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POOR DOCUMENT

HALLEY'S COMET

by Frederic Campbell, Sc.D.
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The Tail a Searchlight, Millions of Miles Long—When the Earth Passes Through a Comet's Tail—The Nature of the Solid Nucleus—Earthly Substances in Heavenly Visitants—How a Dark Comet Becomes Light and Grows Its Tail—Head First and Tail First—The New-found Pressure of Light—How the Sun Tears Comets to Pieces—Meteors as the Small Bits of Old Comets

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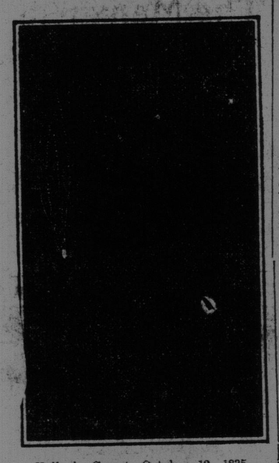
In preceding articles we have inquired into the appearance, distance, dimensions, dates, course and history of that stupendous object, Halley's comet, which is just unsheathing its sword to suspend it over our guilty heads for months. It is now time to make an investigation into the nature of so extraordinary an object.

The impressive thing about a comet is its long, sweeping tail. Halley's has been seen to reach a length of 45 degrees, which is equal to a line of 90 full moons. In appearance this is not unlike a searchlight, which, cast across a landscape, illumines all the finest particles of dust and moisture which happen in its way, giving an impression of substantiality far beyond the facts. It is perfectly easy for a child to walk through the beam of a searchlight, and to throw its full force upon a falling leaf would not disturb it in the least.

It is somewhat so with a comet's tail. It is one of the most unsubstantial things in the universe. The faintest stars can be distinctly seen through millions of miles of its thickness. On the 26th of June, 1819, the earth passes through a comet's tail without any result. The very best vacuum secured in the laboratory is regarded as solid millstone, compared with the density of a comet's tail. It is therefore manifest that, when we gaze upon such an object, we are looking upon next to nothing. Yet, of course, it is something; and, in order to know what it is, we must study the nature of the comet's head from which it proceeds.

The solid part of a comet is its nucleus, or core. This is at the centre of its head,

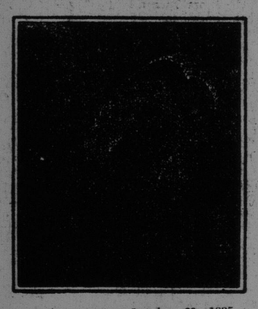


Halley's Comet, October 12, 1835.
(From an old drawing.)

and shows more brightly than the rest. A large part of the head is nearly as unsubstantial as the tail, and may be likened to steaming vapors. Because of the nature of these it is difficult to secure an accurate measurement of the nucleus, as it would be to judge of the size of Paderewski's skull beneath its corona of waving hair. But, when Prof. Charles A. Young says that the mass of the head of an average large comet like Halley's may be regarded as equal to a ball of iron of 150 miles' diameter, it is manifest that here we have something truly substantial. The nucleus then is the real comet. And this is conceived of, not as a solid sphere, but as a mass of objects of uncertain size, held together by their mutual gravitation, and all moving under the influence of the sun.

Where these came from and how they happen to be, no one knows. But the substances of which they are composed are identical with elements with which we are familiar. Hydro-carbons and various metals respond to spectroscopic tests, iron, magnesium, etc., and, as matters develop with the approach of a comet to the sun, the hydrocarbons break up into soot and smoke, which is illuminated by the sunlight in which it travels.

Far away the comet displays no light nor tail; the influences of the sun are felt too feebly at so great distance. But, with the ever-increasing speed of its approach, there is a rapid increase of the sun's energy imparted to it, so that the nucleus, hitherto cold and dark, develops its hazy



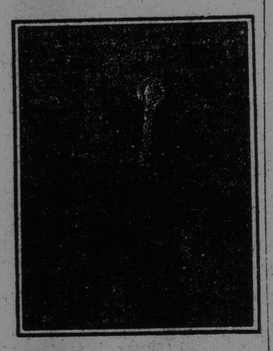
Halley's Comet, October 29, 1835.
(From an old drawing.)

head, and is first seen as an indistinct nebula; then the tail is thrown out and developed, as well as more fully displayed by reason of its near approach. Since the earth lies so near the sun in the celestial vastness, the comet approaches sun and earth at the same time; hence, at first its tail lies behind the head, and is seen nearly lengthwise; but when it passes our globe in either direction, we view it sidewise and obtain the full benefit of its entire length of millions of miles.

The development of the tail is due to the rapid increase of solar heat, and perhaps of electricity, driving out gases from the head, which are repelled in space. As the tail is always turned away from the sun, it is clear that some force proceeding from the sun is accountable for it. It cannot be like a trail of steam or smoke left behind a locomotive; for the comet does not travel in any resisting medium, and is actually preceded by its tail when retreating into space.

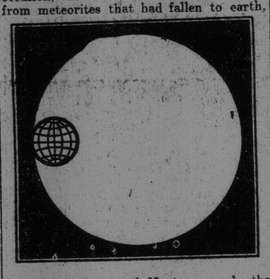
One of our most recent discoveries is that of the force exerted by light itself. No less than 70,000 tons of light pressure are received by the earth from the sun, and its law is that this force rapidly increases with the division of the object into smaller particles. The substances expelled from the nucleus of a comet by the sun constitute the most finely divided matter conceivable; hence the most sensitive to the action of light. Some think that there is an actual bombardment of these particles by corpuscles proceeding from the sun with enormous speed. Hence they are swept back into space in the form of a tail, whose light is chiefly, if not wholly, reflected sunlight, while that of the head is partly reflected and partly the outcome of energies set into action by the sun's influence.

Comets sometimes run so close to the sun that they are torn to pieces by the tidal influence of its tremendous gravitation. Biela's comet is one of these, gone



Halley's comet, January 28, 1836.
(From an old drawing.)

beyond recovery, and now supplanted by the stream of Bielid meteors following its former course. The great comet of 1882 ran so near the sun as to brush its coronal streamers, and it so felt the force of the sun's attraction when so close that it went to pieces before our eyes, breaking into no less than five separate comets, each throwing out its tail after the pattern of the original. It is thus that, in a number of instances, meteoric streams are recognized as the remnants of old comets, feebly pursuing the old paths, and steadily exhausting themselves by self-immolation in the earth's atmosphere. Dr. Odling graphically demonstrated the relation of meteors to comets when, on one occasion, he extracted cometary gasses from meteorites that had fallen to earth,

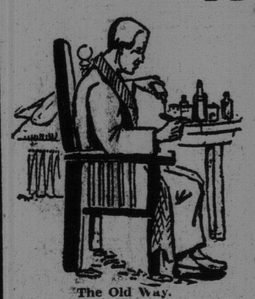


Comparative sizes of Neptune and the earth. To Neptune is given the honor of having captured Halley's somet.
(Drawn by the author.)

and with them illuminated the theatre of the Royal Institution.

FREDERIC CAMPBELL.

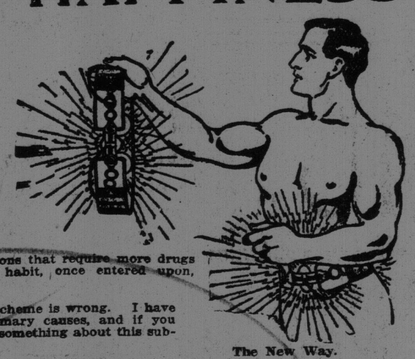
A NEW WAY TO REGAIN HEALTH AND HAPPINESS



The Old Way.

Long ago, when I first lifted my voice of warning against drugs and patent medicines and began my first great fight in favor of Electricity as a curative agent, I found anything but smooth sailing against superstition and prejudice, but, knowing I was on the right track, I pounded away, backing my judgment with what money I had, and have lived to see the great change of sentiment that has now come over the public.

I have done my part in showing that this whole scheme of taking something out of a bottle, a vest-pocket box, or to have something "rubbed on," in order to regain one's health and strength is principally pure superstition. I have taught that while the drug had a certain known direct effect, it had another and after effect that could not be foretold; that this after effect, or reaction, often causes other diseases, and produces complications and aggravations that require more drugs and still more drugs to mitigate; that this drugging habit, once entered upon, has no end this side of the grave.



The New Way.

The old methods are wrong, I tell you; the whole scheme is wrong. I have proved to the world that nearly all human disorders can be cured by removing the primary causes, and if you will come to me, if you will read my book, which is free for the asking, you can learn something about this subject that will interest every Man and Woman who is in search of Health.

If you feel that your Health and Strength—your vital stamina—are on the wane, if your liver has got in your eye, your heart in your boots, if you are not the Man or Woman, physically or mentally, you would like to be, I can give you the secret of getting back the Strength and Vigor you have lost; a process of treatment founded upon common sense; one in which the use of drugs in any form does not enter.

Again and again I have preached that "Electricity is Life"; that by building up the nervous energy of the body by a constant and steady infusion of this life force, the causes of seven-tenths of the weaknesses and diseases to which human flesh is heir can be effectively overcome.

Do you want proofs, Mr. Skeptic? I will give you an abundance of them. "An Ounce of Proof is Worth a Ton of Assertion." Below is a sample of the kind of evidence I have to offer. Write to me and I'll give you more.

Dear Sir,—I have proved your Belt at every opportunity, and I cannot say too much about it, as I am a man now. Before I was a wreck. I am pleased to tell you I am quite cured, and that your Belt has done more for me than all the doctors could do in the Old Country. I was laid up for three years, and took a good deal of medicine, but it did me no good. I can only say that your Belt has done wonders for me—almost a miracle, as I was given up for incurable by most of the doctors, and I cannot give you too much praise. I thank you for your interest in me, and any time I can say anything for the benefit of your Belt I will do so, as I think if more tried it it would save a great deal of pain, as I know, by experience, if they follow your advice, it will be a cure for them. Again thanking you for helping me to be a man once more and able to do a good day's work, I remain,

W. ATWELL, Bolton, Ont.

Do you doubt it? If so, any man or woman who will give me reasonable security can have my Belt, with all the necessary attachments suitable for their case, and they can

PAY ME WHEN CURED

My Belt is a success. It is a remedy built upon solid scientific fact. Already it is proved that my Belt is a cure for hundreds of ailments that drugs and other remedies have failed to cure. For weak and broken-down men and women my Belt is the only logical remedy—the only effective remedy.

My Belt has proved a complete and lasting cure for Indigestion (Dyspepsia), Constipation, Headache, Drowsiness, Rheumatism, Neuralgia, Lumbago, Sciatica, Weakness of the Back, Nervous Debility, General Debility, Sleeplessness (Insomnia), also Female Weakness, Menstrual Complaints, Inflammation, Bearing-down Pains, Dizziness. It improves the blood circulation, it restores lost vitality, it corrects every sign of mental impairment and physical breakdown in Men and Women.

Free Book

Every man who admires the perfection of physical strength should read my beautifully illustrated Book. It tells how strength is lost and how I restore it with my Electric Belt. I will send this book, closely sealed, free, upon request. If you are not the man you should be, write to-day. I have a book for women also.

Put your name on this coupon and send it in.

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YEAR AT BOYS' FARM WAS SUCCESSFUL

Annual Meeting of Directors of Institution for Delinquent Boys at Shawbridge

Shawbridge, Nov. 20—At the meeting of the Board of Directors of the Boys' Farm and Training School for delinquent boys, at Shawbridge, a remarkably successful year was reported. Good progress had been made in farm improvements and everything was being carried to a good conclusion. The boys attending the school and farm have been well behaved. The farm stock had been increased, a horse and eight cows being added to the complement of animals already in the board's possession. A new building is in the course of erection, and the necessity of a new cold storage house being erected was dwelt upon.

J. S. Buchan, the chairman of the Farm Committee, reported the whole year's work in detail. This year's work had been brought to a successful conclusion and the preparations for that of next season were well under way. The government inspector, Dr. Woods, had visited the farm in October and had expressed himself as highly pleased with the work being done. He had recommended in his report to the government that the institution be authorized to increase their accommodation to seventy boys.

Mr. Buchan recommended that a new cold storage house be erected. He said the place could be built mainly by the boys and the stone could be taken from the farm quarry.

G. W. O. Matthews, superintendent of the farm, expressed himself as well pleased with the past season.

A BISHOP ON SPIRITUALISM.

The Bishop of London, preaching at St. Michael and All Angels', Bedford Park, said that putting aside all wild speculation and the foolishness of holding communication with the other world, which was called spiritualism, and which led eventually to madness, there were four things which seemed quite clear about the world to come: the nearness of it, the union with it, the progress in it, and the permanence of it.

Knitted motor coats are delightfully warm and comfy.

AMERICAN SHIPPING TOTALS 7,388,755 TONS

Report of Commissioner of Navigation Shows, in Foreign Trade a Loss of 53,000 Tons During Year

Washington, Nov. 20—The commissioner of navigation has reported to Secretary Nagel, of the Department of Commerce and Labor, that the total documented shipping of the United States on July 1, 1909, comprised 25,688 vessels of 7,388,755 gross tons—a larger tonnage than under any foreign flag except the British, 18,000,000 tons. American shipping is almost wholly engaged in domestic commerce, and 6,501,250 tons are enrolled or licensed for this purpose, while Germany's 4,266,000 gross tons are almost wholly, of course, in foreign trade. American tonnage registered for foreign trade amounts to only 887,505 tons, a loss of 53,000 tons since last year, and much of the tonnage yet registered is permanently laid up. The Great Lakes employ 2,782,481 gross tons.

During the fiscal year shipbuilding shared in the general business depression here and abroad, and only 1,247 vessels of 238,000 gross tons were built, the smallest amount since 1896. In Great Britain, however shipbuilding also declined from 1,580,000 tons to 914,000 tons. Prospects and contracts show a decided improvement in shipbuilding at home during the current fiscal year.

The tonnage duty amounted to $1,052,374, a decrease of $24,197. American ships paid $80,397, British ships $595,737, German ships $140,879. We paid British and German ships for carrying our mails, however, more than these amounts. The exemption of vessels in fresh water trades from tonnage tax is recommended. Under the new tariff law five foreign built yachts have paid $35,854 taxes since September. The constitutionality of the law has been questioned by some yacht owners, and awaits judicial determination. Shipping commissioners shipped and discharged 341,980 men (counting repeated voyages) on American ships. Only 19 per cent of the crews of those ships are American citizens, born or naturalized.

Laws enacted in 1895, when motor or power boats were practically unknown, prescribe equipment unnecessary on the smaller types of these boats, and modification of those laws is recommended.

The bill requiring wireless apparatus on ocean passenger steamers is favored. The report recommends various changes in the navigation laws, but is principally devoted to a consideration of the subsidy question.

Mail subsidies, admiralty subventions and navigation bounties of foreign nations are considered at some length in the report. Commissioner Chamberlain shows that under these heads, including also ship building and fisheries bounties and retainers for naval reserves, these expenditures now amount annually to $46,896,000. The United States for ocean mails in 1908 paid to American steamers $1,467,255, and to foreign steamers $1,228,032, our subsidies being less than those paid by Canada. The expenditures of foreign governments are grouped according to the latest returns from foreign governments.

SON HAS FATHER ARRESTED IN CASE OF CHRISTIAN SCIENCE

Prince Albert, Saskatchewan, Nov. 19—Charged with neglecting and refusing to supply medical attention to his thirteen-year-old daughter, Florence, Frank Cherry, one of the earliest farmers in the district, worth $40,000, was arrested at the instance of his own son. He was committed for trial at the next sitting of the supreme court.

Three weeks ago his daughter had her leg broken in a runaway accident, and since that time the bone had been protruding several inches. The eldest son sent for a doctor, and it is understood that the father refused to allow the physician to dress the wound. The cut remained open, and the son, unable to stand the suffering of his sister any longer, swore out information against the father.

Hear it yourself - the Edison Phonograph

You cannot judge the Edison by hearing other kinds. The Edison is the sound-reproducing machine at its best. It is not a talking machine. It is a Phonograph reproducing every sound faithfully—the song exactly the way the singer sang it; the opera exactly the way the orchestra played it; the two-step exactly the way the band rendered it.

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When he says he wants to see an Edison Phonograph in every home, he means your home. Do you not want one there? Do you not need this amusement maker for your own sake, for your children and for your guests? Hear one today. Hear all the others too and compare. Only in this way can you know that what we say is true.

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Edison Standard Records	.40
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"In the matter of parks and places of public enjoyment, I do not think that Sydney is exceeded by any town in Christendom. Only sixteen miles out there is the famous national park of 37,000 acres, one of the beauty spots of the globe, and frequent trains carry out the population for a shilling the round trip. Another beautiful reservation, 3,000 acres smaller, known as Kuringal-chase, is one of the grandest pieces of forest land extant. Its dense woods are fronting for many miles numerous tidal arms of the sea, and it is to be held for the people for all time. Melbourne also has beautiful recreation grounds near the city, and so have Adelaide, Hobart and Brisbane."

Everybody Admires a Beautiful Complexion.

DR. T. FELIX GOURAUD'S

Oriental Cream

OR MAGICAL BEAUTIFIER

An Indispensable and Delightful Toilet Requisite for Fashionable Women.

A daily necessity for the ladies' toilet whether at home or while traveling. It protects the skin from injurious effects of the elements, gives a wonderfully effective beauty to the complexion. It is a perfect non-greasy Toilet Cream and positively will not cause or encourage the growth of hair, which all ladies should guard against when selecting a toilet preparation. When dancing, bowling or other exertions heat the skin, it prevents a greasy appearance.

Gouraud's Oriental Cream has been highly recommended by physicians, actresses, singers and women of fashion for over half a century and cannot be surpassed when preparing for daily or evening attire.

Gouraud's Oriental Cream cures Skin Diseases and relieves Sunburn. Removes Tan, Pimples, Blackheads, Moth Patches, Rash, Freckles and Vulgar Redness, Yellow and Muddy Skin, giving a delicately clear and refined complexion which every woman desires.

No. 11 For sale by Druggists and Fancy Goods Dealers.

Ferd. T. Hopkins, Prop., 37 Great Jones Street, New York.

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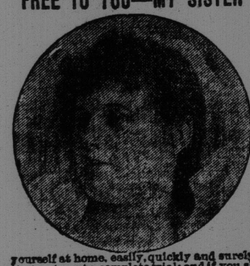

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I know woman's sufferings.
I have found the cure.

I will mail, free of any charge, my home treatment with full instructions to any sufferer from women's ailments. I want to tell all women about this cure—you, my reader, for yourself, your daughter, your mother, or your sister. I want to tell you how to cure yourself at home without the help of a doctor. Men cannot understand women's sufferings. What we women know from experience, we know better than any doctor. I know that my home treatment is a safe and sure cure for Leucorrhœa or Whitishness, Ulceration, Displacement or Falling of the Womb, Profuse, Scanty or Painful Periods, Uterine or Ovarian Tumors or Growths, also pains in the head, back and bowels, bearing down feelings, nervousness, creeping feeling up the spine, melancholy, desire to cry, hot flashes, weariness, kidney and bladder troubles where caused by weakness peculiar to our sex.

I want to send you a complete 10 days treatment entirely free to prove to you that you can cure yourself at home, easily, quickly and surely. Remember, that it will cost you nothing to give the treatment a complete trial; and if you should wish to continue, it will cost you only about 12 cents a week, or less than two cents a day. It will not interfere with your work or occupation. Just send me your name and address, tell me how you suffer, if you wish, and I will send you the treatment for your case, entirely free, in plain wrapper, by return mail. I will also send you free of cost, my book—"WOMAN'S OWN MEDICAL ADVISER" with explanatory illustrations showing why women suffer, and how they can easily cure themselves at home. Every woman should have it and learn to think for herself. Then when the doctor says—"You must have an operation," you can decide for yourself. Thousands of women have cured themselves with my home remedy. It cures all, old or young. To Mothers of Daughters, I will explain a simple home treatment which speedily and effectually cures Leucorrhœa, Green Sickness, and Painful or Irregular Menstruation in Young Ladies. Plumpness and health always result from its use.

Wherever you live, I can refer you to ladies of your own locality who know and will gladly tell any sufferer that this Home Treatment really cures all women's diseases and makes women well, strong, plump and robust. Just send me your address, and the free ten days' treatment is yours, also the book. Write to-day, as you may not see this offer again. Address:

MRS. M. SUMMERS, Box 268 WINDSOR, ONT.

DEVELOPE THE WATER FRONT OF EAST BOSTON

System of Docks Easterly From Boston and Albany Location is Planned

Boston, Nov. 20—Henry M. Whitney president, and G. D. Wadsworth, engineer, of the East Boston Company, have appeared before the Joint Board of Commissions on Metropolitan Improvements with plans for the commercial development of East Boston's water front, and Mr. Whitney told the board that he is convinced that Boston's future commercial development must come from the north rather than from the south. He believes that the East Boston flats present the only practical place for development, and the only place where it can be done advantageously for the railroad companies.

Mr. Whitney admitted that the problem is too great for the East Boston Company to handle, but it can easily be accomplished with the co-operation of the state and city and private individuals. He said that the Harbor and Land Commissioners' line must be changed and located farther out in the water in order that docks may be constructed of a length to accommodate the ocean-going steamships; he suggested that docks should be at least 1,200 to 1,600 feet long.

He pointed out that little of the land to be utilized in this proposed development is the property of the East Boston Company, so the only benefit to the company would be indirect. The plans, he said, have been presented to the two railroad companies having interests at East Boston and have met their approval.

Engineer Wadsworth presented the plans and explained their scope, showing ing a sytem of docks extending easterly from the present Boston & Albany along the water front, to be connected with the Boston & Maine and the Boston & Albany Railroad systems by means of a marginal railroad having connections with the Grand Junction tracks.

Makers of ordinary Hot Water Bottles warn you against the use of Hot Water. The Walpole Hot Water Bottle is tested with 80 pounds of live steam. They are made of one piece of Rubber and made to hold Boiling Hot Water. Our guarantee for two years covers every kind of accident. Best Druggists sell the WALPOLE as their leader. WALPOLE RUBBER CO., LTD., MONTREAL.

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Gray hair is an unnatural disfigurement, it is your duty to yourself and your friends to get rid of it as soon as possible. It is a serious injury to you in your social and business life.

Get rid of it by all means, but don't try to do so by the use of dyes, whose effect is but temporary and unsatisfactory and which may permanently injure your hair.

Use Hay's Hair Health and look young. It isn't a dye—it won't injure your hair and nobody will know you are using it. It quickly and unfailingly restores the natural color and beauty of the hair—brings back its youth, luster, softness and brilliant luxuriance.

$1 and 50c. Bottles, at Druggists.

Send 2c. for books "The Care of the Skin," "The Care of the Hair."

Phile Hay Spec. Co., Newark, N. J. U. S. A.

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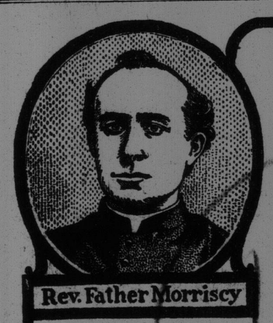

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The very same remedies, with all their healing virtues, prepared from the late priest's prescriptions, are now on sale throughout the Province of Quebec.

The "Lung Tonic," commonly known as "Father Morriscy's No. 10," is one of the best remedies ever put up for Coughs, Colds, Bronchitis and lung troubles of all kinds. It removes the mucus, quickly drives away the inflammation and congestion and heals the membranes, leaving them stronger than before and better able to resist disease.

"No. 10" is absolutely free from Opium, Morphine or any harmful drug, and is perfectly safe even for babies.

Trial size 25c. per bottle. Regular size 50c.

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