is the Wellington Sand Banks. Wellington village is situated on the southern coast of the county, just at the western point of curvature of a bay of the same name which bends around to the east and south-east with an arc of about six miles as coast-line. For about two-thirds of the distance the beach is covered with sand dunes, rising from ten to one hundred feet. These hills of sand were at one time, and that not more than two generations since, covered with a magnificent growth of cedar and dwarf sand-cherry trees, but the thoughtless cupidity of fishermen and farmers has long since stripped them of their beautiful evergreen robe.

The origin of these huge sand banks seems easy to determine. The bed of Wellington Bay is one vast deposit of fine water-worn sand, and every strong south-west wind churns the billows so as to throw up and deposit on the pebbly beach a layer more or less thick of this sand, which, as soon as dried by the wind and sun, is blown up the face of the banks and deposited either on their flattened summits (if sheltered) or carried over and deposited on its rear or leeward side. Previously to the stripping of these sand banks of their garb of green they rose direct from the beach, so close to it that the incoming billows beat against their base, but within the past sixty years those vast dunes have started on a dubious and destructive pilgrimage.

The roots and dense foliage of the cedar forest which once covered these banks held the sand and made the sand hills a

fixture; they kept growing, but they grew symmetrically by accretions of sand from base to summit; but now, with nothing to hold the sand over fully half the area, a veritable simoon occurs with our March and November winds, and the banks have receded in some places thirty or forty rods from the water's edge. For about two miles from the western end of the banks their recession has been slight, partly owing to a partial second growth of cedars, and wherever over this distance any retrogression has occurred, the sand has simply moved into West Lake, encroaching upon its waters and doing no harm to any one. Not so harmless, however, has been the wanderings of those mountains of sand towards their eastern limit; there, where the greatest masses exist, they have covered up in their onward march forest, farms and houses. A pic-nic party which I accompanied to the Banks, about the middle of July, engaged in sports on a plain of clean, compact sand forty feet above a farm-house and orchard buried beneath; indeed, some of the old folks in the neighborhood say that they had often visited at this house when young. The public highway has been removed three times to avoid these shifting, desert-like stretches, and this last spring the township council bought another right of way eighty rods east of the track in use last summer. Tall oaks, once the pride of the forest, girt round with a crushing, smothering weight of sand fifty feet deep, still hold out their dried, mutilated topmost limbs as memorials of the living death they suffered.

The annual progress of the sand over this fertile area is in some places four or five feet, and in others as many rods. Two fields of spring grain have each lost a large fraction of their crop since May last by sand drifts.

The March winds, when sweeping over these banks, beat the sand so mercilessly upon the young pines and cedars as to snap them off like pipe-stems.

The advancing boundary of these banks varies in appearance. In the woods it presents a steep, precipitous face, from twenty to sixty feet high, at an angle of thirty degrees and less from

the perpendicular, while in the the open and cultivated fields it lies in low, long stretches, like yellow snow.

Along the steep northern faces of these banks you will see just at the crest an irregular, narrow fissure, less than an inch wide and apparently not very deep. One of the pic-nic party, Mr. W. Cronk, volunteered to explain the meaning of this if I would procure a spade. A neighboring house soon furnished the requisite tool, and Mr. C. was soon at work. After digging on the face of the bank just below the crest for about two feet, the spade rang out on some hard substance which proved to be one of last winter's snow-banks preserved and solidified by the supervening sand. We cut out some large blocks of the crystal snow, enough to allow the party to engage in a genuine winter game of snow-ball, on a July day, with the thermometer at 85° in the shade.

The sand of these immense mounds is of a very fine grain, and will not soil the most delicate fabric. It is so clean and free from impurities that damsels clad in silks and muslins literally go baptizing in the soft sand without the slightest damage to their apparel.

The appearance of the banks when alternate sunshine and shadow chase each other over their summits is decidedly picturesque.

The visitor to this place may take the choice of two most charming rides. One along the beach from the Lake Shore House, at the south-eastern extremity of the banks, to Wellington village gives a charming view—the blue waters of Ontario on one side, on the other "the ribbed sea-sand" in vast pyramids, or the dark waters of West Lake. Should the day be a windy one, or your horse skittish, take the other from the same starting point toward Bloomfield. You pass comfortable farm houses and highly cultivated farms, driving beneath the longest avenues of hand-planted maples skirting the road-side that I have seen anywhere. One venerable old monarch of the woods has been reverently allowed to stand in the middle of the road—a maple, whose trunk circumference I found by

actual measurement to be twelve and one half feet, while its umbrageous branches cover an area having a circumference of one hundred and eighty feet. O. J. J.

LUBBOCK ON LEAVES.

(Continued from page 108.)

HITHERTO I have dealt with plants in which one main consideration appears to be the securing as much light and air as possible. English trees may be said, as a general rule, to be glad of as much sun as they can get. But a glance at any shrubbery is sufficient to show that we cannot explain all leaves in this manner, and in tropical countries some plants, at any rate, find the sun too much for them. In illustration, perhaps the clearest evidence is afforded by some Australian species, especially the eucalypti and acacias. Here the adaptations which we meet with are directed, not to the courting, but to the avoidance, of light. The typical leaves of acacias are pinnate, with a number of leaflets. On the other hand, many of the Australian acacias have leaves—or, to speak more correctly, phyllodes—more or less elongated or willow-like. But if we raise them from seed we find, for instance, in acacia salicine, so called from its resemblance to a willow, that the first leaves are pinnate, and differ in nothing from those characteristics of the germs. In the latter ones, however, the leaflets are reduced in number, and the leafstalk is slightly compressed laterally. The fifth or sixth leaf, perhaps, will have the leaflets reduced to a single pair, and the leafstalk still more flattened, while, when the plant is a little older, nothing remains except the flattened petiole. This in shape, as already observed, much resembles a narrow willow leaf, but flattened laterally, so that it carries its edge upwards, and consequently exposes as little surface as possible to the overpowering sun. In some species the long and narrow phyllodes carry this still further by hanging downwards, and in such cases they often assume a

scimitar-like form. This, I would venture to suggest, may be in consequence of one side being turned outwards, and therefore under more favorable conditions.

We have hitherto been considering, for the most part, deciduous trees. It is generally supposed that in autumn the leaves drop off because they die. My impression is that most persons would be very much surprised to hear that this is not altogether the case. In fact, however, the separation is a vital process, and, if a bough is killed, the leaves are not thrown off, but remain attached to it. Indeed, the dead leaves not only remain *in situ*, but they are still firmly attached. Being dead and withered, they give the impression that the least shock would detach them; on the contrary, however, they will often bear a weight of as much as two pounds without coming off.

Some leaves, as those of most of the evergreens, which remain on the tree for several years, are tough and leathery, while in others, as the English holly, they are spinose. This serves as a protection from browsing animals; and in this way we can, I think, explain the curious fact that, while young hollies have spiny leaves, those of older trees, which are out of the reach of browsing animals, tend to become quite unharmed.

Another point of much importance in the economy of leaves is the presence or absence of hairs. The hairs which occur in so many leaves are of several types. Thus, leaves are called silky when clothed with long, even, shining hairs (silver weed); pubescent or downy when they are clothed with soft, short hairs (strawberry); pilose when the hairs are long and scattered (herb-robert); rillous when the hairs are rather long, soft, white, and close (forget-me-not); hirsute when the hairs are long and numerous (rose-campion); hispid when they are erect and stiff (borage); setose when they are long, spreading, and bristly (poppy); tomentose when they are rather short, soft, and matted; woolly when long, oppressed, curly, but not matted (corn-centaury); velvety when the pubescence is short and soft to the touch (fox-glove); cobwebby when the hairs are long, very fine, and interlaced like a cobweb (thistle). The arrangement

of the hairs is also interesting. In some plants there is a double row of hairs along the stem; in the chickweed only one. This, perhaps, serves to collect rain and dew. In some cases the hairs probably tend to preserve the leaves from being eaten; while in others, as Kerner has suggested, they apparently prevent the flowers from being robbed of their honey by insects which are not adapted to fertilize them.

It was long ago observed, though no reason was given for the fact, that among the mallows the species which produce honey are hairy, and those which do not are glabrous. If we make a list of our English plants, marking out which species have honey and which have hairs, we shall find that we may lay it down as a general rule that honey and hairs go together. I have made a rough list of the species in the English flora which have honey and which have *not* hairs. It does not profess to be exactly correct, but it comprises one hundred and ten species, in most of which the absence of hairs is easily accounted for, in that they are unnecessary.

In the first place, of these one hundred and ten species, in sixty the entrance to the honey is so narrow that even an ant could not force its way in; twenty are aquatic, and hence more or less protected from the visits of ants and other creeping insects; six are early spring plants, which flower before the ants are roused from their winter sleep; six are minute ground plants, to which hairs could be no protection; four are night flowers; there still remain a few to be accounted for individually, but probably the evidence is sufficiently complete to justify the general inference.

Some plant-forms tend to repeat themselves, and in some cases there seems much reason to suppose that one plant derives a substantial advantage from resembling another: for instance, the common dead nettl and the true stinging nettle. These two species belong to totally different families; the flowers are altogether unlike, but the general habit and form of the leaves is extremely similar. It cannot be doubted that the true nettle is protected by its power of stinging; and, that being so, it is

scarcely less clear that the dead nettle must be protected by its likeness to the other. Assuming that the ancestor of the dead nettle had leaves possessing a faint resemblance to those of the true nettle, those in which the likeness was greatest would have the best chance of survival, and consequently of ripening seeds. There would be a tendency, therefore, according to the well-known principles of Mr. Darwin, to a closer and closer resemblance. Leaves which float on the surface of still water tend to be round. In running water, on the contrary, leaves tend to become more or less elongated; and subaqueous leaves of fresh-water plants have a great tendency either to become long and grass-like, or to be divided in more or less hair-like filaments.

On the whole, we see, I think, that many, at any rate, of the forms presented by leaves have reference to the conditions and requirements of the plant; and if my main argument is correct, it opens out a very wide and interesting field of study, for every one of the almost infinite forms of leaves must have some cause and explanation.

ONE'S opinion of the individual described in the following words will depend very much upon the punctuation given: "He is an old and experienced man in vice and wickedness he is never found in opposing the works of iniquity he takes delight in the downfall of his neighbors he never rejoices in the prosperity of any of his fellow-creatures he is always ready to assist in destroying the peace of society he takes no pleasure in serving the Lord he is uncommonly diligent in sowing discord among his friends and acquaintances he takes no pride in laboring to promote the cause of Christianity he has not been negligent in endeavoring to stigmatize all public teachers he makes no effort to subdue his evil passions he strives hard to build up Satan's kingdom he lends no aid to the support of the Gospel among the heathen he contributes largely to the evil adversary he will never go to the abode of the good he must go where he will receive a just recompense."

EDITORIAL.

PHONETIC REFORM IN INDIA.—According to the Imperial census of 1881, there are 130 languages and dialects current in India. In most of the vernaculars from one to three years are required to master the elementary art of reading. The census states that three or four per cent. of the population are able to read, and probably but one-half of these, who will belong to the upper classes exclusively, are able to get much benefit from their reading. There are only about fifty different sounds in all the Indian vernaculars, and the great difficulty which exists in the way of learning to read is altogether unnecessary. The sounds are familiar to those whose mother tongues they are, and the learning of the signs should be a very simple matter. The alphabets have from thirty-three to thirty-six simple consonants, and from ten to fourteen vowels and semi-vowels. Vowels which begin a word have an initial form, and when they follow the consonants they are represented by modifications of the consonantal forms. The semi-vowels, of which there are four, combine with the consonants and give totally new forms, called compound consonants. When two or three, or even four, consonants come together they are written in curiously complex combination-forms, and for the formation of these combinations no general rule holds. These combinations may be further complicated by having the numerous medial vowel forms attached to them. Counting the *anuswara*, which is a nasal symbol, and the *visarga*, a symbol for a hard breathing, the number of forms which must be committed to memory before being able to read is upward of five hundred. For the 130 vernaculars, thirty or forty alphabets are used, each having about five hundred forms; so that, if a scholar wishes to study all these languages, he must become familiar with ten thousand alphabetical forms. Yet there are only fifty distinct sounds. The government have been taking some steps in the matter, Sir W. W. Hunter, an ardent spelling reformer, being a member of the Council of India. A consistent phonetic spelling of all

the Hindostanee proper names is now enforced in government offices. Many of these dialects are so closely related that the natives using one dialect are able to understand the speech of those using another, while they cannot read one another's books. To remedy this state of affairs, it is proposed to adopt one alphabet of simple forms, in place of the complicated systems now in use, to use the Roman letters as far as they will go, to adopt the new letters agreed upon by the phonetic reformers of England, and to use for the cerebral sounds the mark universally used by Orientalists, a dot beneath the letter, and for the sub-palatal sounds a dash beneath the letter. Rev. J. Knowles, of the London Mission, Travancore, writes in the *Orientalist* of India, that in missionary work the crying need is some simple system by which the people may be taught to read, and the system which stands the best chance of winning the day is that agreed upon by the great philologists and educationalists of England, belonging to the Spelling Reform Association, after three years' careful experimentation and comparison. By this method an adult may learn to read in a few days, and a child in three months. This boon will yet be ours. Who will erect a statue "Spelling Reform Enlightening the World?"

SPELLING REFORM IN TURKEY.—The "unspeakable Turk" has made a move in the right direction. He is said to have the very worst spelling in the world. It is impossible to guess from the spelling how to pronounce a Turkish word. So the Ottoman Porte, ahead of the self-complacent West, has decided upon the constitution of an Academy for the purpose of carrying out a spelling reform in the department of public instruction.

SPELLING REFORM IN JAPAN.—According to *Science*, "the *Romaji Zasshi* is a journal recently established in Japan with the object of introducing the use of the Roman alphabet to spell phonetically the Japanese words. The journal is partially supported by the Government, and is the official organ of a

society of some four thousand two hundred members, which aims to do away with the Chinese characters in Japanese literature."

PHONETICS IN COLLEGES.—There is one class of men who, beside the absolutely ignorant, offer opposition to phonetic reform, and it is composed of many of the ordinary men of letters and the professors of ornamental scholarship. The philologists in professorial chairs and out of them are of but one voice in this matter, and the practical linguists are falling in line now as phonetic alphabets are coming into use in studying foreign languages, some going so far as to propose the use of some system of shorthand to represent all sounds of all languages. No language can be mastered thoroughly except through a phonetic notation. In the matter of phonetics England leads, but the results reached have been the outcome of private study, and while eagerly appropriated by scholars and professors abroad, they have been treated with indifference by the English universities. England and America cannot boast of the provision made in the universities for the study of French and German, which is wretched in the extreme; and, at the same time, modern English, which should be the basis of philological study for Englishmen, is studied more thoroughly and on better methods in foreign universities than in our own. If French and German, in connection with the English, were brought under the treatment of a "living philology," embracing both phonetics and psychology, by teachers appointed in our universities, new vigor would be infused into the study. Then scholars and literary men would be led to see the value of phonetics. Mr. A. J. Ellis claims that he can read Chaucer in a way which Chaucer himself would understand, and which preserves the music of many of his lines. "It would become possible to produce a Greek play with a style of pronunciation in harmony both with history and with the quantitative metre of ancient prosody, instead of the modernized doggerel now in vogue on such occasions." One thing our colleges should recognize, and

that is that phonetics form the only true introduction to all study of language, and that an artistic pronunciation of either a foreign language or of our own is scarcely possible without phonetic investigation and analysis. Phonetics form the sure basis for teaching elocution and oratory, yet a man may go through a distinguished college course, and be able to detect unerringly a wrong accent or a false quantity in a Greek prize poem, and be able neither to analyze phonetically many English words, nor to give an intelligent account of the elementary sounds of his mother tongue. This lack in university training in language is the great cause of the indifference of ordinary literary men to the importance of phonetic reform.

A CHEMICAL WONDER.—*Science* for July says that the chemical wonder of the London Inventions Exhibition is the manufacture of oxygen by the process of Brin frères. By an ingenious process they can take up oxygen from the air, through an artificial lung made of a hydrous oxide of barium. The air is drawn through a vessel of quicklime, which absorbs the carbonic acid and water and leaves only oxygen and nitrogen. The gases are then drawn off into the retorts, heated to 500°, and the artificial lung absorbs the oxygen, and the nitrogen is drawn off to a gasometer to be converted into ammonia, etc. The Brins claim that they have made a revolution in chemistry. Heretofore the lung of baryta had to be renewed every twenty-four hours, at great expense. They have made it virtually indestructible and unchangeable. They claim an almost fabulous reduction in the cost of production. The nitrogen at first wasted is, by an invention of these Brin brothers, converted into ammoniacal salts for manure. Oxygen in large quantities means a revolution in half the processes of chemical industries. For ventilation, ærating water without carbonic acid, for increasing the heat of blast furnaces, and the light of lamps, and for almost innumerable purposes, its uses are self-evident. With an indestructible lung for the instrument, and atmosphere as a reservoir, the supply of oxygen is practically infinite.

AN ANATOMICAL WONDER.—Has man a tail? A tail is generally understood to be "a distinct posterior prolongation of the body, containing a greater or less number of vertebræ." Comparative anatomy designates all the vertebræ behind the sacrum as caudal; so, upon the examination of the human skeleton, we are obliged to regard the coccyx as a true tail. In the embryo, during the second month of gestation, it does form a distinct conical projection; so, whatever we may consider the significance of the fact, man has a genuine rudimentary tail. If man, as far as his physical structure is concerned, is descended from long-tailed ancestors, we should find evidence of this in the embryonic stages. A recent correspondent of one of our exchanges quotes Prof. Hermann Fol, of Geneva, to support the affirmative. He says "he has found that beside the thirty-three or thirty-four vertebræ which persist into adult life, there are other temporary ones." In an embryo five and six-tenths millimetres (about twenty-five days), Fol found only thirty-two vertebræ. Prof. W. His had found thirty-three in an embryo a little larger—seven millimetres. Fol suspected a further increase, and in two embryos of eight or nine millimetres he found thirty-eight vertebræ. This was found to be normal. "The notochord extended almost to the end. The terminal vertebræ had only an ephemeral existence. In embryos of twelve millimetres (six weeks), the thirty-sixth to thirty-eighth vertebræ had fused into a single mass. In embryos of nineteen millimetres, the last five vertebræ have apparently fused to make the permanent thirty-fourth." It is easy to say that this is all *Fol*-de-rol, but if it be fact, we can only accept or suffer from the *lex* tail-*ionis*. Truth is stronger than fiction.

A ZOOLOGICAL WONDER.—The researches of Miss Marie Von Chauvin, extending over a period of ten years, as to the biological relations of the amphibians, have led to many interesting results as to the power of environment to modify an organism, some of which are here given. She experimented with

the Mexican axolotl, and she has demonstrated that by certain treatment, under certain conditions, the aquatic axolotl, breathing by means of gills, can be transformed into the terrestrial amblystoma, which breathes by means of lungs. Younger specimens were more easily transformed than older ones, but axolotls changed more rapidly into amblystomas if kept in water containing little air. In richly aerated water the conversion was slow. It was further shown that if external compulsion toward change was carried up to a certain point, they would complete it in spite of hindrance. In some cases, after the individual had become completely adapted to a terrestrial life, it retained for a long time the power to live in water, though the gills were absorbed. This power disappears after the first moulting. Return to the former life was then impossible. On the other hand, axolotls which had lived for months in damp moss, but had not changed their skins, were perfectly at home when placed again in the water. The following metamorphoses occurred in the life of an axolotl of three years and a half:—"The first fifteen months it spent naturally, without interference, in the water; its development was then artificially accelerated, and in twelve days it was transformed into a lung-breathing animal; it then lived on land for fifteen and a half months; it was next, during a lapse of six days, brought back to the water, where it spent three and a half months; in the space of eleven days it was again so modified that it could once more live on land, where it remained for more than six months up to its death." These experiments show that the external conditions of life—the most important of which are water, air, and heat—can transform the nature of an animal; but, in opposition to these external agencies, there are powerful internal forces, acquired by inheritance, which can be directed, but never entirely suppressed. This caused the failure of many experiments. In Miss Chauvin's experimental tub occurred again what happened after "the dry land appeared," and the vertebrates, discarding gills for lungs, became land animals.

THE DANCING MANIA.—The latest work issued in the cheap form of the Humboldt Library bears the above name, and in its pages presents some very curious facts in connection with the origin and nature of the various epidemic dances of the middle ages. St. Vitus' and St. John's dances of Germany, tarantism of Italy, the tigretier of Abyssinia, and the religious manias of England and America, are referred to in order; though in the last the author, Dr. Hecker, would certainly find some opposition among the historians of early Methodism. A few remarks in reference to St. Vitus may prove interesting. A Sicilian youth, martyred in 303 A.D., his fame developed after his death, and tradition honored his memory and ascribed to him miraculous powers, including that of being able to cure the dancing mania. His shrine, therefore, in the early part of the fifteenth century became the resort of hysterical crowds of the dancing maniacs of Strasburg. Starting at first from the wild, long-continued, bacchanalian revels of religious feasts, the epidemic spread with wonderful rapidity, until in a few years every town of south-western Germany became the scene of shrieking crowds of maniacs, who leaped and shouted until, falling in convulsions, they swooned away, only to revive, and with foaming mouth rejoin the mob. Curiosity attracted crowds of spectators, who were irresistibly drawn into the mad dance, and the malady soon rendered them powerless to retire. The chapters give us an insight into one of the most horrifying but interesting phases of human nature.

GENERAL GRANT AND HIS BOOK.—The General began to work at his book almost immediately after the Grant & Ward failure. He wrote the first volume and one-third of the second with his own hand, when his sickness became so severe that death was hourly expected. Upon his recovery he requested his publishers to furnish him with a stenographer, and then every morning he dictated his memoirs for an hour, and sometimes nearly two hours. His dictation was very rapid. Sometimes he looked at the few notes he had pencilled on brown manilla paper, but

generally talked as with a friend. He seldom hesitated for a word. The matter was copied out on the type-writer on large sheets of white paper and submitted to the General for revision. He sometimes added new matter and changed a word here and there, and then it was copied again and sent to the printers. It is a singular fact that the publishers saw no part of the book in Grant's own hand-writing. The first volume was written by the General, and copied by Colonel Fred. Grant, or on the type-writer. The General's own copy has been kept in the family. The books of reference to which the veteran referred for figures and dates were big heavily-bound ledger books, which contain the General's journal, kept during the war, in which his secretary entered the important occurrences of the day, and posted the letters, documents, charts, etc., which accumulated in the natural course of events. These thirty volumes contain a detailed history of all the General's military doings during the war.

LYING IN ROUND NUMBERS.—It is a proverb that "nothing can lie like facts, except figures." A rather suggestive commentary on this is found in some peculiarities in the age statistics of the United States, unearthed by Joseph Jastrow. He tells us that shortly after the issue of the present census reports, attention was called to the peculiar fact, that a very much larger number of persons were recorded as being just 20 or just 50 years old than there were as being 19 or 49. Of course, there ought to be fewer. There seems to be an attraction toward the round numbers. It is found all the way up to 90 years of age. To institute comparisons, he subtracted the number of persons recorded as 9 years old from the number recorded as 10, and expressed this excess in percentage of the number at 9 years. The same was done at 19 and 20, and so on. This is called the "10 exaggeration." The average "10 exaggeration" for the United States is 71¼ per cent.; among the colored people the exaggeration is enormous, viz., 432 per cent. In other words, there are 5⅓ times as many colored people recorded

at any age containing a multiple of ten as at any preceding age. The native whites are the best, with the average excess of 28 per cent. The average of the foreign born is 103 per cent. Ignorance of the language may account for a part of this. The gentler sex exaggerates more than the male sex. For the total population the male average exaggeration is 61 per cent., the female 81 per cent. The "5 exaggeration" follows the same law as to race and sex as the "10 exaggeration." The native whites of the Southern States seem to be affected by association with the "round-number" loving negroes, as they have a high average. The New England States rank highest, of which Rhode Island is the least exact. Iowa, Ohio, Pennsylvania, Indiana, Minnesota, Wisconsin and Michigan also stand high as to veracity. The exaggeration varies for different ages. It is found that persons in the neighborhood of 10 years of age are as apt to call themselves 10, as those about 19 are to call themselves 20. After these two periods of equal exaggeration, there is a uniform increase in the excess for each decade until the maximum is reached at 60, and after that point there is a fall till 90 is reached. It would seem as if a man had to live ninety years to begin to learn to be perfectly truthful in the matter of age. Among the colored people the excess at the age of 60 is 930 per cent., that is, ten times as many colored people claim to be 60 as 59. Why the excess should be greatest at 60 is not easily explained; nor why the greatest "5 exaggeration" should be at 45. It is interesting to note, that in the seventy-eighth and ninth decades of life the greatest difference between the exaggerations of the sexes occur, the woman, of course, taking the lead with the highest percentage. It would seem to indicate that old women are more forgetful of their ages than old men. Does it point to the fact that a woman will often count more anxiously the increasing years of her spouse than her own? There is another exaggeration, and that is found in the case of 21 years of age. This, of course, is due to political reasons, and consequently the native male whites, the most reliable at all other ages, are here the greatest offenders. The

inhabitants of the Western States are the worst, and New England the best. It is found, by a comparison of the census returns of 1870 and 1880, that the colored race are becoming more exact, having decreased their excess from 1267 per cent. to 647 per cent. in ten years. Some parts of Jastrow's summary sound like readings from the book of judgment. "There is nothing hidden which shall not be revealed."

PIPE ORGANS.

IN the various kinds of musical instruments known to-day, we find represented four different methods of producing sound—by vibrating reeds, strings, plates, and columns of air. Under the head of reed instruments are included the cabinet-organ, the concertina, and the clarionet; among stringed instruments, the piano, the violin, the harp, and the guitar; among those having vibrating plates, the drum, cymbals, and bells; and among those having vibrating air columns, the flute, the cornet, and the pipe organ. Each class of instruments has its own peculiar merits and demerits; but in this paper we wish to consider a few points of interest in connection with the last class mentioned.

If I take a test tube, and blow quietly over the mouth of it, I obtain a certain sound. By blowing harder, I get another higher sound; and by blowing still harder, I get a very shrill note. The shorter the tube, the higher in pitch is each of these sounds respectively. Suppose, now, that we take such a tube, capable of giving us three different sounds. In the first case, all the air in the tube vibrates as one body. The tone thus produced is the lowest that the tube is capable of sounding. If I blow harder, the sound will be higher. This is because the air in the tube vibrates in two parts, which are called ventral segments, and which are separated by a plane called the nodal plane. The sound heard is that given by the vibration of the air above the nodal plane, and is of the same

pitch as that made by a tube whose length equals the distance from the nodal plane to the top of the tube. If I blow still harder, the tube becomes divided into smaller ventral segments, the number of nodal planes increases accordingly, and the sound is the same as that produced by a tube the length of the part above the upper nodal plane. At the nodal planes the air is at rest, while at the mouth of the tube it is in the state of greatest agitation. Consequently the mouth of the tube is the centre of a ventral segment. In the second case, also, the distance of the nodal plane from the top is one-third of the length of the tube, and in the third case, that of the upper nodal plane is one-fifth and the other three-fifths of the length of the tube.

In open tubes, that is those open at both ends, the vibration is different. A nodal plane is formed in the centre, and the air vibrates in two parts, which means really that we have two closed tubes, each half the length of the open one, sounding together. The sound thus made has double the intensity of that of a closed tube half as long as the open one, and it is the lowest tone the tube can emit. By blowing harder, two nodal planes are formed, the distance of each one from each end being one-quarter the length of the tube. The sound thus given out is equal in pitch and intensity to that of two closed tubes, one-quarter the length of the open one, sounded together.

Now, let us apply these facts practically. Many of us remember how, in boyhood, at the proper season of the year, we constructed small wooden whistles for ourselves out of basswood or leatherwood. Unconsciously we were young scientists, applying acoustical laws to the manufacture of musical instruments—Willises and Warrens in organ-building, each organ having in its construction one closed pipe.

The flute is an instrument which, when it has keys enough to produce all the notes of the chromatic scale, has twelve pipes. By blowing quietly, and performing the necessary fingering, we can sound each of these pipes at its lowest pitch.

By blowing harder we divide them into smaller ventral segments, and sound each one an octave higher. In the cornet, still greater use is made of the nodal planes. The chief skill of the player lies in his ability to blow properly, so as to arrange the proper number of nodal planes in his instrument.

The pipe organ is the most typical instrument of the class we are considering. It is a collection of both open and closed tubes, so arranged as to be all more or less under the control of the performer at the same time. The history of this instrument is merely a narrative of the efforts made by men to bring under control the largest number of these tubes, and to make the action as easy and noiseless as possible. In this article we called our wooden whistle an organ. Here we may say, also, that the flute, the cornet, and kindred instruments are, in the same way, organs, possessing a greater or lesser number of pipes. In the first manufacture of these instruments, which was as much as forty centuries ago, we see the wooden pipe organ in embryo, and, by a little close observation, we can follow the development of this noble instrument from this source to its present stage.

After the invention of the flute, it was soon found that if the mouthpiece was placed in the end, one performer could play on two of these instruments at the same time. This accordingly was very often done, and so the first step was taken towards the perfection of the organ. In Egyptian monuments we can find figures of men thus playing on the double flute.

So far the supply of wind was furnished from the lungs; but with the increase in the number of pipes which were to be played together, other blowing appliances were necessary. So the next step was to have a number of flutes placed on end over a chamber supplied with air by a hand-bellows. These pipes were made to speak or be silent by means of small pieces of wood, which, on being pulled forward or backward, admitted the supply of air to the pipes or shut it off again. In course of time these pieces of wood were acted upon by keys, made different from modern ones in that the sharp ones were white

and the natural ones black. There are those who claim great antiquity for organs of as complicated a structure as this. The *magrepha*, though not mentioned in the Bible, is described in the Talmud as an organ with ten keys, and ten pipes to each key, of very powerful tone, used in the Temple of Jerusalem. This, however, might be true, and at the same time differ very greatly from modern instruments, not only in capabilities but also in structure. As the organ increased in size, the number of blowers necessarily became larger; and in Saxon times it was not an uncommon sight to see four or five men toiling at the bellows, and two or three others manipulating the clumsy wooden keys, and in this way "grinding" out the music to the comfort and inspiration of their delighted audiences.

Perhaps the most valuable improvement in the organ was made in the fifteenth century, when pedals, or keys for the feet, were introduced. By their means the organist is furnished with a source of harmony not to be found in any other instrument, and is enabled, with the enormous pipes placed under his command, to furnish music that is grand and thrilling in its effects. The Germans were not slow in utilizing and improving the appliance, but the English took very little notice of it till about the beginning of this century.

During the last four hundred years the instrument has undergone vast improvements. The necessity of having soft, quiet tones with which to accompany soloists and trained choirs when singing *pianissimo*, brought about the introduction of another bank of keys communicating with pipes of a very delicate tone. This combination is called the "choir organ." In order to easily and rapidly change the power and quality of the tones, the swell organ and stop action were added. Improvements were made in the bellows, in the keys, and in very many other particulars, and, as a result, we have the wooden pipe organ, so large that its pipes are numbered by thousands, that the air is supplied to it by water-power, that it can only be of service in the mighty cathedrals of the land,

yet so easily controlled that one man can, with ease, bring out the full capabilities of the instrument in the rendition of the soul-stirring strains of a Mendelssohn's wedding-march, or call forth feelings of devotion in the heart by the subdued symphonies of a Beethoven or a Mozart.

T. H. FOLLICK.

EL CAPITAN.

THE most impressive granite wonder in the Yosemite Valley is the great rock El Capitan, gray in the shadow and white in the sun. Standing out a vast cube with a mile front, a half-mile side, and three-fifths of a mile high, and seventy-three hundred feet above the sea, it is almost the crowning triumph of solid geometry. Thirty "Palace Hotels," seven stories each, piled one above another, would just reach the hanging eaves of El Capitan—two hundred and ten granite stories by lawful count. Well did the Indians christen him *Tu-toch-ah-nu-lah*—Great Chief of the Valley. He fronts you when you catch your first glimpse from Inspiration Point. Had there been any fourteenth story windows, you would have looked squarely into them. When you reach the valley he towers above you on the left. He grows grander and more solemn every step of the way. When you stand beneath him he blots out the world. When you reach the base he blots out the sky; for, though the wall seems to stand upright, the eaves project one hundred and three feet, a granite hood five hundred feet thick, but in the vastness you never see it. Get as far from him as you can, he never diminishes. He follows you as you go. He is the overwhelming presence in the place. A record in the Grand Register runs thus: "A lady fellow-traveller, struck by the constant appearance of El Capitan in the Valley, suggested that it recalls the Rabbinical (?) legend, 'The Rock that followed them was Christ.'"

You never tire of seeing eastern sunshine move down the front, like a smile on a human face. You never tire of seeing

the great shadows roll out across the broad meadows, as the sun descends or rises, like the tide in Fundy's Bay, till the valley is half filled with night, and the tips of the tall trees are dipped like pens in ink. You never weary of watching the light from a moon you cannot see, as it silvers the cornices and brightens the dusky front, as if wizards were painting their way down without stage or scaffold. A dark spot starts out in the light. It turns into a great cedar. Pines that stand about the base resemble shrubs along a garden wall. They are two hundred feet high. A few men have crept out to the eaves of El Capitan, looked over and crept back again. Little white clouds sail silently toward the lofty eaves and are gone, as to a dove-cote in a garret. And yet an earthquake in 1872 rocked him like a cradle, and the clocks in the valley all stopped, as though, when El Capitan was moved, then "time should be no longer." B. F. TAYLOR.

CONDUCTED WHOLLY IN ENGLISH.

A CURIOUS circumstance connected with the negotiations recently concluded at Tien-Tsin between the Chinese and Japanese with regard to Corea is that the discussions were conducted wholly in English. Li Hung Ching, the Chinese commissioner, knows no language except his own, but his secretaries and interpreters have been in Europe and have acquired English and French, while Count Ito, the Japanese plenipotentiary, understands English thoroughly. As a consequence he spoke throughout in that language; and it was agreed on both sides that this course was advisable, inasmuch as there was in English an ample vocabulary of clear and definite diplomatic terms, which cannot be said either of Chinese or Japanese. To find anything analagous to this, we must fancy French and English diplomatists in solemn conclave at Dover to arrange their future policy with regard to Belgium, and using the Chinese language as a means of communication.—*Selected.*

USE OF BIG WORDS.

"HE goes on his own hook" has been rendered more elegantly, in deference to and in accordance with the spirit of the times, in this manner: "He progresses on his own personal curve;" and a barber in London advertises that his "customers are shaved without incision or laceration for the microscopic sum of one halfpenny." "One might have heard a pin fall" is a proverbial expression of silence; but it has been eclipsed by the French phrase, "You might have heard the unfolding of a lady's cambric pocket-handkerchief;" and as it is somewhat vulgar to say "pitch darkness," it has been so improved as to read "bituminous obscurity." Another polite way of expressing the fact that a man is naturally lazy is to say that he is "constitutionally tired;" and "Nominate your poison" is the poetical way of asking, "What will you drink?"

On one occasion, we are told, a doctor of divinity rung the changes on "He that hath ears to hear, let him hear." "He that is accessible to auricular vibration," said the doctor, "let him not close the gates of his tympana." Then, again, we have that old-fashioned saying, "The more the merrier," delightfully translated in this way: "Multitudinous assemblages are the most provocative of cachinatory hilarity." It is even reported that not very long ago a clergyman spoke of seeing a young lady "with the pearl-drops of affection hanging and glistening on her cheek." He meant that she was crying. Certain critics, too, occasionally launch out in a similar metaphorical style. Concerning a young and aspiring orator, one wrote: "He broke the ice felicitously, and was immediately drowned with applause."

Quite recently a literary man of some celebrity, in a letter describing the early fall of snow in Switzerland, did not say the storm abated, but "the flakes dwindled to flocculi!" and instead of vulgarly putting it that they melted a potful of snow to obtain water, he said that firewood was "expended in rendering its own heat latent in the indispensable fluid." Equally

as good was that which relates to a certain eminent professor, who observed that very wonderful things were occasionally discovered nowadays. He had found out lately that "Nystagmus, or oscillation of the eye-balls, is an epileptiform affection of the cerebellular oculomotorial centres;" and he added, "Don't forget in future what sort of a thing a 'nystagmus' is."

"You have mentioned several times during the evening," observed one of the audience to a lecturer, "the word 'periphrasis;' would you kindly inform me of its precise meaning?" "Certainly," said he. "It is simply a circumlocutory and plenastic circle of oratorical sonorosity, circumscribing an atom of ideality, lost in verbal profundity." As this explanation was received in solemn silence we trust it was deemed a satisfactory one. It is, however, recorded that the gifted orator was not called upon again to explain for the rest of the evening.

London possesses a phraseology of its own, and is at times rather amusing than otherwise. Two pedestrians were recently accosted in terms the most magniloquent by a street beggar: "Good gentlemen, will you kindly administer the balm of consolation to a wretched and debilitated constitution?"

"Our 'buses," said a conductor in answer to an inquiry made, "runs a quarter arter, arf arter, quarter to, and at!" A young man from the country, while exploring one of the quiet lanes in the city for a dinner, had his ears mysteriously saluted by a shrill voice from an eating house, which uttered in rapid tones the following incomprehensible jargon: "Biledlamancapersors, Rosebeefrosegoos, Bilerabbitbileporkanonionsors, Rosemutton-antaters, Biledamancabbagevegetables, walkinsirtakeaseatsir!"

Sometimes, in ordinary conversation, we find people very apt to make use of a particular sentence or a somewhat puzzling word even, with merely a vague idea of its proper meaning. Take the following as an instance: A rich but ignorant lady, who was rather ambitious in her conversational style, in speaking of a friend, said, "He is a *paragram* of politeness." "Excuse me," said a wag sitting next to her, "but do you not mean a parallelogram?" "Of course I do," immediately replied the lady. "How could I have made such a mistake?"

It is well, by the way, to bear in mind a celebrated maxim of Lord Chesterfield's, which runs thus: "It is advisable, before you expatiate on any particular virtue, and give way to what your imagination may prompt you to say, to ascertain first whom you are speaking to." The following will exemplify the necessity of this precaution: "My dear boy," said a lady to a precocious youth of sixteen, "does your father design you to tread the intricate and thorny paths of a profession, the straight and narrow ways of the ministry, or revel in the flowery fields of literature?" "No, marm; dad says he's a-going to set me to work in the tater-field."

As an example of meaningless phraseology, take the following anecdote of O'Connell. In addressing a jury, and having exhausted every ordinary epithet of abuse, he stopped for a word, and then added, "This naufrageous ruffian." When afterwards asked by his friends the meaning of the word, he confessed he did not know, but said he "thought it sounded well." By this admission we are reminded of a certain critic who charged a flowery orator with using "mixed metamorphosis;" and of an afflicted widower who recorded on the tombstone of his deceased wife, that here lay the "meretricious mother of fourteen children."—*Chambers' Journal.*

SOME WONDERFUL VELOCITIES.

SEE, now, the wonderful velocities which must prevail among some of these great bodies! Knowing their mean distances from the sun and their periods, we readily calculate their hourly pace on their orbits. Mercury moves one hundred and nine thousand miles an hour; Venus eighty thousand; Earth sixty-eight thousand; Neptune eleven thousand; the comet of 1680, at its fastest, eight hundred and eighty-four thousand miles an hour. We have wondered at the great speed of the eagle, of the winds, of the cannon ball, of the moon, with her fifty-four thousand miles a day; yet the moon, on her monthly

journey about us, is but an indifferent traveller compared with the most leisurely of the planets. They all seem as if on some urgent errand—some errand of life and death. When one is resting his weary body from one-third to one-half of his whole time, and happens to think of the tremendous activity of those great revolving spheres, he is discontented with himself. That miraculous fleetness! What if these flying orbs should, through some want of balance in the system, encounter each other in mid-heaven?

NATURE'S TALES.

LIGHT tells us of strange worlds where there are two suns, one blood-red, the other deepest emerald. Strange indeed must be the changes beheld by the dweller on the planet of such a system, as it swings slowly to and fro, his world now glowing a fiery red, anon all pale green, and then flaming yellow, under the scorching rays of two suns.

But not of the stars alone are Nature's marvellous stories. She will tell of wonderful things on the earth; of the whirling dance of atoms in every leaping flame; of the clash of the grappling molecules as they build and unbuild in secret the forms of all visible things; of the fairy chains that are woven by the power that sculptures crystals; of the marvels of the magnet that man has taught to speak; of the stroke of the hurtling thunderbolt; of the crash of the down-rushing avalanche; of the awful fires of the volcano; of the mighty throes of the earthquake.

She will tell how the solid rocks unfold the tale of ancient life, and how that same life under different forms still throbs and pulses everywhere, from the eternal snows on the highest mountain peaks and in the wastes of the farthest Greenland; from the boiling springs of New Zealand and the alkaline lakes of La Plata, to the deepest depths of ocean, where dwell, amid darkness and eternal silence, those strange fish who never rise within a mile of the surface, and to whom daylight means death.

She will tell how every stagnant pool and every slimy puddle is peopled by countless myriads of living creatures, to whom a water-drop is a vast dominion, and a day a lifelong age.

She will tell how at the bottom of the ocean, unmoved by the fiercest blasts of the tempest, unswayed by the rush of the mightiest tidal wave, lies the oozy mother of all living things, slow pulsing to and fro with earth's possession, each mighty throb lasting 26,000 years!—*J. C. Glashan.*

THE POWER OF GROWTH.

THERE is no human engineering which can compare in power with the silent machinery of a growing forest. It has been estimated that the physical energy of the sap in the plant is four times that of the blood in man. Prof. Clark, of the Massachusetts Agricultural College, has recently succeeded in measuring the power of growth of a squash. He harnessed it in iron, put it in prison, and gave it a weight to lift. The squash, thus harnessed, was placed in a box in such a way that it could only grow by pushing upward and lifting a long lever with weights suspended on it. On Aug. 21st it was lifting 60 pounds; Sept. 15th it was lifting 1,400 pounds; Oct. 18th, 3,120 pounds; Oct. 31st, 5,000 pounds. How much more it could have carried is not known, for at this time the iron harness cut into the rind of the squash, thus putting an end to the experiment. There is, to our imagination, something grand in the thought of a force so vast, so almost incalculable, exerted without noise, and apparently far exceeding the ordinary exigencies of the plant. In every acre of well-cultivated ground a power is silently at work, which transcends man's mightiest machines by almost as much as the infinite transcends the finite.—*Illustrated Christian Weekly.*

WE should often turn our thoughts upon ourselves, and look into that part of the wallet which men commonly sling behind their backs that they may not see their own faults.

A TWELVE THOUSAND-FOLD SUN.

THE Sirius system is equal in light to sixty-three of our suns; the Pole-Star system to eighty-six. In each of these the two stars composing the system differ exceedingly from each other in brightness, and the larger star must be credited with the most brilliancy. Think of an eighty-fold sun! However, some stars are still more astonishing; Vega, for example, which blazes with the might of three hundred and forty-four suns; Capella, for example, which blazes with the light of four hundred and thirty; Arcturus, for example, which blazes with the light of five hundred and sixteen; Alcyone, for example, which blazes with the light of twelve thousand! As we have seen, our sun is no trifle. Its astonishing orb would fill the whole lunar orbit and would weigh down, eight hundred times over, its whole ponderous cortege of satellites, planets and comets. And yet it is only one of the lesser lights of space. Not the smallest, indeed—forbid it, little 61 Cygni—but still a mere rush-light and glow-worm as compared with many of the huge luminaries which pour their glories adown the immensity of nature. It could not remain visible a moment in the presence of such golden-haired and majestic day-kings as even Sirius and Polaris, to say nothing of those huger monarchs whose effulgence floods the celestial spaces.—*The Beautiful, the Wonderful, and the Wise.*

SELECTED NOTES.

IRON has been rolled in such thin sheets that 15,000 are required to make an inch in thickness.

IN 1870 the statistics show that with a population of 38,500,000 in the United States there were 16,010 professional musicians and teachers of music; while in 1880, with a population of 50,100,000, there were 30,477 musicians. In other words, that while the population has increased about one-third in ten years, the number of musicians has nearly doubled.

DR. CHIBRET, a French oculist, reports to the Academie de Medecine that, having been obliged to remove a diseased eye from a young girl, he replaced it with one taken from a rabbit. At the time of his statement fourteen days had elapsed, and the eye had retained its vitality and was doing well.

M. LEO ERRERA considers india ink, on account of its harmlessness and its intense coloration, a valuable aid in the study of certain microscopic organisms. He has kept infusoria, etc., alive for several days in a solution of that ink, the carbonic matter having little or no effect upon the life of such objects. For making durable preparations ink diluted with water is gradually replaced by ink diluted with glycerine. Many organisms which are distinguishable with difficulty in clear water are easily observed in water charged with india ink.

EXAMINATION QUESTIONS.

WE last month gave some specimens of the way young Canadian genius wrestled with examination questions. In this number we publish a few similar flashes of genius from over the sea. They were furnished to the *Pall Mall* (pronounced *pell mell*) *Gazette* by a correspondent, who vouches for their authenticity.

Ques.—How do we get the seasons?

Ans.—The earth goes round on its axis. The earth's axis is a pole put through the centre of the sun, which turns it round, and thus we get the seasons.

The equator is a line running through the centre of the earth. At one end is the tropic of Cancer and at the other is the tropic of Capricorn.

The Nile is the only remarkable river in the world. It was discovered by Dr. Livingstone, and rises in Mungo Park.

Constantinople is on the Golden Horn; a strong fortress, has a university, and is the residence of Peter the Great. Its chief building is the Sublime Porte.

The Boers are the wild people of Cape Colony.

Oliver Cromwell is said to have exclaimed, because he cut off King Charles' head and got on the throne, "If I had served my God as I served my King, he would not have left me to my enemies." Also that the word "Charles" would be found on his heart.

After the wars of 1815 there was a great famine in the land (England), for the country had been plundered and pillaged by foreigners. The ground would not bear fruit because of its bloodshed, and it was said that "Christ and all his saints slept there."

Egbert was a wicked king. When J. Cæsar came over he beat him back several times. Three times was Cæsar driven back by this bad man.

The Druids were an ancient people, supposed to be Roman Catholics.

Julius Cæsar invaded Britain 400 B.C. The condition of the Britons was a rude state. The people lived in huts made of straw, and the women wore their hair down their backs, with torches in their hands. They joined in games such as cock-fighting.

The word torrid means hot, and frigid means cold, and temperate means neither hot nor cold; therefore the temperate zone is neither hot nor cold.

The greatest writers of the present day are Lord Beaconsfield, who wrote the "History of Cyprus," and Miss Braddon, whose books, such as "Guy Mannering," "Peveril of the Peak," etc., are, in my opinion, too full of bloodshed and romance.

Gibraltar is an island built on a rock. It was discovered by Sir G. Rooke in 1704, and has 15,000 inhabitants.

In 1839 the English had to stop the advance of Russia in India, and Suraja Dowla was made Governor. In 1846 confusion again broke out, but the English Government went out and stopped it. This led to the appointment of a Secretary of State. It consisted of fifteen persons.

Buckingham is noted for its palace.

CHAFF.

WHILE her mother was taking a fly out of the butter, little Daisy asked, "Is that a butterfly, mamma?"

A POOR sick man with a mustard plaster on him said: "If I should eat a loaf of bread I would be a live sandwich."

THE following is a true copy of a letter received by a village schoolmaster: "Sur, as you are a man of nolege i intend to inter my son in your skull."

PAT: "And who is it that lives there, Mike, in the big house?" Mike: "Why, that old gintleman I was tellin' ye of that died so sudden last winter with a fever."

"WHY, Sam! how do you expect to get that mule along with a spur only on one side?" "Well, boss, if I gets dat side to go, ain't de udder one boun' to keep up?"

A JOLLY-LOOKING Irishman was saluted with the remark, "Tim, your house is blown away." "'Deed, then, it isn't," he answered, "for I have the key in my pocket."

TWO Mississippi darkeys saw a train of cars for the first time. One dispelled the mystery which overhung the monster thus: "It is a dried-up steamboat getting back into the river."

A DANDY with a cigar in his mouth entered a menagerie, when the proprietor requested him to take the weed from his mouth lest he should teach the other monkeys bad habits.

"YES, SIR," said the Kentuckian, as they sat by the stove, on whose top gracefully reposed the pedals of that individual, "you kin tell a man's rank in this State thusly: If you see a man with his feet on top of the stove he's a gineral; but if his feet is on the rail, about half way up, he's a kernel; and if he keeps them on the floor he's a major." "Ah, yes," said his companion, "that's good as far as it goes; but how are you going to distinguish a captain or a lieutenant?" "Stranger, we don't go no lower than major in Kentucky."

ONTARIO LADIES' COLLEGE,

WHITBY, ONT.

COLLEGE WILL RE-OPEN SEPTEMBER 3rd, 1885.

Parents thinking of sending their daughters from home to be educated are asked to consider the following Special Advantages, which have contributed to the present success and popularity of the ONTARIO LADIES' COLLEGE:—

1. An advanced literary course, with the privilege of preparing for professional or matriculation examinations.

2. A graduation course in Instrumental and Vocal Music, such as is given in the leading American and European Conservatories.

3. A graduation course in the principles of Fine Art, such as is given in the Ontario School of Art, with the same examinations.

4. Judicious training in home and social life by Miss Adams, the Lady Principal.

5. Beautiful buildings, capacious grounds, exhilarating exercises, low rates.

For Calendar and further information, apply at once to

Rev. J. J. HARE, M.A.,
PRINCIPAL.

UNIVERSITY OF VICTORIA COLLEGE,

COBOURG, ONTARIO.

This Institution, so long and favorably known, is making rapid advances, presenting full courses in the Departments of

ENGLISH, FRENCH, GERMAN, THEOLOGY, CLASSICS, MATHEMATICS, MENTAL AND MORAL PHILOSOPHY, AND SCIENCE (Theoretical and Practical).

In May, '84, seventy-one degrees were conferred in

ARTS, SCIENCE, LAW, THEOLOGY, AND MEDICINE.

Ladies are admitted to all the privileges of the University, and the number in attendance is steadily increasing.

For calendars and particulars, address

SECRETARY VICTORIA UNIVERSITY,
COBOURG, ONTARIO.