FLAMES OF THE SUN.

Mighty Flashes That Reach Upward Forty Times the Earth's Diameter.

AN OCEAN OF LIVID FIRE

On Whose Breast Roll Waves Larger Than Our Whole Planet.

NATURE'S ONLY SOURCE OF POWER

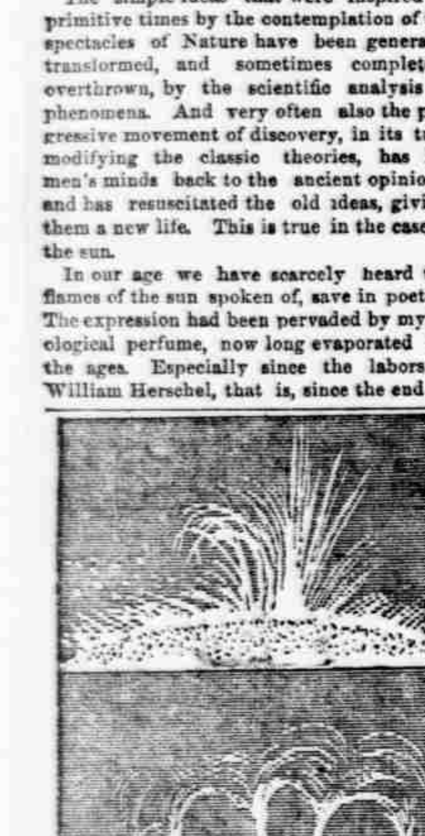
The Light and Heat Mostly Due to the Gradual Contraction.

ONE OF FLAMMARION'S POETIC PAPERS

[WRITTEN FOR THE DISPATCH.]

The simple ideas that were inspired in primitive times by the contemplation of the spectacles of Nature have been generally transformed, and sometimes completely overthrown, by the scientific analysis of phenomena. And very often also the progressive movement of discovery, in its turn modifying the classic theories, has led men's minds back to the ancient opinions, and has resuscitated the old ideas, giving them a new life. This is true in the case of the sun.

In our age we have scarcely heard the flames of the sun spoken of, save in poetry. The expression had been pervaded by mythological perfume, now long evaporated by the ages. Especially since the labors of William Herschel, that is, since the end of



Three Solar Explosions.

the last century, the orb of day seemed to have lost his fires. It is known that, for theological reasons, Herschel believed the sun to be habitable and inhabited. His globe was considered by him, by Wilson and their cotemporaries as solid as the earth, and, as it were, environed by a vast atmosphere, crowned with an eternal dome of resplendent clouds. Astronomers in the first half of our century admitted this theory.

Other Curious Old Theories.

It is true that they had noticed during total eclipses of the sun certain red projections surrounding the moon and luminous clouds of the same color apparently suspended around the central orb, but they were not disposed to attribute these things to the sun. A few theorizers, more royalist than the king, went so far as to sustain that not only is the sun not blazing, but that he is a veritable block of ice, and that the luminous heat which we receive from him is a subjective phenomenon.

But now we behold the flames of the sun rekindled and never again to be extinguished. The qualification, flames, is even more exactly appropriate to the nature of the phenomenon than are the words actually employed, prominences, protuberances, explosions or clouds, for it corresponds better with the lightness and inconstancy of the aspects observed, with the aerial, vapory, changing forms of light, with the calorific condition of the solar atmosphere in whose bosom breathes forth and darts upward the incandescent hydrogen. There are, even on earth, flames and flames. Without abusing metaphor, do we not even sometimes see cold flames? Has the ignis fatuus which flits over graves at night ever burned anything but the wits of the bewildered spectator who meets it? Are not the rose-colored lights of the aurora borealis as cold as the atmosphere of the poles?

There Are Flames and Flames.

What a contrast between these inoffensive flames and those of the furnace pouring the glowing metal in streams of fire into the sand with its dazzling ebullitions and filling the forge with stifling heat! What an abyss between the gentle, silent flame which detaches itself and flies away from the candle as it is extinguished, and the blinding flash of powder which explodes, scattering ruin and death in its path! The variety, the diversity of chemical and physical phenomena expressed by this one word amply justifies its general application to the solar protuberances.

We can see these flames of the sun (in the spectroscope) standing out on the background of the sky only around the solar circumference; we can distinguish them only when they are presented thus in profile. We must in our mind regard the immense globe of the sun as encompassed, bristling at every point with flames shooting up into his atmosphere and sometimes reaching in sheets of fire out into the illuminated heights.

The solar surface which we see, and which outlines for us the globe of that star, is covered with a sheet of scarlet fire, from which rise constantly a multitude of flames, a veritable and perpetual conflagration. The dazzling light of the orb of day renders these flames invisible to us—they are, moreover, transparent—as the stars are made invisible to us.

Not Much Time for Observation.

Before the invention of the spectroscope they were seen only at the rare instants of total eclipse, when the lunar disk, interposed between the sun and us, masked the dazzle of the sun and allowed us to distinguish his surroundings. It is evident that such observations, limited to a few moments in time, and diminished in clearness by the surprise and the strange beauty of the phenomenon, were necessarily fugitive and imperfect. At present they are made every day. The gaseous layer which envelops the sun, the ocean of fire, measures in depth from 4,000 to 5,000 miles. From this ocean dart gigantic flames to a height of from about 60,000 to 250,000, and even 300,000 miles. On the 7th of October, 1880, Prof. Young observed a flame which, at 1 o'clock, leaped to the height of 350,000 miles, broke into filaments and vanished.

When protuberances do not exceed in height 7,500 miles, or the thickness of the earth, astronomers make no note of them. The earth in flames set on the edge of the sun and seen from here would not be, or would scarcely be, noticed. A quarter of the protuberances observed surpass in height 25,000 miles. Those of 62,500 miles are not rare. They present the most varied forms. Some, more especially designated by the term eruptions, dart up like explosions to the fantastic elevations which we have just described.

The Clouds on the Sun.

Others, designated by the name of clouds, bear a perfect resemblance to the clouds suspended in our atmosphere; at times they appear heaped up on the edge of the sun like a bank of clouds on the horizon, but commonly, when they are seen in their entire outline to the bottom, it is marked that they are connected with the chromosphere by slender columns. Sometimes also, the lower surface of a cloud is hung

As Seen July 23, 1871.

with filaments directed toward the bottom, reminding us of a shower of rain falling from a heavy cloud.

The eruptive flames are not of long duration. They shoot up into the celestial heights with incomprehensible rapidity, falling back frequently upon themselves like a shower of fireworks, and dropping in a rain of fire on the blazing surface, where they vanish, spreading out like a rosy smoke; it is at times as if we saw the flames of a violent conflagration driven by the wind. These cloudy protuberances last for a long time, sometimes for several days and sometimes for weeks. These formidable explosions are often thrown upward with a velocity the more surprising in that the surface of the sun, being neither solid nor liquid, does not offer the resistance which would be met by volcanic eruptions or by any projections whatsoever on our planet. This leads us to believe that the surface of the sun is composed of a gas extraordinarily condensed, even to a liquid condition, or to the viscous consistency of pitch. Velocities have been measured in these eruptions of 300,000 and 400,000 yards per second.

The Intense Heat of the Sun.

But what are all these flames in comparison with the magnificence of the solar corona, which constantly envelops the dazzling orb in an aureola of glory and light, and which darts its rays to distances exceeding the entire diameter of the sun! What rays! What grandeur! We are only beginning to-day to possess the elements of the solution and understanding of this important problem.

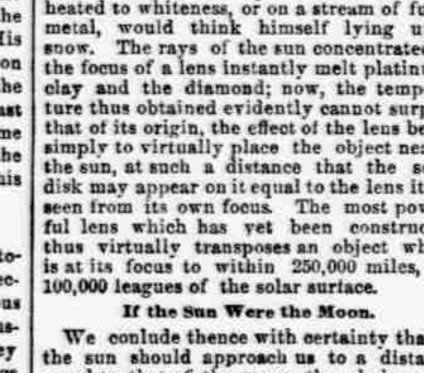
Important it is, indeed, as is everything which touches upon life. "The present order of things," writes Young, "seems to be limited, in the future as in the past, by terminal catastrophies, which are veiled by clouds which have so far been impenetrable." It is, above all, the question of the solar heat and of the feeding of these flames which interests the most. It is certain that this temperature is so high that no one of our chemical combinations is possible there, and that the elements there remain dissociated. It is a fire so hot that it no longer burns. Its most probable thermometrical valuation is 10,000°. A being who should come forth from that temperature and should lie down upon a sheet of iron heated to whiteness, or on a stream of fused metal, would think himself lying upon snow. The rays of the sun concentrated in the focus of a lens instantly melt platinum, clay and the diamond; now, the temperature thus obtained evidently cannot surpass that of its origin, the effect of the lens being simply to virtually place the object nearer the sun, at such a distance that the solar disk may appear on it equal to the lens itself seen from its own focus. The most powerful lens which has yet been constructed thus virtually transposes an object which is at its focus to within 250,000 miles, or 100,000 leagues of the solar surface.

If the Sun Were the Moon.

We conlude thence with certainty that if the sun should approach us to a distance equal to that of the moon, the whole earth would melt like a ball of wax and would in great part become vaporized. It is most happy for us that the orb of day is so far removed. Far removed, indeed! Impressions are transmitted by our nerves with the rapidity of 30 yards per second. If we could imagine a child with an arm long enough to touch the sun and be burned by it, this child would never feel the burn. To travel from his hand to his brain the nervous impression would require not less than 150 years. The child would have become an old man and died long before the pain could have traveled from the end of his arm to his brain.

At a constant speed of a kilometer (⅝ of a mile) a minute, an express train would take 148,000,000 of minutes to travel from here to the sun—or 266 years—a period of seven human generations!

Who could imagine, who could depict the ardor of that celestial fire, intense enough to bring to the boiling point in an hour, 1,362,500,000,000 cubic miles of water at the temperature of ice, rich enough yet to burn without a pause through 10,000,000 of years! If we could approach it without



An Explosion of Curious Form.

being vaporized like a drop of water falling upon a hot iron, without being blinded in the furious glare, we would see

A Luminous Ocean, Without Shores,

an ocean of flames, whose agitated waves are almost as high as the diameter of the earth, in the midst of and above which, through blinding flashes of lightning, tempests break upon each other in fury, tear each other into pieces and spring up anew, while mountains of flame as large as our planet and far more voluminous dart forth into the sky as if by the monstrous hands of invisible Titans, spreading up into the cooling atmosphere, expanding into clouds of light, or falling back again in a rain of fire upon the ever burning ocean! Immense rays of light travel to the distance of millions of miles, in all directions, sending out like beacon lights their dazzling brightness into space filled with whirling meteors. Superb phenomena, in which heat, light, electricity, magnetism, act in unison, with an energy so fearful that our most violent hurricanes, our volcanoes and our thunder storms are, in comparison with them, but fleeting smiles in the dream of a sleeping infant.

And how shall we measure, in addition to all these giant forces, the magnetic reaction which we feel from them at this distance, over 37,000,000 of leagues away? And yet this mysterious connection is no longer to be denied. How shall we refuse our interest to the subject of this divine Sun? He it is who makes us live, and all the destinies of the earth are hung upon his rays. He is at once the hand which sustains us in space, the lamp which lights us, the fire which warms us, the puissant source from which all energies are derived. It was expressed 18 centuries ago by a happy metaphor of Theon of Smyrna, "He is veritably the heat of the universal organism, since his palpitations spread all about him in space the waves of planetary vitality."

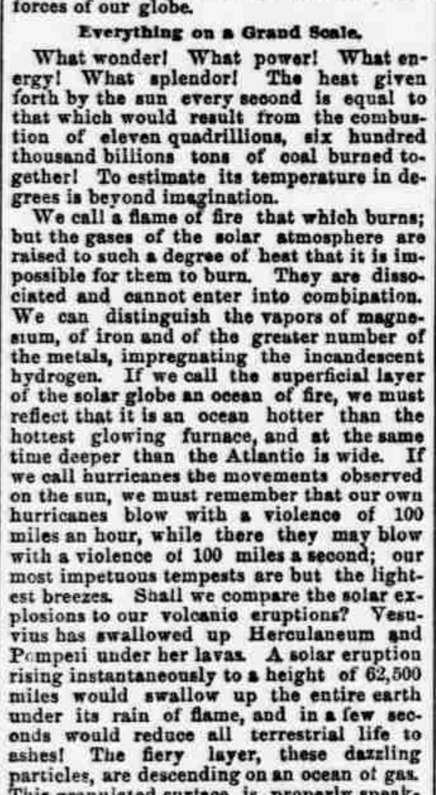
The Source of Life and Power.

If he stopped for an instant, if he varied in his brightness, if his calorific energy became more violent, or if its emission were suddenly paralyzed, all humanity would be struck to the heart, and all personal activity ceasing, we would hopelessly await the universal death agony. As certainly as that power which moves the watch is derived from the hand which wound it, so certain is it that every terrestrial force descends from the sun. It is he who maintains the liquid condition of the profound ocean, of the river which flows across the plains, of the babbling brook and the murmuring spring, for without him water would be rock. To him we owe the wind which blows, the cloud which passes, the green grass, the forest, the flower with its perfume and color. It is he who makes the world go round, who brings back the spring, who raves in the tempest, who sings in the unwearying throat of the nightingale. The galloping horse moves only by means of combustible material which he has received from the sun; the turning mill is moved by the same beneficent orb. The wood which warms us in winter is sunshine in fragments. Every cubic inch, every pound of wood, was built up by the heat of the sun. And in the darkness of night, through rain or snow, the noisy and blind train which flies like a serpent, plunges beneath mountains, goes whistling and flashing through the fog in the frozen nights of winter, this artificial animal is but another child of the sun god, for the coal which feeds it is again sunshine stored up through millions of years in the geological forests of the coal period. The sun comes to us in the form of heat, he leaves us in the form of heat; but between his coming and his going he has brought into existence all the vital forces of our globe.

Everything on a Grand Scale.

What wonder! What power! What energy! What splendor! The heat given forth by the sun every second is equal to that which would result from the combustion of eleven quadrillions, six hundred thousand billions tons of coal burned together! To estimate its temperature in degrees is beyond imagination.

We call a flame of fire that which burns; but the gases of the solar atmosphere are raised to such a degree of heat that it is impossible for them to burn. They are dissociated and cannot enter into combination. We can distinguish the vapors of magnesium, of iron and of the greater number of the metals, impregnating the incandescent hydrogen. If we call the superficial layer of the solar globe an ocean of fire, we must reflect that it is an ocean hotter than the hottest glowing furnace, and at the same time deeper than the Atlantic is wide. If we call hurricanes the movements observed on the sun, we must remember that our own hurricanes blow with a violence of 100 miles an hour, while there they may blow with a violence of 100 miles a second; our most impetuous tempests are but the lightest breezes. Shall we compare the solar explosions to our volcanic eruptions? Vesuvius has swallowed up Herculaneum and Pompeii under her lavas. A solar eruption rising instantaneously to a height of 62,500 miles would swallow up the entire earth under its rain of flame, and in a few seconds would reduce all terrestrial life to ashes! The fiery layer, these dazzling particles, are descending on an ocean of gas. This granulated surface is, properly speaking, neither solid nor liquid nor gaseous; it is cloudy, and rests upon the solar globe which appears formed of gas incomparably condensed. This immense solar globe is 1,280,000 times more voluminous than the



Flames 150,000 Miles in Height.

earth, and measures no less than 863,750 miles in diameter. It weighs alone as much as 324,000 earths put together.

The Sources of the Great Heat.

And now, how are this light and this heat maintained? Three principal causes appear to be in play: The contraction of the solar globe, the falling of meteors upon its surface and throwing off of heat produced by chemical combinations. The first cause must be the most important. Every body which falls and which is arrested in its fall produces a certain quantity of heat, and the quantity of heat produced is the same, whether the body be suddenly arrested or its course gradually slackened by resistance. If, as is probable, the solar globe is the result of the condensation of an immense nebula which originally extended beyond the orbit of Neptune, the falling of the molecules involved in the present condition of condensation has formed about 18,000,000 times as much heat as the sun now gives yearly. From this it would result that the sun has only had 18,000,000 years existence. On the other hand, suppose this to be the only source of solar heat; this orb continuing to be condensed will be reduced to one-half its present diameter in 5,000,000 of years at the latest, and since, with this size, it would have eight times its present density, it would become liquid and its temperature would begin to decrease, so that after 10,000,000 of years its heat would no longer be sufficient to supply a condition of life analogous to the present one. The entire life of the solar system would not surpass, according to this hypothesis, 30,000,000 of years. The falling of meteoric matters might increase it by so much as would bring it up to 60,000,000 of years. It is prudent to add that we are not acquainted with all the resources of nature, and that probably this prodigious giving forth of light and heat is kept up by other additional causes.

However this may be, the physical construction of the sun is one of the most curious and one of the most important subjects of study which are offered to our attention, and any mind which is interested in the affairs of nature cannot refrain from being impressed by this greatness and attracted by these problems, whose study doubles to us the pleasure of life.

CAMILLE FLAMMARION.

TWO SIDES OF MEN.

One Is His Conduct Toward Society, the Other Toward Himself.

A SERMON UPON THE LATTER SIDE.

Realization of the Creator, Hatred of Sin and Love of the Savior,

APPEAR IN CHRISTIAN CHARACTER

[WRITTEN FOR THE DISPATCH.]

Sermon No. 1.

Men and women may be thought of either individually or socially. The Christian may be considered either in himself or in society. If we desire, however, to see people as they really are, we must look at them out of both eyes. It is not for nothing that God has given us two eyes. It means that the right way to look at the world is from two points of view. And we ought to have two eyes in our minds. We ought to study truth from more than one side. If we wish to understand people we must look at them from at least two points of view. We must consider them not only individually, in themselves, but in their relations with other people in society.

Ever since that great social and religious crisis which we call the Reformation, great emphasis has been laid on individualism. Before that, the individual was but little accounted of. In the pages even of the New Testament, we read that not only might a man be sold into slavery for a debt, but that his wife and his children might be sold with him. The man's family was thought of simply as a part of the man. Before the Reformation, the individual was subordinate in politics to the State, and in religion to the Church. Every man, with the fewest possible exceptions, had a master. The supreme human duty was obedience. The people had princes over them to tell them what to do, and priests to tell them what to think.

Two Sides to Every Man.

But about the time when Columbus discovered that there are two sides to the Atlantic Ocean, there was made a still more important discovery—that there are two sides to the nature of every man. It was asserted that every human being stands not only in a social relation to the State and the Church, but that he stands also in an individual relation to the Most High God. It was declared that the meanest human being that breathes possesses an immortal soul, and that for the well-being of his soul he is directly and personally responsible to God. The laws of God must be obeyed, and then the laws of man, afterward. And every man must test man's laws by God's laws. No dogma nor decree, no act of Parliament nor Article of Faith, no word of prince or priest, is to be accepted save so far as it commends itself to the instructed conscience.

The effect of this new emphasis was wonderful. Old things began to pass away, all things began to become new. The Reformation was the dawn of liberty, equality and fraternity. It meant free speech and free thought. It meant political liberty and private judgment. It meant the spiritualizing of religion.

The Pilgrim's Progress Idea.

But these were not its only consequences. The new emphasis had the defects of its qualities. In general, men began to think more about the rights of men than about the duties of man. In the religious world, one result was the division of Christendom into sects and parties. Every man insisted upon doing his own thinking; scant reverence was paid to precedent, or position, or authority. Another result was the turning of the attention of the religious teachers in, rather than out. Supreme emphasis was set upon the individual soul. To get that saved was the pre-eminent purpose of human life. The Church was regarded, as some one says, as a great spiritual colonization society, meant to muster emigrants who should abandon earth and turn their faces toward heaven. The hero of Pilgrim's Progress is a good idea of the Reformation ideal of a Christian. He finds himself in the City of Destruction, and he never thinks of staying there and trying his best to make a City of God out of it. He runs away. His whole endeavor is to save his soul.

Thus a separation was set in man's mind between the sacred and the secular. The prayer that the will of God might be done on earth as it is in heaven was prayed with unheeding hearts. Religion was parted from politics, from business, from society. The great doctrine of Christianity was taken to be the doctrine of the atonement, that Christ died for our sins. The other great doctrine, of the incarnation, that Christ lived to sanctify all our common life and show us how to live it, was neglected.

The Religion of To-Day.

Now, to-day, there is again a turn in the tide. More and more emphasis is laid on the relations of men and women to the world we live in. It is being taught, as Ruskin said, that if religion is good for anything it is good for everything. Christianity is being brought into a new contact with all the institutions of our modern life. The ministers to-day are shutting up the old theologies and opening the new sociologies. Religion is taken to mean the saving of men, soul and body. Shoulder to shoulder with the modern Church stands the parish house, the center of all manner of uplifting influences. The prophets who to-day are dreaming dreams and seeing visions of the coming century predict a reign not of individualism, but of universal socialism.

Nevertheless, it is true, as I said at the beginning, that the only right way to look at people is out of two wide-open eyes. Not much, after all, is gained when one who has been looking only out of the left eye, shuts that and looks only out of the right. The way to understand men and women is to think of them both individually and socially. We must look at them out of both eyes, if we wish to see them as they are. Accordingly, I began this series of studies, which will be concerned for the most part with the Christian in his relations to others, with a consideration of the Christian in himself.

What do I mean by the Christian in himself? I mean the Christian spirit, the Christian disposition.

Jesus laid more emphasis on disposition than he did on conduct. He was more desirous to get people to feel in a certain way than to act in a certain way.

Principles in Place of Rules.

It is evident in the records of His life, by instance after instance, how He absolutely refused to lay down rules, but taught principles in place of them. That is, He would not say, thus and thus must you behave, but thus and thus must you feel in your heart. Take, for example, that time when Peter asked Him for a rule about forgiveness. "How oft shall my brother sin against me and I forgive him?" Jesus, in answer, gave a parable, the point of which is that the essential thing is the spirit of brotherly love.

Take again that case of the two brothers who were disputing over the division of an inheritance. They desired Jesus to act as arbitrator. They wanted Him to look into the will and the deed and the title and the accounts, and settle up the estate fairly. But He refused. He laid down a great eternal principle which, if they followed, would enable them to decide their own discussion. He knew well that without the recognition and the acceptance of that principle, no decision could really decide between them. "Take heed," He said, "and beware of covetousness." We know what He did even with those laws which came with the highest of all sanctions, from the judgment seat of Sinai. He emphasized not the letter but the spirit. Whoever has an angry thought in his heart is a murderer. Whoever has an impure thought in his heart is an adulterer.

Indeed, so exceedingly desirous was He to have it understood that disposition is of more account in religion even than conduct, that He put his words of counsel into such extreme forms that it might be plain that what he asked was not literal but spiritual obedience. Turn the other cheek, resist not evil, give to him that asketh; these are not regulations of outward conduct; they teach the spirit of fraternity. Christ is emphasizing not the act but the feeling.

This attaching of supreme importance to disposition was partly due, no doubt, to the fact that conduct, divorced from disposition, has no moral value. God looks at the heart to see how much is held out in the hand. Without charity—that is, without a Christian disposition—nothing that we do is of account. Partly, also, Jesus had in mind that a right disposition is sure to show itself in a right conduct. Like a wise physician He prescribed not for the symptoms but for the disease. Men and women cannot be set right from the outside. Betterment must begin at the heart. You cannot regulate a watch by moving the hands; you must set the mainspring right.

You see the importance, then, of a man's being a Christian in himself; that is, of the possession of the Christian spirit. What sort of a Christian he will be in the family, in business, in society, in the parish, in the city, will depend upon what sort of a Christian he is in himself.

Conscious of the Blessed Presence.

We come, accordingly, to the consideration of the characteristics of the Christian in himself. One characteristic of the Christian in himself, is that the Christian realizes God. How different that is from a mere intellectual conviction of the existence of a Great First Cause, of an Infinite and Eternal Energy from which all things proceed! How different from a mere rote recitation of a church creed, in which the lips speak while the heart is silent! The Christian realizes God. The Christian is conscious of the blessed presence of God.

For Christianity is human life made the most of, lived in the largest and highest way. Life, the men of science tell us, is harmony wieh environment. It is proportioned to the relation between that which is without and that which is within. An animal lives a larger and higher life than the plant, because it is responsive to a larger circle of environment. It is capable of companionship. It has some idea of freedom, of fidelity, of love, of duty. And a man lives a larger and higher life than the animal, because he is responsive to a still wider circle of environment. He is capable of intellectual pleasures of which the animal is ignorant. And among men he lives the largest and highest life who is responsive to the widest circle of environment.

Getting the Most Out of Life.

One man delights in little beyond the pleasures of the grosser appetites. He eats, and drinks, and sleeps. Another is cultivated to enjoy books and music and art and science. It is evident that there is a vast difference between these two in the matter of making the most of life. But here is another who can appreciate thoughts that are higher still. He is responsive to his spiritual environment. He hears the whispers of conscience. He sees visions of beneficent duty. He knows the joy of prayer and adoration. He realizes God. This man is perfectly alive. He alone, of all the children of God, makes the most of life.

The Christian realizes God; realizes, that is, the abiding presence of God. God is here. Every thought of my heart and your heart is audible to Him. Wherever we go, whatever we say or do, God is with us, knowing all. And the Christian knows who God is. To the Christian, God is the Father. This constant presence is not the hateful presence of a Divine despot; it is not the intrusive presence of a Divine taskmaster; the Father is with us, who made us, who is interested in us, who cares for us, who loves us. The Christian realizes this protecting, helpful, blessed presence. The Christian lives in the presence of God as a young boy lives in the sight of his father whom he reveres, or as a young girl lives in the sight of her mother whom she loves. The presence is a perpetual uplifting influence, inspiration, benediction.

Every Man Desires to Be Better.

Another characteristic of the Christian in Himself is that the Christian hates sin. He longs to be free from all sin. Here again, Christianity takes in all that is best in the aspirations of men. I have a friend who is an ethical lecturer in St. Louis. He made an address the other day, in which he summed up the results of five years of observation and experience in the endeavor to uplift men. He said that he was now confirmed in the conclusion that every man desires to be better, and that the best way to help people is to begin by taking that for granted. We have tried too long, he said, to get men to do right by teaching them to believe right. Let us now try to get them to believe right by helping them to do right.

But this is not a new discovery. Jesus Christ always ministered to men upon this principle. He always took it for granted that even the meanest man wishes to be better. And as for the precedence of conduct before creed, that is what he taught beyond a doubt. If any man will know the truth of God, let him begin by doing the will of God. All this that my friend has arrived at after five years of study is right here in the Christian Scriptures.

Herbert Spencer, in his "Data of Ethics," sums up the conclusions of a whole lifetime of hard study, and the end of the whole matter is this: That the only right conduct is that which is based upon the principle of altruism. And altruism, when we come to look into it, is nothing in the world but Christ's own commandment, "Thou shalt love thy neighbor as thyself." This which Mr. Spencer has worked out, using all the resources of his splendid genius, is only what every humblest Christian knew already.

Plenty of Satisfying Religion.

These people are like the crew of that old ship which was sailing along the coast of South America and ran out of water. And the scorching sun shone down upon them, and the great ocean seemed to mock them with its delusive waves, and, one after another, the men began to die in the agonies of thirst. And one day they sighted a ship, and they set the signals of distress. They said, we are dying here for lack of water. And the other ship vessel answered, why don't you dip your buckets down? This is the mouth of the great Amazon. There is good water all about you. The religion of Jesus Christ, if men would but take that, has satisfaction in it for all the hunger and thirst of all humanity.

The Christian hates sin. And this, not with a passive and indefinite hatred, but with the spirit of one who fights against an enemy. The Christian has a passionate longing to be free from every taint of sin. He watches his words and his actions. He keeps guard over his lips and eyes, and hands. He knows that Christianity means character, and that the only way to be a good Christian is to be a good Christian.

The Third Great Principle.

Another characteristic of the Christian in himself is that the Christian loves Christ. The Christian has a great love for Jesus Christ. See how this takes these other characteristics of Christianity and emphasizes them. How it deepens the realization of God! Because it reveals the nature of God. Christ is the manifestation of God. We think the truest thoughts of God when we think of God as being like Christ. And how it deepens the hatred of sin! Because it shows the fearful sinfulness of sin. The Christian looks at sin from the side of the cross. The Christian is really the only person in the world who knows what sin is. Because he measures right and wrong by the one accurate and ideal standard of the character of Christ. He tests life by the approbation of Jesus Christ. Never to do anything that we would not like to have Jesus Christ see us do; never to say anything that we would not like to have Jesus Christ hear us say, is the purpose of the Christian.

Do not think that Christianity is a church or a ritual. Do not think that it is a creed or a theology. The Christian spirit is the spirit of Christ. Christ is Christianity.

To realize God, to hate sin, and to love Christ is what it means to be a Christian.

GEORGE HODGES.

TOPICS OF THE TIME.

The Difficult Role Amelia B. Edwards Essayed With Success.

A COUNTESS AS A SKIRT DANCER.

Queen Victoria Had a Court Jester Who Died Only the Other Day.

THE WOMEN TEACHERS OF NEWNHAM

[WRITTEN FOR THE DISPATCH.]

Egyptology and novel writing at first sight are not a team that a woman would be likely to find easy to drive, but Miss Amelia B. Edwards, the English writer who died a few days ago, showed how well it could be done. Latterly American readers have known her best as the historian of the discoveries made in Egypt under the auspices of the Egyptian Exploration Fund, of which she was the founder.

Amelia B. Edwards.

She has done more to popularize the study of Egyptian hieroglyphics and antiquities generally than any other writer of her time. In a recent American magazine article she paid a very pretty tribute to the Americans who had furnished the Egyptian Exploration Fund with the sinews of war.

But a generation ago almost Miss Edwards won a large audience in this country by the graphic pictures she gave of running the blockade into Charleston harbor during the war. For truthful details of that exciting business recourse can be had to no better authority than Miss Edwards' novel "Debenham's Vow." Her preliminary study for this book, of charts and original records—she interviewed blockade runners by the dozen and took a special course in seamanship—was characteristic of her thoroughness in all things. Her fiction is a mosaic of facts.

The *Saturday Review* of London once had the temerity to poke fun at what it called her "woman's seamanship" in "Debenham's Vow," and an Admiral of the royal navy came to her rescue with an indorsement of all her nautical statements. She was one of your systematic workers; dividing the day into set periods for different work, walking a measured half mile in the garden of her home near Bristol before breakfast and another half mile after, and so on. Her plan in novel writing was amusingly precise. First she sketched the plot chapter by chapter, going deeply into details. This finished she would start afresh, and evolve as she wrote an entirely new plot.

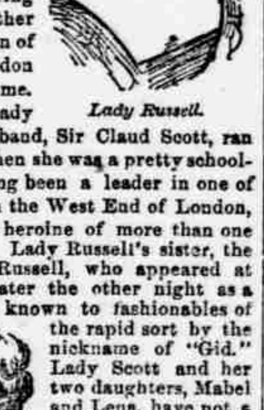
The Democratic Spirit in England.

The revival of the interest in the affairs of the Guelph family by the adjustment of the difficulty between the Duke of Cumberland and the German Government, as to the disposition of the so-called Guelph fund, has taken the form of a controversy in the English newspapers as to what the surname of the reigning family in England really is. The general acceptance of Guelph as the family name is disputed by some. It is pointed out that accepting the family tree as printed in Burke's Peerage and other standard authorities, it is clear that more than 800 years ago Cunegunda, a daughter of Guelph, Duke of Nether Bavaria, married Azo the Second, Marquis of Este, and her son succeeded to his uncle's estates upon the latter's death. Therefore it is claimed the family name should then have been changed to D'Este. But it does not seem to have been, although the name D'Este has apparently continued to be regarded as a sort of second name by the family.

When Frederick-Augustus, sixth son of George III., and commonly known by his title of Duke of Sussex, married Lady Augusta De Ameland, daughter of the Earl of Dunmore, it was considered a breach of the royal marriage act, and the courts, although the marriage had been regular, declared it null and void. But a son and daughter were born and both took the name of D'Este, showing that their father recognized that as a family name. One writer suggests that the English royal family might just as well take the name of Plantagenet or Stuart, for they have just as much of the blood of those royal lines in their veins as of the Guelphs. It is significant of the progress of democratic ideas in England that the contributors to this controversy handle the subject without gloves, and talk of the Guelphs and other royal personages fully as flippantly as if they were plain Smith, Jones or Brown.

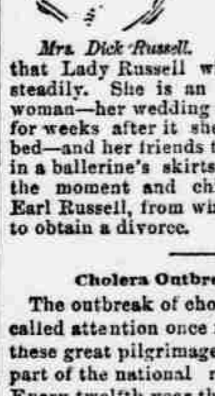
A Countess in a Ballerina's Skirts.

The debut of Countess Russell as a skirt dancer on the London stage last week is quite in keeping with the exploits of the family from which she comes. Though she is the first of her blood, in recent times at all events, to literally kick propriety out of sight, with her clinging black lace skirts and daring dance, her mother has the reputation of having made London howl in her time. Thy latter is Lady



Lady Russell.

Scott, whose husband, Sir Claud Scott, ran away with her when she was a pretty schoolgirl. She has long been a leader in one of the fastest sets in the West End of London, and has been the heroine of more than one social sensation. Lady Russell's sister, the wife of Major Russell, who appeared at the Royalty Theater the other night as a skirt dancer, is known to fashionables of the rapid sort by the nickname of "Gid." Lady Scott and her two daughters, Mabel and Lena, have not a little beauty and brains between them, and their photographs, singly or grouped, are to be seen often in the London shop windows. The most beautiful daughter, and the eldest of the three, Florence, died some years ago.



Mrs. Dick Russell.

It is hardly likely that Lady Russell will stick to the stage steadily. She is an impulsive, hysterical woman—her wedding almost killed her, and for weeks after it she was confined to her bed—and her friends think that her exploit in a ballerine's skirts is merely a freak of the moment and chiefly aimed to annoy Earl Russell, from whom she recently tailed to obtain a divorce.

Cholera Outbreak at Hurdwar.

The outbreak of cholera at Hurdwar has called attention once more to the danger of these great pilgrimages, which still form a part of the national religion in the East. Every twelfth year the pilgrimage, which at any time means a crowded city, fairly swamps the local accommodations, and thousands are compelled to camp in the open air on the unhealthy flats around Hurdwar. This year, for instance, between one and two millions of pious natives are expected to visit Hurdwar, and that ancient city of 5,000 inhabitants is no better prepared to receive them than usual.

Hurdwar is a place of prodigious sancity. There is a foot-print of the great Vishnu to be seen in the stone at the ghat or public bath, and thither pious Buddhists throng from all over the East. Cleanliness being anything but next to the godliness of these devotees, epidemics are often the result of their congregation. Now the cholera has broken out and the pilgrims are scattering to the four winds, carrying the contagion of cholera with them. The Indian Government fears a plague of tremendous proportions is at hand and is powerless to stop it.

Talking of the cholera an officer of the English army in India once told the writer that a natural warning of the plague's presence may always be noticed in the atmosphere. In the early morning and again at sunset a peculiar bluish haze is be seen hanging over the place where the cholera is raging. So invariable was this phenomenon that the soldiers on the march looked out for it, and chose their camping ground accordingly.

Work for the British Army.

The wild tribes of the northeastern frontier of India continue to furnish work for the British army. Last week the cables announced that the Lushais had attacked the British camps no less than three times within four days, repeated repulses seeming to have no effect on their fighting ardor. The Lushais, or Kukis, as they are sometimes called, belong to a numerous family of nomadic tribes inhabiting the Lushai hills, a range that extends into the heart of the unexplored mountains of Upper Burmah. It will be observed that in the battles mentioned the natives were in each case the attacking party. It would be supposed that they would hesitate to take the initiative against a force much superior to their own, both in numbers and equipment, but, if the opinions of travelers go for anything, the Lushais have really no alternative, as they are being pressed forward by a still stronger people, the Soktis, from the interior of Burmah.

There is good reason to believe this is true, as the Lushais have been raiding the British lines since the earliest occupation of the territory. These forays are also thought to be instigated by a desire to obtain human heads, which they use in their peculiar religious ceremonies as propitiatory sacrifices to the gods of the mountain. In the warfare that has continued for more than a century the native tribes have had, a a rule, the best of it, although the British forces have been victorious in the recent engagements.

Principal Clough's Successor.

The girl undergraduates of Newnham College, Cambridge, are greatly pleased, we are told, at the appointment of Mrs. Henry Sidgwick as Principal in succession to the lamented Miss Clough. Mrs. Sidgwick has been associated with Newnham for many years as a Professor of Mathematics and as Treasurer, so that she is in thorough sympathy with the policy which has

Mrs. Sidgwick.

made this college for girls an institution entirely worthy of a place beside the older houses of classic Cambridge. It is a little unusual to find that so successful an educator and woman of affairs as Mrs. Sidgwick has not contemned man altogether. Her husband is Henry Sidgwick, Professor of Moral Philosophy at Cambridge.

The families of the Premier of England and of his arch opponent are, singularly enough, both represented in the faculty of Newnham, for Mrs. Sidgwick is a niece of Lord Salisbury, and one of the professors is Miss Helen Gladstone, a daughter of the Grand Old Man, and one of the brightest women in England.

Queen Victoria's Court Jester.

Who knew that Queen Victoria had a court jester? Jocularity, official or otherwise, has been out of fashion at the Court of St. James for many years, and the announcement of the death of William Wallett, Court Jester, has a very strange sound. The office must have been a sinecure, and is hardly likely to be filled again under the scrutiny of the watchful Radicals in Parliament. What a change came over the office in the lapse of only three centuries, for down to the time of Queen Elizabeth in England the court jester continued to be a personage of some importance. In fact, fools were a part of the kindly retinue until George I. came over to England. In France the official mirthmaker to royalty lasted longer, and we find as late as Louis XVIII.'s time a certain Coulon filling the double office of court jester and physician, and his jokes must have been better than his medicines, for the fame of them has survived him.

The court fool in earlier times was munificently rewarded, witness the endowment of Berdic, William the Conqueror's fool, with three towns and much land in Gloucestershire. One famous fool stands immortalized in a monstrous statue of wood in front of the celebrated tun in Heidelberg, and in Rome the effigy of Pasquino still exists to remind us of the origin of the pasquinade.

W. G. KAUFMANN.

Electric Cars Without Conductors.

The electric cars in Halle, Germany, carry no conductors, and this facts renders the wages account remarkably low, the entire working expenses coming to only about 5 cents per car per mile, or 55.5 per cent of the gross revenue. In this, however, no allowance has been made for depreciation, which would add nearly 2 cents more to the expenses account. An incident of special interest in connection with this line is that the German Government stopped the running of the electric cars immediately after the opening ceremony, because they interfered with the proper working of the telegrams and telephones. The case came before the law courts, and the judges decided in favor of the railroad company, stating at the same time that the streets of a city were intended for general traffic, and that their course could not be altered, but that the postal authorities could easily make any necessary deviation in the line of the telegraph and telephone wires so as to place them beyond the influence of the electric lines, which use the rails and earth for the return circuit.

Music From Electricity.

The public is becoming accustomed to the sound of organs whose mechanism is actuated by electricity; but the idea of a musical instrument, in which the electric current produces the musical tones by no other means than the conductor itself, is startling as well as puzzling. In the experiments of Von Lepel, in Germany, a disk of glass or paper rubbed with paraffine, placed between the terminals of the conductors (small copper wires) from a strong induction machine, have thrown out with great rapidity tiny balls of fire, which disappeared with a faint whistling sound. A more definite and practical instrument has been constructed, consisting chiefly of coils of wire of various sizes and lengths. On passing through the electric current a distinct musical sound of peculiar quality is given out.

CLEARING UP FOGS.

Results of Electrical Experiments at Sandy Hook and Boston.

A NEW STYLE OF CASH REGISTER.

The Telephone In Hawaii Has Made the Ladies Fatter Than Ever.

NEW APPLICATIONS OF THE CURRENT

[WRITTEN FOR THE DISPATCH.]

Various reports, none of them unfortunately authoritative, have been published of the recent trials at Sandy Hook and in Boston harbor with the view of dissipating fog electrically. So far as can be gathered from the meager details made public, it would appear that the effect of the current is directly proportional to the intensity of the fog; i. e., the denser the fog the more easily it is affected by the discharge, and consequently the larger the area that can be cleared with the same amount of energy. No detonation or explosion accompanies the discharge. The largest area cleared by one discharge is said to have been nearly two acres, or, approximately, a radius of 150 feet from the point of application. It is claimed that with more powerful machinery much greater areas could be cleared. The fog is described as falling in the form of rain, and the atmosphere after the process as being clear as after a summer rain storm. The surrounding fog, however, closes in over the cleared space in a few minutes, and it would require discharges made at intervals of two minutes to keep the air practically clear.

The subject of fog clearing by electricity is not by any means new, and it is so certain to engage serious attention before long in consequence of the important issues which it would inevitably affect that it is to be hoped the results of the recent tests will be given to the public officially.

A Useful Cash Register.

The number of storekeepers and others who have had sad experience of the fallibility of patent cash registers is legion, and such will welcome the advent of a new cash register that promises to pay for itself very quickly. One of its advantages is its simplicity, which materially lessens the liability to get out of order with which so many devices of the kind seem to be afflicted. The new register will keep any number of accounts, either at the point of sale or at a distance. For instance the sales made in the store can be recorded in the proprietor's house, whether it be above the store or at a distance. The proprietor can thus know what the day's receipts are up to any given moment without coming near the store.

The cash drawer is opened automatically by the action of the lever which registers the sale. The drawer can be opened and change made without registering, but every time it is opened a record is made of the fact. In other words, if the drawer is opened simply to make change, no record is made of a sale, but a record is made of the fact that the drawer has been opened for the purpose of making change. A strong point of the invention is that there is no known way of "beating" it. If any attempt is made to tamper with it the bell rings. Furthermore, the bell rings whenever anything gets out of order, and continues to do so until the fault has been attended to. No money can be taken from the drawer without detection. The device is worked electrically, and the battery which supplies the current will last 16 months without recharging, which can be done at slight expense.

The Telephone in Genial Hawaii.

A celebrated engineer who some time ago spoke at an important meeting of electricians in New York told his audience that the inhabitants of Hawaii, from which he had just returned, were the best natured people on the face of the earth. He stated, moreover, that the climate was sultry and that the principle on which business was conducted was never to walk if you could ride, and never to ride it you could sit still. Under such conditions it was only natural that the Hawaiians should look upon the telephone as the greatest invention of the age, and it came instantly into universal use. The ladies especially were in high glee at being able to do their minor shopping while sitting at home, and to such an extent did they forego their wanted exercise that an increase in the average weight of the female section of the community was distinctly apparent. This was told not as a joke, but in sober earnest, and a letter which goes far to confirm the account has been received from the superintendent of the Honolulu Exchange, who says: "Honolulu has the most wonderful telephone system in the world. You can get any number you want as soon as you ask for it, and can hear perfectly a great distance. The people of Hawaii use the telephone much more than do the people in any part of the United States that I was ever in. If a man wants to know what time it is, instead of getting out of his seat to look at the clock he rings up the operator and finds out."

Electric Launches in England.

An English company has 16 pleasure launches plying on the Thames, all worked by electricity, and charging stations have been built at various points on the banks of the river, so that if a pleasure party is delayed or chooses to extend its excursion, all it has to do is to put into the bank and recharge its batteries. The large fleet of electric launches now on the Thames includes many private boats. A fine electric launch has just been built for the Earl of Dysart, which measures 55 feet in length and 8 feet 6 inches in beam. With her full equipment on board she will draw 2 feet 6 inches of water, and her speed will be 8½ to 9 miles an hour for seven hours. She is built of mahogany and teak, with omnibus seating on the roof of her capacious saloon.

Making Phosphorus by Electricity.

The application of electricity to the manufacture of phosphorus is expected to revolutionize the industry. The phosphorus is extracted from the usual materials by being intensely heated with carbon in an electric furnace. It is thus vaporized and is afterward collected in copper condensers. The latest pattern of furnace produces daily about 150 pounds of very poor phosphorus, with a loss of about 14 per cent of the total quantity of the raw material. The effect of this new development will be that a single building which has been erected for the purpose in England will soon be turning out about half as much as the world's present consumption.