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All about HALLEY'S COMET

Comet Lore

By

Edwin Emerson

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HALLEY'S COMET OF 1910, AS SEEN IN NEW YORK, LOOKING WESTWARD, DURING THE LATTER PART OF MAY.

COMET LORE

Halley's Comet in History and
Astronomy

By

EDWIN EMERSON

Author of "A History of the Nineteenth Century," Etc.



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COMET LORE

and
Comet in History and
Astronomy

Life

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TO THE COMET

"Thereby Hangs a Tail."—*Shakespeare.*

Lone wanderer of the trackless sky!
Companionless! Say, dost thou fly
Along thy solitary path,
A flaming messenger of wrath—
Warning with thy portentous train
Of earthquake, plague and battle-plain?
Some say that thou dost never fail
To bring some evil in thy tail.

W. LATTEY.



THE COMING OF THE COMET

THE Sun will surely rise and set to-morrow.

Just so surely must a Comet flare forth in our Heavens this Spring.

Star-gazers, astronomers and learned men have been waiting for this Comet all over the earth—in America, in Europe, in far China.

They have known for certain that this Comet would come; and they knew just when and where in the Heavens the Comet would first show itself to the naked eye—down to the very night.

All this has been known so surely because this same Comet has been seen by the people of this earth before.

It came and went seventy-four years ago. Seventy-six years before that, it came and went. And seventy-six years before that, the Comet had come and gone.

As long as human beings have lived on this earth—for thousands and thousands of years—human eyes have beheld this same Comet every seventy-six years or so.

The longest time between the Comet's coming has been seventy-nine years. The shortest interval of all— $74\frac{1}{2}$ years—was this time.

For thousands of years in the past, wise men have written down records of this Comet.

Long, long ago, when white men were still savages who dwelt in caves, patient star-gazers in China and Chaldea studied the motions of this Comet.

Farther back than that, in the hoary days before the

art of writing was known, ancient bards sang of this Star and its hairy tail. Some of their words are still remembered.

Artists have drawn pictures of this Comet. Their pictures are still shown.

Women have stitched images of this Comet into their handiwork. Some of this handiwork can still be seen.

Coiners have stamped designs of this comet on their coins and medals. Those coins are still shown in mu-seums.

Priests, Popes and great Divines have preached about this Comet. Their sermons are still preserved in the records of the Church.

Learned men have written in their books what happened when the Comet came. Those books are read to-day.

The coming of this Comet in olden times has been fixed in lasting records, which he who runs may read.

Nothing in all History is more certain than the story of this Comet.

WHY HALLEY'S COMET ?

TWO hundred and twenty-eight years ago, when this Comet was seen shining over the City of London, the great astronomer, Edmund Halley, made a special study of it.

Halley was the first to say that this Comet had come before and would surely come again. He wrote down the time when the Comet would come again, long after he should be dead.

"If it should return," he wrote, "according to our predictions, about the year 1758, impartial posterity will not refuse to acknowledge that this was first discovered by an Englishman."

The Comet returned, as he had foretold, seventeen years after Halley's death, when it was first seen in 1758, on Christmas night, by a man in Saxony, named Palitsch, who was looking for the Comet.

From that day this Comet has been called after Halley.

Since then many famous astronomers, such as Clairaut, Pontécoulant and Laplace in France, have calculated the dates for the Comet's return.

Last time, in 1835, Halley's Comet returned within a few nights of their prediction.

This time, so the astronomers figured seventy-five years ago, the Comet should be plainly seen after dark late this May.

What they predicted has come true.

THE TERROR OF THE COMET

"Canst thou fearless gaze
Even night by night on that prodigious Blaze,
That hairy Comet, that long streaming Star,
Which threatens Earth with Famine, Plague and War?"
—*Sylvester.*

SO LONG as the memory of man goes back, the appearance of a Comet has always been taken as a just cause for dread.

In the train of Comets, it has ever been held, come wars, bloodshed, fires, floods, plagues, famine and the fall of mighty rulers.

Our Holy Bible confirms this time-honoured belief.

The Saviour Himself said, according to the Gospel of St. Luke, Chap. XXI., Verse 10-11:

"Nation shall rise against nation, and kingdom against kingdom; and great earthquakes shall be in divers places, and famines and pestilences; and fearful sights and great signs shall there be from Heaven."

In the Revelation of St. John the Divine (Chap. VIII., Verse 10) we read:

"There fell from Heaven a great star burning as a torch," and again (Chap. XII., Verse 3):

"There was seen another sign in Heaven, and behold a great red dragon . . . and his tail draweth a third part of the stars in Heaven. And behold the third woe cometh quickly." (Chap. XII., Verse 14.)

The "flaming sword" in the hands of the angel of the

Lord, when Adam and Eve were driven from the Garden of Eden, many sacred writers hold, can only be interpreted as a Comet.

“For the Almighty set before the door
Of th’ holy park a seraphim that bore
A warning sword, whose body shined bright
A flaming Comet in the midst of night.

—*Todd.*

So, too, when Jerusalem was to be wasted by a plague, David beheld a Comet in the shape of a flaming sword:

“And David lifted up his eyes and saw the angel of the Lord stand between the earth and the Heaven, having a drawn sword in his hand stretched out over Jerusalem.”

—*I. Chron. XXI. 16.*

The fall of Satan, some sacred writers hold, was marked by the appearance of a Comet. In Isaiah (XIV. 12) we find:

“How art thou fallen from Heaven, O flaming one, son of the morning!”

John Milton, in his “Paradise Lost,” has fixed this image in immortal verse:

“Satan stood
Unterrified, and as a Comet burned
That fired the length of Ophiuchus huge
In th’ arctic sky, and from its horrid hair,
Shakes pestilence and war.”

The Great Deluge, described in Holy Writ, came after the appearance of a mighty Comet (Halley’s Comet), so Dr. William Whiston, Sir Isaac Newton’s successor in the Lucasian chair of Mathematics at Cambridge, set forth in a special treatise. The great French astronomer, Laplace, also reached the same conclusion.

This same Comet (Halley's Comet) likewise foretold the final fall of the Holy City, Jerusalem, in the year 70 after Christ. This Comet was seen by St. Peter. Josephus in his History of the Jewish Wars recorded the nightly appearance of this Comet over the City of Jerusalem just before the war which ended with the destruction of the Holy City.

"Amongst other warnings," writes Josephus, who saw this Comet with his own eyes, "a Comet of the kind called swordshaped, because their tails appear to represent the blade of a sword, was seen above the city for the space of a whole year."

Josephus at the time rebuked his Jewish countrymen for listening to false prophets while so clear a sign from Heaven was before their very eyes.

This same Comet (Halley's Comet) reappeared at a critical period of the rule of Constantine the Great, the first Christian Emperor of Rome. He first beheld his sign from Heaven in the midst of battle as it blazed overhead in the sign of a Cross. With the help of his mother, the sainted Helen, Constantine was moved thereby to turn Christian.

Constantinople, the great capital of the Orient, which owes its name to this same Emperor Constantine, was lost to Christendom in the year 1453, when the Turks overran the great city with fire and sword. This event, it is recorded, was heralded by another appearance of a Comet. Three years later, when the Turks were about to descend upon Belgrade, another Comet (Halley's Comet) spread consternation throughout Europe.

At that time Pope Calixtus III., on the appearance of this Comet, seeing that evils were impending for the human race, called for prayers that the Almighty would



"A SWORD-SHAPED COMET BLAZED OVER THE DOOMED
HOLY CITY."
—Josephus' *"History of Judea."*

turn these evils upon the Turks, the enemies of the Christian faith.

At the same time the Holy Father gave orders for all Church bells to be tolled at noon to remind faithful Christians to pray for those battling against the Turk.

Into the Ave Maria were put the words: "From the Devil, the Turk and the Comet, Good Lord, deliver us!"

Since that time in most Catholic countries the Angelus is still regularly rung at noon. In Italy, even to-day, the cakes sold before the church doors at noon go by the name of *Comete*.

All the great Fathers of the Church have taught that Comets are to be taken as signs from Heaven.

Baeda, the Venerable, declared in the seventh century in England, that "Comets portend revolutions of kingdoms, pestilence, war, winds, or heat."

John of Damascus, preaching in the same century in the Orient, laid down the same belief.

St. Thomas Aquinas, the great Light of the Church in the thirteenth century, accepted and handed down the same opinion.

The sainted Albert the Great, the most noted thinker of the Church in the Middle Ages, received and taught the same doctrine.

The teachings of these Church Fathers as to Comets have been commended in our own day by Pope Pius IX.

The great teachers of other religions, likewise, have laid down identical beliefs as to the meaning of Comets.

The sacred books of India are full of awed references to the baleful influence of Comets.

The ancient year books of China, written centuries before white men kept any records, tell of the appearance of Comets and of the disasters they foretold.

The Mohametans and their wise Arab star gazers,

when they saw a Comet in the Heavens, knew that it meant war.

The woe of one Comet (Halley's Comet of 1456), which had the shape of a Turkish scimitar, so the Arab soothsayers foretold, would be turned against their enemies. This was the same Comet which brought such fear to the hearts of Pope Calixtus III. and all his Christian followers.

Thus it can be seen that Comets have been held to foretell disaster on one side, and victory on the other.

The Comets which conquerors hailed as their guiding stars, have meant war and bloodshed and disaster to those whom they came to conquer.

The same Comets which shone upon the birth of mighty rulers, have blazed in warning of their death.

Julius Caesar, who was born under a Comet, saw his bloody end foretold by another Comet.

Therefore, Shakespeare in his play "Julius Caesar," makes Calphurnia say to Caesar:

"When beggars die, there are no Comets seen;
The Heavens themselves blaze forth the death of
princes."

On the night of Caesar's assassination, when the Comet was seen blazing at its brightest, the Romans said that it had come to bear away the great soul of the murdered Caesar.

At the death of Nero, the Roman Emperor, who persecuted the Christians, a Comet blazed forth again. The Roman historian Suetonius, who wrote the Life of Emperor Nero, thus described this Comet:

"A blazing star, which was commonly held to portend destruction to Kings and Princes, reappeared above the horizon several nights in succession."

Another great Comet (Halley's again) reappeared when Attila, the King of the Huns, the "Scourge of God," was overthrown in the greatest battle of Christendom on the Catalaunian fields.

Claudius, a Roman writer of that period, then stated that "a Comet was never seen in the Heavens without implying some dreadful event."

This has ever been the belief of all the great poets of olden time.

Homer, the greatest poet of Ancient Greece, a thousand years before the birth of Christ, sang of:

"The red star, that from his flaming hair
Shakes down diseases, pestilence and war."

Let it be explained here that the word Comet in Greek means "long-haired," from *kome*,—hair.

Virgil, the greatest Roman poet, sang of "the baleful glare of bloody Comets," and again, of "dreadful Comets blazing in the sky."

Tasso, the greatest of Italian poets after Dante, sang thus of Comets in his "Jerusalem Delivered":

"Qual con le chiome sanguinose horrende
Splender Cometa suol per l'aria adusta,
Che i regni muta, e i ferì morbi adduce,
Ai purpurei tiranni infausta luce."

—*Gerusalemme Liberata, Canto VII., Stanza 52.*

Rendered thus by Wiffen into English:

"As with its bloody locks let loose in air
Horribly bright, the Comet shows whose shine
Plagues the parched World, whose looks the Nations
scare,
Before whose face States change, and Powers decline,
To purple Tyrants all, an inauspicious sign."

The great English poets, on their part, have lifted up their voices to sing of the dire effects of Comets.

Shakespeare, the greatest of them all, abounds in allusions to these dread wandering stars.

Thus he makes Horatio in the first scene of "Hamlet" speak with awe of:

"Stars with trains of fire and dews of blood;

.

And even the like precursor of fierce events,
As harbingers preceding still the fates
And prologue to the omen coming on."

More briefly Shakespeare in his "Henry VI." refers to:

"A Comet of revenge
A prophet to the fall of all our foes";

and again, in "The Taming of the Shrew" to:

"Some Comet or unusual prodigy."

Spenser in his "Faerie Queene" sings of a woman's hair loosely dispersed in the wind:

"All as a blazing starre doth farre outcast
His heavy beames, and flaming lockes dispredd,
At sight whereof the people stand aghast;
But the sage Wizzard telles, as he has redd,
That it importunes death and doleful drearyhedd."

John Milton, besides likening Satan to a Comet, as before quoted, also showed that he shared in the belief that the flaming swords mentioned in Holy Writ were Comets:

"High in front advanced
The brandish'd sword of God before them blazed
Fierce as a Comet."

The poet Young, in his "Night Thoughts," aptly writes of the Comet:

"Hast thou ne'er seen the Comet's flaming light?
Th' illustrious stranger passing, terror sheds
On gazing Nations, from his fiery train."

The poets of other nations have written of Comets in like vein. There is an old German rhyme, sung by German school children even to-day, which has been put into English by Dr. Andrew D. White in his "History of the Doctrine of Comets":

"Eight things there be a Comet brings,
When it on high doth horrid range;
Wind, Famine, Plague, and Death to Kings,
War, Earthquake, Floods and Direful Change."

This little rhyme was originally put forth for German school children by two Protestant preachers of Basle, Switzerland, at the time of the great Comet of 1618, which heralded the outbreak of the great "Thirty Years' War."

These Protestant ministers got their belief in Comets and their evil influence upon mankind not from the Church of Rome, but from the Bible teachings of such great Protestant reformers as Martin Luther, Melanchthon, Zwingli, Calvin, John Knox of Scotland, Bishop Jeremy Taylor and John Howe, the great Nonconformist divine.

Martin Luther preached in one of his Advent sermons:

"The heathen write that the Comet may arise from natural causes; but God creates not one that does not fore-token a sure calamity."

Luther's friend, Melanchthon, in a letter, declared Comets to be "heralds of Heaven's wrath."

Zwingli, in 1531, declared that the great Comet of that



year (Halley's Comet) was sent by God to betoken calamity.

John Knox, preaching in his Scottish kirk at Edinboro, declared that he saw in Comets tokens of the wrath of Heaven. .

The great divines of the Church of England,—from Cranmer, Bishop Latimer, Archbishops Spottiswoode and Bramhall, Bishop Jeremy Taylor, down to our own times, clearly preached the doctrine that Comets must be taken as tokens from Heaven.

Thus the Comet of 1572 was pointed out from the pulpits of England and Scotland as a token of Heaven's wrath and warning at the St. Batholomew Massacre on the night of August 24, 1572, when thirty thousand Huguenots were murdered in the streets of Paris and elsewhere in France.

Across the sea, in the new Commonwealth of Massachusetts, the great New England divine and President of Harvard College, Increase Mather, on the apparition of the great Comet now known as Halley's, in 1682, preached on "Heaven's Wrath Alarm to the World—wherein is shown that fearful sights and signs in the Heavens are the presages of great calamities at hand."

Increase Mather preached on the text taken from the Book of Revelation: "And the third Angel sounded, and there fell a great Star burning as a Torch, . . and behold the Third Woe cometh quickly."

In this sermon the great preacher told of the Roman Emperor Vespasian, who, when warned of the omen of a Comet, made fun of it, and then died miserably.

So Mather preached: "For the Lord hath fired his beacon in the Heavens among the stars of God there. The fearful sign is not yet out of sight. . . Do we not see the sword blazing over us? . . Doth God threaten



THE TERROR OF THE COMET OF 1531. FROM AN OLD
NUREMBERG WOOD-CUT.

our very Heavens? O pray unto Him, that he would not take away stars and send Comets to succeed them!"

The profound Russian thinker Tolstoy, in his great book "War and Peace," has written of the flaming Comet of 1811. This was the famous "Comet of Napoleon," which blazed over Western Europe when Napoleon was gathering his grand army for its disastrous march into Russia and to Moscow.

At Moscow, the ancient capital of Russia, this Comet was observed by anxious thousands. One night there was this talk between a novice nun and the Abbess of her Convent. On their way to vesper service one evening in Moscow the nun suddenly beheld the Comet for the first time and asked: "What is that star?"

The Abbess answered: "It is not a star. It is a Comet."

"But what is a Comet?" asked the young nun. "I have never heard that word."

The Abbess then answered: "Comets are signs in Heaven, which God sends before misfortunes."

Shortly after this the bloody battle of Borodino was fought, and Napoleon, with his army, appeared before the gates of Moscow. The hundred-towered city was abandoned by the Russians and was given over to the flames.

Years afterward this same nun thus told her story, as printed in the "Revue des Deux Mondes":

"Every night the Comet blazed in the Heavens, and we all asked ourselves: What misfortune does it bring? Then the enemy came, and our sacred city was put to the torch. Our convent, together with all other cloisters, monasteries and churches, was burned to the ground."

Many other writers of the time who saw the great Comets that blazoned Napoleon's destructive wars have

recorded how they were universally taken as omens of the great conqueror's bloody trail.

Napoleon himself gloried in this dread omen and hailed the Comet as his "guiding star."

All this has been fully set forth by the famous French astronomer Messier, a latter day observer of Halley's Comet, who wrote a special book on "The Wonderful Comet which appeared at the Birth of Napoleon the Great."

As for the many Comets that have blazed down upon other great conquerors and other bloody wars, before the comparatively recent Comets of the American Civil War and the Napoleonic Wars, they are all set down in a special History of Comets.

In this great work, entitled "A History of All Comets," the Latin scholar Lubienitius has pointed out all the calamities and dire events which attended the appearance of each and every Comet recorded in history.

THE EFFECTS OF COMETS ON MAN

SOME thinkers have pointed out that there has often been a direct connection between the feelings produced in the human soul by the appearance of a Comet and the human deeds of violence or the human epidemics and excessive mortality following the widespread terror produced by Comets.

Only this year (1910) the appearance of Inness' Comet over Mexico caused a panic stricken holy pilgrimage to the Shrine of Talpa. In China, too, it caused terror, resulting in Christian massacres. |

Hence, also, several Jewish massacres inspired by Comets in the past and hence also so many terrifying plagues connected with Comets.

Thus Ambroise Paré, the "Father of French Surgery," who flourished in the sixteenth century, has recorded the effect produced upon his contemporaries by the Comet of 1528.

"This Comet was so horrible," wrote Dr. Paré, "so frightful, and it produced such great terror among the common people, that many died of fear and many others fell sick."

Dr. Paré himself appears to have come under the influence of this fear, judging from his awe-struck description of the appearance of this Comet:

"It appeared to be of excessive length; and was of the colour of blood. At the summit of it was seen the figure of a bent arm, holding in its hand a great sword as if about to strike.

"At the end of the point there were three stars. On both sides of the rays of this Comet were seen a great number of axes, knives, and blood-coloured swords, among which were a great number of hideous human faces with beards and bristling hair."

Hannibal committed suicide on account of a Comet. So did Mithridates. So did one Toma, in Hungary, only this year.

King Louis "the Debonair" of France, died from fear of a Comet (Halley's Comet) in 837 A. D.

Emperor Charles V., of Germany and Spain, the monarch who boasted that "the sun never set on his dominions," was so moved by the appearance of a Comet in 1556, that he gave up his crown and became a monk.

Certain metaphysicians have held that there is a substance in a Comet, or in its tail, which has a weird effect on man's brain, as moonshine is believed to have on some men, making them lunatics. As a matter of fact, as Arago pointed out, Comets have caused tremendous spring tides just like the moon. The same irresistible pull of gravity or electricity or light-pressure must perforce affect other substances besides water, such as human brains.

According to this metaphysical theory, the close approach of a Comet to the earth affects and disturbs men's brains, so that men are inwardly stirred with warlike impulses. Hence the great wars almost invariably following the appearance of Comets.

Hence, too, the appeal to Comets made by so many conquerors, from William the Conqueror down to Napoleon. In the homely phrase of one writer, "the inner eye of man, under the weird effect of a Comet, sees red and makes him thirst for blood."

Those rare beings who have lying latent within them the gift of Second Sight or divination, according to this same metaphysical theory, upon the near approach of Comets find themselves stirred to prophesy. Hence, so many marvellous prophecies inspired by Comets since the ancient days of Merlin, the seer.



"THE COMET OF 1910 SO ALARMED THE PEOPLE OF MEXICO THAT MANY THOUSANDS WENT ON A HOLY PILGRIMAGE TO THE SHRINE OF TALPA IN XALISCO."—*Mexican Herald*.

THIS YEAR'S PROPHECIES

THE return of Halley's Comet in this Year of Our Lord 1910 has already called forth several memorable prophesies.

On January 20th the French astrologer and prophetess Madame de Thebes, who predicted the disastrous French floods of this year, as well as the coming of Inness' unexpected Comet, uttered the following prophesies:

"This year, 1910, will be one to look back to with trembling.

"The earth is under a terrific strain from Comets and planetary revolutions. Human destiny is red. That means blood. Political events are black. Terrible changes are imminent.

"This winter, France will be swept by terrible floods. Paris will be under water. The influence of form changes in other planets and the coming of a Comet will affect us for the worse.

"The strain of the stars will be most severely felt in America. The people of America will have to pay dearly for all their riches and sudden prosperity. With the coming of another Comet disaster will descend upon America.

"A financial crash is impending, to be followed by a long string of suicides. Black ruling us, men will commit all manner of crimes and knaveries for money.

"The times are swaying toward degeneration. We are swinging within the evil influence of a strange orbit. Our souls are jarred from their proper bearings. I

dare not say all that is revealed to me. It would be too terrible."

Soon after this prophesy was uttered came the first of such suicides. Adam Toma, a wealthy landowner of Szozona, Hungary, cut his throat because of the Comet. He left a note saying that the Comet was the cause of his death.

Cardinal Gibbons later expressed his profound belief that the Paris floods of this year were sent by God as a punishment to the Parisians for their frivolities and sins, of which the Comet was a fiery warning.

Commenting on Madame de Thebes' predictions and her connection of the Comet of 1910 with this year's spring-floods in France, Italy and Germany, the French astronomer Henri Deslandres, late Director of the Astronomical Observatory of Meudon and member of the French Academy of Sciences, said:

"However distant Comets may be, it is not at all impossible that their enormous tails, measuring 75,000,000 to 125,000,000 miles in length, may come in contact with our atmosphere. The theory that a Comet may disturb the atmosphere of the earth, causing rains of great duration, and consequently inundations and the sudden overflow of rivers, is not at all absurd. It can be sustained by scientific reasoning."

It should be remembered here that Laplace, one of the greatest of all astronomers, credited the deluge to a Comet.

Before Madame de Thebes' ominous prophesy concerning Halley's Comet and its effects upon America were cabled over to this country, another, no less dire prediction of financial disaster in the United States, coincident with the appearance of Halley's Comet, was made by W. E. Corey, the President of the American Steel Trust.



THE COMET OF 1910, FROM A TELESCOPIC PHOTOGRAPH TAKEN
AT GREENWICH.

Mr. Corey then warned his friends to "call in their money and get from under" because a calamitous financial crash and general business ruin would surely come during the Spring of 1910.

The most ominous of all prophecies connected with the coming of Halley's Comet this year was made by the venerable General Ballington Booth, the head of the Salvation Army. Speaking in London, immediately after Halley's Comet had been located, early this year, General Booth said:

"We are, this year, rapidly approaching the end of all things, with similar results, but far surpassing in horrors any disaster that has gone before.

"All things will be wound up. Besides a deluge of water sweeping parts of the world and its inhabitants there will be fierce destruction by fire."

FAMOUS COMETS OF OLDEN TIMES

BACON, the great English thinker, has said: "Comets have some action and effect on the universality of things."

All Comets recorded in history, so Lubieninitius has shown in his "Universal History of All Comets," appeared in connection with some great event or catastrophe in the History of Man.

George F. Chambers, one of the most up-to-date writers on Astronomy and Comets, on the second page of his "Story of the Comets" (1909), declares:

"It is the general testimony of History during many hundreds of years, one might even say during fully 2,000 years, that Comets were always considered to be peculiarly 'ominous of the wrath of Heaven and as harbingers of wars and famines, of the dethronement of Monarchs and the dissolution of Empires.' "

Reaching back into remotest history, the sacred books of India show that the births of Krishna and of Buddha were foretold by moving lights in the Heavens.

The ancient records of China tell of the appearance of a moving beacon in Heaven at the birth of Yu, the first ruler of the Celestial Empire, and again at the birth of the great Chinese prophet, Lao-Tse.

The ancient Greeks have recorded similar appearances of Comets. Aesculapius, the divine healer and first physician, was born under a Comet.

The oldest traditions of the Jews tell us that when Abraham was born a moving star was seen in the East.

Another moving star with long radiant gleams of light streaming behind it shone forth at the birth of Moses. This Comet was seen by the Magi of Egypt, who pointed it out to the King as an omen meant for him. Hence Pharaoh's order, as recorded in the Old Testament, for the slaughter of all male Jewish infants then born in Egypt.

GREAT EVENTS CONNECTED WITH HISTORIC COMETS IN ANTIQUITY

THE earliest Comet of which there is any historic record was a Comet mentioned in the oldest cuneiform inscriptions of Babylonia several thousand years before our Christian era, recently found on the north bank of Nahr-al-Kalb, near Beyrut in Syria. This Comet is recorded to have been visible to the naked eye for 29 nights.

At the time Lubienitius wrote his big "History of all the Comets" the exact date of this Comet had not been fixed. Lubienitus, though, had a record of this same Comet, the date of which he fixes at the year 2312 before Christ, the date computed by him and other writers for the beginning of the deluge.

In modern times the great French astronomer Laplace credited a Comet with causing huge floods at the time of the great Deluge.

Two hundred and eighty-eight years after the great Deluge, according to the records of the Chaldean star gazers, there appeared another Comet. This is the date, computed by Lubienitius, for the building of the Tower of Babel and the confusion of tongues.

Two thousand and sixty-four years before Christ, another Comet appeared, as recorded by the Chaldeans. This is the date given for the birth of Abraham.

When Abraham was seventy years old, in the year 1949 B. C., a Comet was seen shining over the Valley of Siddim for twenty-two nights. This is the date given by Bible historians for the destruction of Sodom and

Gomorrha, the two cities of iniquity which lay in the Vale of Siddim.

Jewish analists record a Comet in Egypt in the year corresponding to B. C. 1841. This Comet shone at the time of the bitter persecution of the Jews by the Egyptians.

Arabian star gazers have recorded a Comet shining over Arabia 1732 B. C. In that year there was a terrible famine, of which mention is made in the Old Testament.

The ancient Chinese year books record the appearance of a Comet over northern China and Manchuria in the year corresponding to 1537 B. C. The appearance of the Comet, so the Chinese chronicles tell, was followed by a great flood and disastrous famine.

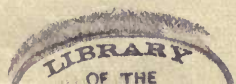
The next Comet of which we have any record, appeared 1515 B. C. This was at the time of the expulsion of the Jews from Egypt.

In the year B. C. 1194, we are told by Hyginus that "On the fall of Troy, one of the Pleiades group of stars rushed along the Heavens toward the Arctic pole, where the star remained visible with dishevelled hair, to which the name of Comet is applied."

We are informed by Pliny, the Roman historian, that in B. C. 975, the "Egyptians and Ethiopians suffered from a terrible famine, the dire effects of a Comet. It appeared all on fire, and was twisted in the form of a wreath, and had a hideous aspect. It seemed not to be a star, but rather a knot of fire."

Babylonian cuneiform inscriptions tell us that about 575 B. C., when Nebuchadnezzar overran Elam, "a star arose whose head was bright as day, while from its luminous body a tail extended like the sting of a scorpion."

According to Pliny, again, a Comet in the form of a



horn was seen in the year B. C. 480, just before the great invasion of Greece by Xerxes ending in the bloody sea fight of Salamis.

The next Comet mentioned by Lubienitius appeared in B. C. 466, when it was seen for 75 nights all over Greece. In that year Greece was ravaged by war between the Spartans and Athenians, and the city of Sparta was all but destroyed by an earthquake.

The next Comet appeared one generation later in 431 B. C., and was seen through 60 nights all over the ancient world. This Comet was followed by a terrible pestilence which swept over Aethiopia, Egypt, Athens, and Rome. War broke out all over Greece. It was the beginning of the great Peloponnesian War, which devastated Greece for a generation to follow.

In the year 394 B. C., there was another Comet seen in Greece, followed by the great Corinthian War with the bloody battles of Knidus and Koronea.

Aristotle records a Comet seen by him in his fifteenth year, 371 B. C. The sight of it inspired the youth to a special study of astronomy. The Comet was visible until the end of the first week of July. On July eighth was fought the great battle between the Thebans and Spartans, when Epaminondas, one of the greatest generals of antiquity, overthrew the Spartans.

The next Comet, that of 338 B. C., which was likewise observed by Aristotle, who had then become the teacher of Alexander the Great, marked Alexander's first public entry into the history of the world. The Comet blazed its brightest on the eve of the bloody battle of Chaeronea, Alexander's first victory and achievement in war.

In the year 344 B. C., there was another Comet, followed by another war in Greece and Sicily. Diodorus of Sicily wrote of this Comet: "On the departure of the

expedition of Timoleon from Corinth for Sicily with all his war ships, the Gods foretold success by an extraordinary prodigy: A burning torch appeared in the Heavens for an entire night and went before the fleet into Sicily."

The Comets of Carthage.

Nearly a hundred years passed before the appearance of another Comet in 240 B. C. This is the first recorded appearance of Halley's Comet. By the light of this Comet, Hamilcar, the great Carthaginian general, made his young son Hannibal swear eternal enmity to the Romans. Hamilcar was then in the midst of preparations for the war against Rome, which broke out soon afterward.

Comets appear to have been stars of special omen to Hannibal and to his native city, Carthage. Twenty years later, appeared another Comet which shone over Carthage for 22 nights. Its appearance was followed by the outbreak of the great war between Hannibal and the Romans, and by a terrible earthquake in Greece.

The next Comet shone in 204 B. C., when Hannibal suffered his first bloody defeat by Sempronius, while Scipio, Hannibal's arch enemy, was crossing over to Africa, for the first attack upon Carthage.

The appearance of the next Comet, twenty years later, 184 B. C., which shone through 88 nights over Asia Minor "with a horrible lustre" was followed by the death of Hannibal. Soothsayers at the court of King Prusias of Bithynia, in Asia Minor, whither Hannibal had fled from the Romans, told the King that the Comet betokened Hannibal's early death. This so wrought on Hannibal's spirit that he ended his life with poison.

In the year 150 B. C., appeared another Comet "of

horrible size." It was seen for many nights running all over the Mediterranean Sea. Its appearance was followed by the outbreak of the third great Punic War between Rome and Carthage.

Within four years another Comet, blazing over northern Africa in 146 B. C., was followed by the fall of Carthage, which was stormed and utterly destroyed by the Romans.

Mithridates' Star.

Mithridates, King of Pontus, and conqueror of Asia Minor, another arch foe of the Romans, having been born under a Comet, seems to have fallen under the bane of Comets.

During the Winter of 134-135 B. C., preceding Mithridates' birth, a Comet of unusual lustre flared over Asia Minor through 72 days. This Comet was so bright that its long, flaming tail was plainly visible even in day time. The ancient historian Justinus thus described it:

"Its splendour eclipsed that of the midday sun and occupied the fourth part of Heaven."

The next Comet, burning through 72 nights again, preceded Mithridates' accession to the throne of Pontus, 119 B. C.

Mithridates' fourth Comet, now identified as Halley's Comet, was seen over Asia Minor through the Winter months of 87-88 B. C., just before the horrible massacre of 150,000 Italians ordered by Mithridates.

Twenty-five years later, 63 B. C., Mithridates saw his Comet for the last time when his own son rose up in arms against him. The omen of the Comet so wrought on Mithridates that he first poisoned himself and then had one of his own soldiers despatch him with his sword.

Caesar's Star.

No other Comet is recorded in ancient history during this century, except the one which was seen shining over Italy preceding the birth (July 11, 100 B. C.) of Julius Caesar, destined to become "The foremost man of all this world," as Shakespeare calls him.

"Caesar's Comet" as it came to be known (now identified as Halley's Comet) appeared again over Italy during the great Civil War between Marius and Sylla, when Caesar was first entering into public affairs and earned his spurs as a warrior.

"Caesar's Comet" shone again over Rome in the year 60 B. C., when Julius Caesar, together with Pompey and Crassus, took charge of the government of Rome and presently seized supreme power as Consul of Rome.

Ten years later "Caesar's Comet" was seen once more in Italy in the Winter months of 49-50 B. C., when Caesar, returning from his conquest of Gaul, crossed the Rubicon and began the great Civil War against his rival for power, Pompey.

The last appearance of "Caesar's Comet," was in 44 B. C., on the death of Caesar. Its coming was foreseen in a dream by Caesar's wife Calpurnia, who warned him of the omen, as immortalized in Shakespeare's lines, put into the mouth of Caesar's wife:

"When beggars die, there are no Comets seen,

The Heavens themselves blaze forth the death of
Princes";

followed by Caesar's famous answer, as culled from Plutarch by Shakespeare:

"What can be avoided,

Whose end is purposed by the mighty gods?

Yet Caesar shall go forth; for these predictions

Are to the world in general as to Caesar."

On the following morning Caesar was murdered at the foot of Pompey's statue in the Curia.

Immediately after Caesar's death, records the Roman historian Suetonius in his "Life of Caesar": "A Comet blazed for seven nights together, rising always about eleven o'clock, visible to all in Rome. It was taken by all to be the soul of Caesar, now received into Heaven; for which reason, accordingly, Caesar is represented in his statue with a star on his brow."

Only one more Comet is recorded in ancient history before the birth of Christ. This was the Comet, now identified as Halley's Comet, which shone over the dense forests of Germany, eleven years before the birth of Christ, when Drusus, the brother of Tiberius, was warring against the ancient Germans and robbing them of their last vestige of liberty. At the same time fell the death of Agrippa, who ruled over the Roman Empire in the absence of Augustus.

THE STAR OF BETHLEHEM

THE coming of the Messia, according to the sacred legends of the Jews, was to be foretold by a flaming star.

Many sacred writers have held, and many still hold, as did the distinguished American astronomer R. A. Proctor, that the "Star of Bethlehem," whose shining trail guided the Wise Men from The East, was a Comet. Lubienitius in his "History of Comets" expressly mentions the Star of Bethlehem as the most important Comet of history.

As a matter of fact our modern astronomical computations prove that a Comet appeared in that year so as to be visible to the naked eye over Arabia, Syria, and the Holy Land.

When this Comet appeared Herod was King of Judea. On the appearance of the Comet, Herod consulted the oracle of the Sibyl in Rome. She told him that the Comet shone in token of a boy destined to be far greater than he.

Herod grew so afraid at this that he caused to be murdered his own two infant sons, Aristobolus and Alexander, and after that his eldest son, the boy Antipater. Herod further ordered the massacre of all male infants born in Judea under this Comet, as told in the Gospel of Matthew (Chap. II., Verse 1). As the Comet kept on blazing in the sky, Herod, becoming desperate, tried to kill himself. Five days after this he died of a loathsome disease.

Christian painters and writers from olden times until

now, accordingly have pictured the Star of Bethlehem as a Comet.

Take for instance this description of "The Light in the Sky" as given by Lew Wallace in his "Ben Hur: A Tale of the Christ":

"About midnight some one on the roof cried out: 'What light is that in the sky? Awake, brethren, awake and see!'

"The people, half asleep, sat up and looked; then they became wide awake, though wonder struck. . . . Soon the entire tenantry of the house and court and enclosure were out gazing at the sky.

"And this is what they saw: A ray of light, beginning at a height immeasurably beyond the nearest stars, and dropping obliquely to the earth; at its top, a diminishing point; at its base, many furlongs in width; its sides blending softly with the darkness of night; its core a roseate electrical splendour. The apparition seemed to rest on the nearest mountain southeast of the town, making a pale corona along the line of the summit. The khan was touched luminously so that those upon the roof saw each others' faces all filled with wonder.

"Steadily the ray lingered. . . .

"'Saw you ever the like?' asked one.

"'Can it be that a star has burst and fallen?' asked another, his tongue faltering.

"'When a star falls its light goes out.'

. . . .
"After that there was silence on the housetop, broken but once again while the mystery continued.

"'Brethren!' exclaimed a Jew of venerable mien, 'what we see is the ladder our father Jacob saw in his dream. Blessed be the Lord God of Our Fathers!'"

Meanwhile the Wise Men from the East, as described

in the same story, were travelling over the desert, on the alert for the apparition of the star, whose coming had been revealed to them.

"Suddenly, in the air before them, not farther up than a low hill-top," writes Lew Wallace, "flared a lambent flame; as they looked at it, the apparition contracted into a focus of dazzling lustre. Their hearts beat fast; their souls thrilled; and they shouted as with one voice: 'The Star! the Star! God is with us!' "

GREAT EVENTS LINKED WITH COMETS SINCE CHRIST

SINCE the time of Christ, thanks to the spread of Christianity and learning, with the growing zeal for keeping records and studying the stars, a far greater number of Comets and events connected therewith have been recorded.

A number of learned writers have made a special study of the history of Comets and their effect upon man. Long before Lubienitius' ponderous work on the subject there were other histories written in Latin and Arabic, with references to which his book abounds.

Since then others have followed in the same direction, notably Pingré, Hind, Lalande, Messier, Chambers and latterly Messrs. Crommelin and Cowell, of the Greenwich Observatory.

The number of known Comets has grown immeasurably since Galileo's invention of the telescope, 300 years ago, and our later perfections of this instrument, together with latter-day devices for photographing Comets invisible to the naked eye.

It would carry us too far to trace the possible connection between modern events and Comets that were seen only by astronomers. Since our record of Comets is already too full, we shall limit our story of the Comets and their influence upon man to a bare recital of the most important events connected with the more memorable and conspicuous Comets from the time of Christ until now.

DATES OF COMETS FOLLOWED BY IMPORTANT EVENTS

A. D.

- 14—A Comet preceded the death of Augustus, the first Emperor of Rome. Earthquake in Italy.
- 55—Suicide of Pontius Pilate, the judge who condemned Christ.
- 68—Halley's Comet. Suicide of Nero, persecutor of Christians. Siege of Jerusalem.
- 73—A Comet shone 180 days over Cyprus. Earthquake in Cypress in which 10,000 persons perished.
- 79—Death of Emperor Vespasian, who began the siege of Jerusalem. The Roman historians Dion Cassius and Suetonius relate that Vespasian, when taken sick, heard his astrologers discussing in a low tone of voice the Comet which was then visible, which they said predicted his death. The Emperor roused angrily and said: "This hairy star is not meant for me. It must be meant for my enemy, the King of the Parthians, for he is hairy, while I am bald."
- On the following night Vespasian died in great pain, and the Comet was seen no more.
- Shortly after Vespasian's death followed the fierce eruption of Mt. Vesuvius, Nov. 1, which destroyed the two flourishing cities of Herculaneum and Pompeii.
- 130—A Comet shone over Holy Land for 39 nights, followed by destructive earthquake in Holy Land.

- 145—One week's Comet over Island of Rhodus. Earthquake in Rhodus, followed by famine and pestilence.
- 217—From a Comet which shone for eighteen nights soothsayers predicted the death of the Roman Emperor, Caracalla. The Emperor was murdered immediately afterwards by his rival Macrinus.
- 312—A Comet in the sign of a cross seen by Constantine the Great during battle of Saxa Rubra under the walls of Rome. Constantine was victorious and afterward turned to Christian faith.
- 337—A Comet seen just before death of Constantine the Great.
- 373—Halley's Comet. Beginning of tremendous migration of peoples which overran all Central Asia and Europe.
- 399—This Comet was described by Nicephorus as "of prodigious magnitude and horrible aspect, with a point like a sword and fiery hair reaching nearly to the ground, from which a great peril to the people was predicted." Its appearance was followed by the conquest and capture of Rome by Gainas.
- 410—A sword-shaped Comet shone over Italy for four months until the third week in August. On Aug. 24 Rome was taken and plundered by Alaric, King of the Visigoths. This marks the end of the old Roman Empire.
- 442—First appearance in Europe of Attila, "The Scourge of God," and his Hunnic hordes.
- 449-50—Two Comets (now believed to be coming and going of Halley's Comet) were observed over England and France. First invasion of England

by the Anglo-Saxons under Hengist and Horsa. Attila overthrown in the great battle on the Catalaunian Fields, at which a hundred and eighty thousand warriors fell, among them Theoderic, the King of the Goths. The Roman historian Callimachus recorded that this battle was preceded by a brilliant Comet and an earthquake.

- 453—Death of Attila and end of his Hunnic empire.
- 530—Halley's Comet. Merlin, the British seer, prophesied from this Comet. His prophesies came true.
- 531—Comet observed in Constantinople by the astronomers of Emperor Justinian. Earthquake in Constantinople followed by famine and uprising of the people in which two thousand were killed. Pestilence.
- 538—Terrible famine throughout civilized world, so that many people became cannibals.
- 547—A lance-shaped Comet over Italy. Ostro-Goths under Totila overrun Italy. Totila storms Rome.

Mohamet's Star.

- 570—Scimitar-shaped Comet over Arabia. Birth of Mohamet.
- 610—Another scimitar-shaped Comet over Arabia. Mohamet begins preaching the Koran.
- 622—Flight of Mohamet to Medina.
- 624—Fourth scimitar-shaped Comet over Arabia and Holy Land. Mohamet's first battle for the new faith. His massacre of 700 Jews.
- 632—Last appearance of Mohamet's Comet during first week of June. Death of Mohamet on June 8 at Medina.

Charlemagne's Star.

- 800—A Comet seen during Coronation of Charlemagne as Emperor of Rome.
- 814—Torch-shaped Comet seen in Germany during the first three weeks of January. Death of Charlemagne on Jan. 28, at Aix la Chappelle. The monk Eginard relates in his chronicles that on the appearance of the Comet all those at Charlemagne's court feared for the Emperor's life. Eginard preached to them from the text of Isaiah not to believe in the signs of the heathens. But Charlemagne reproved him, saying that he felt that he had reason to thank God for having sent him a timely warning of his impending death. Thereupon the Emperor made his testament and divided his empire among his successors. On the day following the disappearance of the Comet, he died.
- 837—Halley's Comet observed in France by King Louis the Debonair, who died from fear of it.
- 876—Disastrous flood in Italy, followed by plague.
- 900—Another Comet over Italy. Saracens invade Italy.
- 944—Comet with an immense tail over Italy, followed by disastrous earthquake.
- 1000—In January of this year a Comet was observed all over Europe. Gigibertus describes it "shaped like a horrible serpent and so bright that its light was seen even indoors." It was generally taken to foretell the end of the world,—the millennium prophesied in the Apocalypse. When it was followed soon by earthquakes, floods and famine there was universal panic which was not allayed until the end of the "fateful year."

- 1002—A Comet over England and Scandinavia. Massacre of all Danes in England by King Ethelred.
- 1066—Halley's Comet. It appeared in May at Easter time and shone for forty nights, waxing and waning with the moon. William the Conqueror hailed it as an omen of destruction to Harold of England just before the battle of Hastings.
- 1077—Comet over Italy and Germany. Emperor Henry IV. of Germany was excommunicated by the Pope, followed by war in Italy and Germany.

Crusaders' Comets.

- 1099—Arabic astronomers record a Comet in the shape of a scimitar over Arabia and the Holy Land for six weeks in Spring and early Summer. First crusade and storming of Jerusalem by the crusaders on July 15 after a siege of five weeks. Bloody massacre of Mohammedans.
- 1109—Emperor Henry V. of Germany enters Rome and makes Pope prisoner.
- 1148-9—Second crusade. Utter destruction of whole army of French and German crusaders.
- 1200—Comet recorded by Hal Ben Rodoan, an Arab astronomer, over North Africa. Bloody revolt of Arab warriors in Morocco.
- 1212—Lance-shaped Comet shining over western Europe for eighteen nights. The Children's Crusade. Thousands of German and French boy crusaders perished or were sold into slavery. Bloody invasion of Tartar hordes into Russia and Poland.
- 1223—Preaching of fifth crusade. Outbreak of "Guelph and Ghibelline" war between Emperor Frederick II. of Germany and Pope Gregory the IX.

- 1264—Very bright Comet observed shining all over Europe for three months. Pope Urban IV. died on the night of the Comet's disappearance. A Latin verse gained great currency in which it was said that the Comet portended "disasters, sickness, hunger, and war." The chronicles of that age ascribe to this Comet besides the death of the Pope a famine and pestilence in Italy, the ravages of the Russians into Poland and of the Slavs into Prussia.

Comets of Bloodshed.

- 1282—An immense Comet over Italy. Disastrous earthquake in southern Italy. On March 30, a fortnight after the first appearance of the Comet followed the massacre of all Frenchmen in Sicily on the evening of Easter Monday, known in history as the "Sicilian Vespers."
- 1298—Because of the appearance of a Comet over middle Germany, there were riots in Nuremberg and other neighbouring cities followed by a general massacre of the Jews in those cities.
- 1300—A brilliant Comet preceded the Jubilee of Pope Boniface the VIII. The Pope interpreted the Comet as a happy omen, but because of the popular dread of the Comet there were riots and bloodshed in Rome and elsewhere in Italy. The chroniclers of the times pointed out the significant fact that shortly after his jubilee Pope Boniface was made a prisoner by King Philip of France, causing him to die of rage.

Plague Comets.

- 1305—A Comet "of horrible aspect" burning all through Passion Week preceded the outbreak of the ter-

rible black plague which swept from the Orient all over Europe and Asia.

1333—Chinese and Arab astronomers record a bright Comet over China, Turkestan and Persia. Birth of Tamerlane, the "Scourge of the Nations" at Samarkand, in Turkestan.

1347—A Comet precedes the "Black Death," a terrible pestilence followed by famine all over the world. One fourth of all the people of Europe died. Fifteen million deaths in China,—twenty-five million in Europe.

1363—A Comet of immense size shone for three months over northern Europe. Pestilence and famine in England, Poland and Russia.

1378—Halley's Comet. Pestilence in Germany. Holy Church is rent by the great schism, with rival popes at Rome and Avignon.

Tamerlane's Star.

1382—Arab astronomers and Chinese report a very bright Comet which shone a fortnight. Tamerlane and his hordes overrun Central Asia. Pestilence breaks out there and spreads all over the world.

1402—Arab astronomers report another Comet seen all over the East. Tamerlane carries war into Europe and takes Constantinople by storm. Sultan Bayezid is taken prisoner by Tamerlane and is carried to Asia in a cage.

1405—Chinese astronomers record a spear-shaped Comet over China. Tamerlane dies while invading China.

1456—Halley's Comet. Bloody war between the Christians and the Turks. Battle of Belgrade.

- 1492—Arab astronomers record a Comet over northern Africa and Spain. Final conquest of Granada from the Moors by Ferdinand and Isabella of Spain. Discovery of the New World.
- 1500—Sword-shaped Comet over northern Europe, followed by Tartar invasion into Russia and Poland.
- 1528—A Comet noted by Ambroise Paré, who recorded that many people fell sick and died of fright. War between Emperor Charles V. of Germany and Francis I. of France, with fighting in France, Germany and Italy.
- 1531—Halley's Comet. Plague in Italy. Great schism in the Church. Defection of German Protestants from Rome. Henry VIII. of England declares English Church independent of Rome. Sultan Soleyman ravaged Hungary. Disastrous floods in Holland, where 400,000 people were drowned.
- 1556—Emperor Charles V. of Germany and Spain, on account of his fear of the Comet that appeared in that year, abdicated his throne and became a monk. Wide-spread wars all over Europe. The Turks ravaged Hungary. Persecutions of English Protestants under "Bloody Mary." Many Protestants burned at the stake, beheaded or broken on the rack.
- 1572—St. Bartholomew's Comet. Massacre of St. Bartholomew, when 30,000 Huguenots were slaughtered in France.
- 1577—General persecution of Huguenots in France, followed by Civil War in France.
- 1607—A Comet seen over Constantinople for several weeks. Wide-spread war on the part of the Turks against the Persians on one side, the Poles on another, and against Venice on the third.

1618—A blood-coloured Comet observed just before the execution of Sir Walter Raleigh in England. A bloody rising of the Protestants in Bohemia, followed by the outbreak of the terrible Thirty Years' War in Germany and the Netherlands. This was the Comet which gave rise to the German school rhyme:

“Eight things a Comet always brings,
Wind, Famine, Plague and Death to Kings,
War, Earthquake, Floods and Dire Things.”

Louis XIV.'s Star.

1661—Inspired by the appearance of a Comet, a horde of fanatics under Venner, a cooper, preached the coming of the “Fifth Monarchy” in England, and proclaimed Jesus Christ as their only King. The fanatics were routed and put to death. Death of Mazarin, the “Master of France.” Rise of Louis XIV., the most powerful ruler of France. French war against the Pope. X

1680—This Comet was studied by Halley, in Paris, and by Newton, in England. It was called “Heaven’s Chariot.” Plague in Europe. The French overrun Alsace and carried war into Germany. War between Venice and the Turks.

1682—Halley’s Comet. War in Italy. War in Hungary against the Turks.

1689—A remarkable Comet observed all over Europe, followed by war all over Europe. Wars between France, Germany, England, Spain and Italy. The Rhine lands were harried by the French with fire and sword, rendering 4,000,000, people homeless. Burning of the castle of Heidelberg by the French. Religious war in Ireland and Scotland.

Siege of Londonderry and Dundee. Battle of Newton Butler in Ireland.

1729—War between France, England and Spain.

Frederick the Great's Star.

1744—A six-tailed Comet observed in Germany just before the death of Emperor Charles VII. His death followed by war between Frederick the Great and Maria Teresa of Austria. War spreads to England, Holland, France, Spain and Italy. A British fleet beaten by French and Spaniards off Toulon.

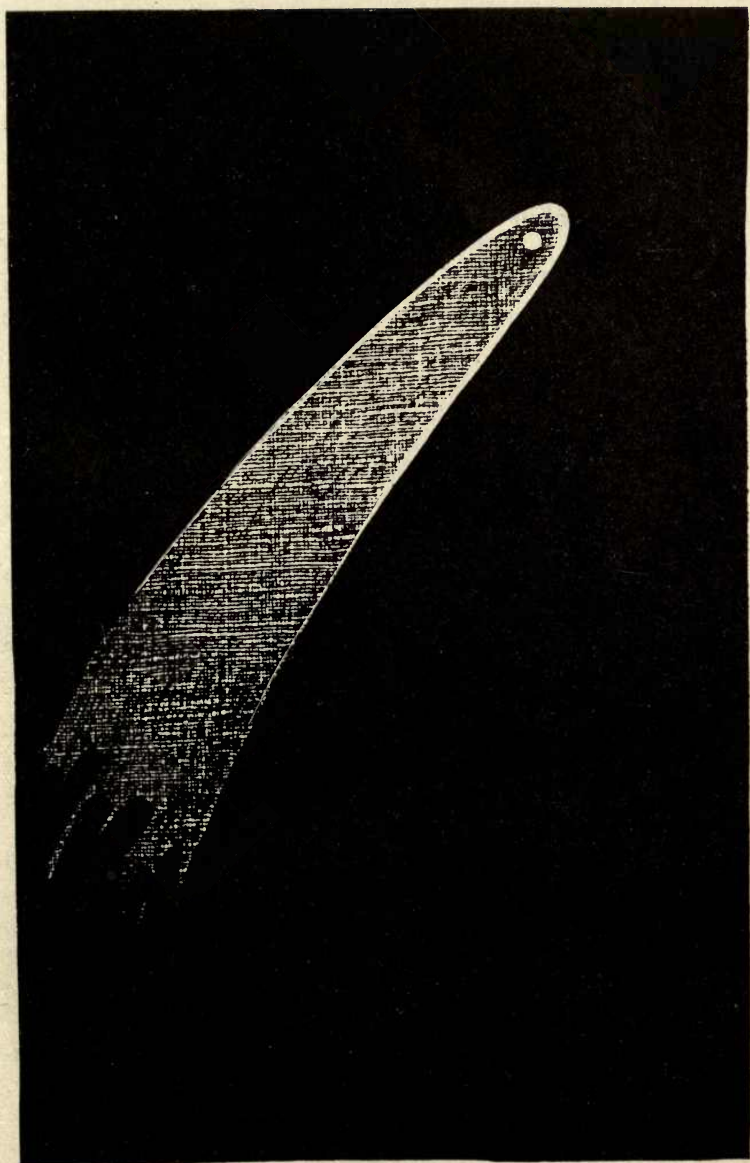
1755—A Comet precedes earthquake of Lisbon, by which 40,000 people lost their lives.

1759—Halley's Comet. Seven Years' War in Germany. Frederick the Great overthrown in four bloody battles. French lose Canada by their disastrous defeat of the plains of Abraham, and lose India by the loss of their fleet through three successive defeats on the sea.

Napoleon's Star.

1769—"Napoleon's Comet." A Comet of unusual red lustre was observed over Italy and France. French overrun Corsica. Bloody massacre of Corsicans. Birth of Napoleon on August 15 in Corsica, just after the Comet was seen no more.

1811-12—This huge Comet was one of the most famous Comets of modern times. It was first seen in France on March 26, 1811, and was last observed over southern Russia on August 17, 1812—an appearance of seventeen months, the longest on record. For a while it had two tails, then only one. The length of this tail was estimated as 100,000,000 miles. It was called "Napoleon's Comet." Under its lustre Napoleon gathered



THE GREAT COMET OF 1811.

his "grand armée," the greatest army assembled in Europe since Xerxes, and invaded Russia. Wars were fought at the same time in Portugal and Spain, where the British stormed Ciudad Rodrigo and Badajos; and in America, where Harrison's victory over the Indians under Tecumseh at Tippecanoe, and the seafight between the "President" and "Little Belt" ushered in the War of 1812. In Egypt the Comet was taken as an omen of the bloody massacre of the Mamelukes perpetrated at Cairo.

1821—"Napoleon's Comet." Seen one night only over France and over St. Helena the night before the death of Napoleon at St. Helena.

1823—A Comet much mentioned by Spanish writers. While it shone over Spain, South America and the Mediterranean, the French overran Spain and reinstated the Spanish king. Revival of the Spanish Inquisition and bloody persecutions of the revolutionists. War of Independence in Central and South America. Bloody war of Greek Independence.

1835-6—Halley's Comet. New York City all but destroyed by fire. Zulu massacre of Boers at Weenen. Mexican massacre of Americans at the Alamo. Wars throughout South America.

1843—Another famous Comet seen all over the world during the Spring of that year. Especially brilliant in the Southern Hemisphere and in India. War in India on the part of the British against Afghanistan, Beluchistan, Scinde and against the Sikhs.

1848—Encke's famous periodic Comet. Bloody revolutionary risings and civil wars in France, Hungary, Bohemia, Austria, Germany, Italy and Poland.

1858-9—Donati's Comet. This Comet, which appeared to be charging straight down from the zenith, and had a curved tail, was observed from June 1858 to April 1859. It was seen at its brightest in the South, in Italy, Mexico and in the Far East. While it shone over the Far East there were bloody wars between the British and the risen people of India; between the British and the Chinese, who objected to having opium thrust upon them; while Japan was in the throes of revolution and civil war. In Mexico the standard of revolt against the clericals was raised by Juarez, thus plunging Mexico into civil war and war with France. Immediately after the disappearance of the Comet war broke out in Italy between the French and Italians on one side and the Austrians on the other, ending in the bloody Battle of Solferino.

Civil War Comets.

1861—"First Civil War Comet." The brightest Comet of the nineteenth century. Sir John Herschel, the great English astronomer, said of this Comet: "It far exceeded in brightness any Comet I have before observed, those of 1811 and the recent splendid one of 1858 not excepted." The Comet was first seen by a layman, and appeared at its brightest during the Summer months in North America. Its coming was heralded as a token of the great Civil War which broke out then in America.

1862—"Second Civil War Comet." Another Comet of very peculiar appearance, with jets of flame flaring from its head, showed itself during the Summer months in North America. The Civil War



THE GREAT COMET OF 1843 AS SEEN ON MARCH 17 FROM BLACKHEATH, KENT.

was then at its height. The coming of the Comet was taken to herald the bloody battles of Shiloh, Williamsburg, Seven Days, Seven Pines, Cedar Mountain and Antietam, all fought that year after the Comet's appearance.

- 1874—Coggia's Comet. This Comet was seen at its brightest over Southern France and Spain during the Summer months of that year. Spain was then in the throes of the bloody Carlist War.

Garfield's Comet.

- 1881—Garfield's Comet. This Comet showed itself for a few nights only in March during the week following President Garfield's inauguration. It was observed also in Russia. On March 13, Emperor Alexander II. of Russia, was assassinated with a bomb. Three months later President Garfield was assassinated in Washington.

War Comets.

- 1882—Comet of Tel-el-Kebir. A Comet with two tails was seen at its brightest over Egypt during the first two weeks of September. Egypt was then in the midst of Arabi Pasha's uprising against the British. On September 18, when the Comet was last seen, Arabi Pasha was overthrown by General Wolseley in the bloody battle of Tel-el-Kebir.
- 1904-5—Manchurian War Comet. From the early part of February, 1904, until Midsummer, 1905, Chinese observers recorded the appearance of a Comet over Northern China. Throughout that period Manchuria was ravaged by the bloody war between the Japanese and Russians.

Earthquake Comets.

- 1906—San Francisco Comet. A Comet discovered by

Ross on March 17, remaining visible for one month. Observed from the Lick Observatory in California. On April 17 came the California earthquake and burning of San Francisco.

- 1908—Morehouse's Comet. Visible for more than a month, during the autumn. In Italy it was interpreted afterward as an omen foreboding the Messina earthquake late in the year.

This Year's Comets.

- 1910—Inness' Comet, otherwise known as "1910 A." An unexpected Comet of short duration during January. On the appearance of this Comet Madame de Thebes, a French astrologer, predicted floods and general disaster for France. The disappearance of the Comet in France was followed by unprecedented rains and floods which covered one-fourth of France with water and inundated Paris, completely submerging all the bridges over the Seine. Floods also in Italy and Germany. This Comet was likewise observed in China late in January, where it caused universal consternation.

- 1910—Pidoux's Comet. Another unexpected Comet was first observed by Pidoux, in Geneva, during a few nights late in February. It is recorded astronomically as "1910 B." Its fleeting observations by astronomers were followed by Socialist franchise riots in Germany and by the labour riots of Philadelphia, with widespread bloodshed between the rioters and the constabulary.

- 1910—Halley's Comet of this year was first "picked up" by Dr. Wolf, in Germany. Already various astrologers have foretold disaster from its coming. It remains to be seen whether their predictions will come true.



THE GREAT COMET OF 1882, ON OCTOBER 9, AT 4 A. M.

HALLEY'S BALEFUL COMET

AMONG all the stars known in astronomy, the periodically returning Comet now known as Halley's Comet has the most baleful record.

In this Comet's wake, after every one of its recorded appearances, there have always followed terrible disasters.

Not only war and battles, or other deeds of bloodshed, such as massacres and murders, but each of the dread disasters that are held to go with Comets have followed along one after the other in this Comet's train.

Of the eight baneful after-effects of Comets mentioned in the old German ditty that has been sung in the Fatherland ever since the great Comet which ushered in the dreadful Thirty Years' War,

"Wind, Famine, Plague and Death to Kings
War, Earthquakes, Floods and Dire Things,"

Halley's Comet is known to have preceded each and every form of these evils in turn.

Directly after each return of Halley's Comet there has always followed somewhere within the influence of its rays one or other of those "dire things,"—a flood, an earthquake, a hurricane, famine, plague, war, bloodshed, or the sudden death of a ruler.

Thanks to the careful work of such painstaking astronomers and historians as Lubienitius, Pingré, Dionys de Séjour, J. Russell Hind, Laugier, and Messrs. Cowell and Crommelin, the records of great events connected with Halley's Comet have been traced back nearly 2,000 years, to the days before Christ.

Among the signal events following in the train of this Comet there have been so many bloody massacres and appalling disasters that Halley's Comet now has the ominous distinction of being the bloodiest of all stars of ill omen.

Herewith follows the story of this Comet's periodic appearances in history and of the events connected therewith, as traced back from its last return in 1835 to its first recorded entrance into the history of mankind.

1835-1836

HALLEY'S Comet last appeared in the Summer of 1835, and was seen until Spring of the following year.

It was first discerned by Father Dumouchel with a powerful telescope from the observatory of the Collegio Romano in Rome on the night of August 6, 1835. Father Dumouchel, who had been watching for it many months, picked it up close to the spot in the heavens that Rosenberger, a German astronomer, had predicted for its appearance on that date.

The last astronomer to see the Comet was Sir John Herschel, who observed it from the Cape of Good Hope until the middle of May, 1836.

Other noted astronomers who made observations of it were Arago, Struve, Bessel, Kaiser, Sir Thomas Maclear, Admiral Smyth, Baron Damoiseau and Count Pontécoulant.

This last astronomer, many years before, had computed the exact time of its coming and came within four days of it. For this brilliant feat Count Pontécoulant received a gold medal from the French Academy of Sciences.



HALLEY'S COMET OF 1835, FROM A DRAWING BY ROSENBERGER.

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The German astronomer, Rosenberger, who had likewise computed the Comet's return, coming within five days of its passage nearest to the Sun, received a similar gold medal from the Royal Astronomical Society of Great Britain.

Professor Struve, who studied the Comet through the great telescope at Dorpat in Russia, described it as "glowing like a red-hot coal of oblong form."

Bessel, who observed it from the Koenigsberg observatory in Northern Germany, described the Comet's appearance as that of "a blazing rocket, the flame from which was driven aside as by a strong gale, or as the stream of fire from the discharge of a cannon when the sparks and smoke are carried backwards by the wind."

Struve at Koenigsberg and Kaiser at Leyden were the first to see the Comet with their naked eyes in the third week of September.

Immediately after the Comet became generally visible in the Old World the bubonic plague, known of old as the "Black Death," broke out in Egypt. In the City of Alexandria alone 9,000 people died on one day. By the Moslems this calamity was generally attributed to the evil influence of the Comet.

In America the Comet became visible to the naked eye only late in the year. Then, on its approach to the Sun, it was lost to view and passed over to the Southern Hemisphere where it was next observed by Sir John Herschel in South Africa.

Shortly after its brief blaze over North America the great "New York Fire" laid waste the entire business section of the biggest city in the New World. All the commercial centre of the city, including the richest firms and largest commercial warehouses, were laid in ashes. The fire raged through days and nights. In all, 530

houses burned down and \$18,000,000 of property was consumed. Owing to the intense cold, the sufferings of the homeless were pitiable.

Down in Florida, at the same time, Osceola, the chief-tain of the Seminole Indians, called upon the Comet as a signal for war against the whites. The Indians called the Comet "Big Knife in the Sky."

The war began with a bloody massacre of American soldiers under General Wiley Thompson at Fort King. All were slaughtered. Osceola scalped General Thompson with his own hands.

On the same day, Major Dade of the American Army, who was leading a relief expedition into Florida from Tampa Bay, was ambushed by the Indians near Wahoo Swamp and was massacred with his men. Of the whole expedition only four men escaped death.

Within forty-eight hours of this horrible massacre came another bloody Indian fight on the banks of the Big Withlacoochee.

With the passing of the Comet to the Southern Hemisphere, bloody wars broke out one after another in Mexico, Cuba, Central America, Ecuador, Bolivia, Peru and Argentina. All those countries were in a welter of blood.

At the same time the American settlers of Texas declared themselves independent and made open war on Mexico. The war began with the bloody battle of Gonzales, in which 500 American frontiersmen fought and defeated over a thousand Mexican soldiers. This was followed by other fierce fights at Goliad and Bexar.

Next came the bloody massacre of the Alamo, when all of Jim Bowie's and Davy Crockett's American followers were killed in an all night fight. Out of 200 Americans every man fell at his post. This was the deed

of blood on which Joaquin Miller wrote his stirring Ballad of the Alamo.

“Santa Ana came storming as a storm might come,—
There was rumble of cannon; there was rattle of blade;
There was cavalry, infantry, bugle and drum,—
Full seven thousand, in pomp and parade,
The chivalry, flower of Mexico,
And a gaunt two hundred in the Alamo.”

One month before the final disappearance of the Comet, the Texas War came to an end with the bloody battle of San Jacinto, when Sam Houston, with 800 American frontiersmen, defeated 1,500 Mexicans, and made a prisoner of President Santa Ana of Mexico.

When the Comet had passed to the Southern Hemisphere, it was seen at its brightest in South Africa.

The pious Boers of Cape Colony understood it to be a sign from heaven and forthwith set out on their great trek across the Orange and Vaal rivers, where they founded the Orange Free State and Transvaal Republic.

Thus the Comet was the signal for the first blood drawn in the long fight between the British and Boers.

A little later, though, the Boers found another, more woful significance for the blazing of the Comet.

Under the leadership of Piet Relief, a thousand Boer families had trekked across the Drakensberg Mountains into Natal. A solemn treaty of peace with the Zulu warriors was entered into with Dingaan, the chief of the Zulus at Dingaan's Kraal. Suddenly the Zulus pounced upon the unsuspecting Piet Relief and his sixty-five Boer followers and massacred them to a man.

Then the Zulus, numbering some 10,000 warriors, swept out into the veldt and made for the Boer wagon

trains. Near Colenso, at a spot called Weenen (weeping), in remembrance of the dreadful tragedy there perpetrated, the Zulus overwhelmed the Boer laager and slaughtered all its inmates—41 men, 56 women, 185 children and 250 Kaffir slaves.

After this bloody massacre, equalling in horror the Massacre of the Alamo on the other side of the world, the Comet of 1835-36 was seen no more.

1758-1759

THIS was the first return of the Comet predicted by Halley. Hence it must be reckoned as the first appearance of "Halley's Comet" under his name.

It was first seen on Christmas night, 1758, by John Palitsch, a Saxon farmer, near Dresden, who was looking for it with a self-constructed telescope of eight-foot focus. The Comet did not become visible to the naked eye until well into 1759. It passed around the sun on March 12, 1759. After that it was seen throughout Europe during April and May, appearing at its brightest during the first week in May. Later it was seen to advantage in the Southern Hemisphere.

In Germany, where it was seen at its fiercest, the Comet was taken as a token of the bloody Seven Years' War, which was then being fought between Frederick the Great and his enemies on all sides.

The ominous Comet had scarcely vanished from view when all Germany was overrun by marching armies from France, from Austria, from Russia.

The French, under the Duke of Broglie, overthrew the Germans, under the Duke of Brunswick, at Bergen, and seized the city of Frankfurt. Then came the bloody battle of Minden, in which two large French armies

were beaten. Meanwhile the Russians were marching into Prussia, and another bloody battle was fought at Kay in mid-summer.

Within a fortnight King Frederick the Great and his whole army were overthrown by the Austrians and Russians in the disastrous battle of Kunersdorf.

Another Prussian army was overcome at Maxen, where 13,000 Prussians were taken.

Altogether, during this year's campaigns, several hundred thousand soldiers lost their lives.

It was the worst year of the Seven Years' War for Frederick the Great and his soldiers, who attributed their bloody defeats to the ill omen of the Comet.

In other parts of the world, likewise, the coming of the Comet was followed by widespread war and bloody fighting.

For the French, the Comet signalled disaster after disaster. After their armies had been beaten in Germany, their navy was defeated on August 17 in a great sea fight in the Bay of Lagos, on the coast of Portugal. Six weeks later there was another bloody sea fight between the British and French, when Admiral Pocock inflicted a telling defeat on the French fleet.

Then came the final French naval disaster off Quiberon, in the Bay of Biscay, when Admiral Hawke destroyed French naval power by sinking or blowing up over a score of the French fighting ships. This bloody defeat was a disaster of untold consequences to the French, since it meant the loss of India.

But this was not all that this Comet of ill omen had brought to the French.

On September 13th of that year the French lost their strongest hold on America in the disastrous defeat inflicted upon them by General Wolfe in the bloody battle

on the Plains of Abraham, where Wolfe himself fell fighting. On the French side, General Montcalm, the Commander-in-Chief, was mortally wounded. This meant the loss of Quebec and of all Canada to the French, an event of far-reaching importance that has changed the destiny of all America and of the modern world.

1682

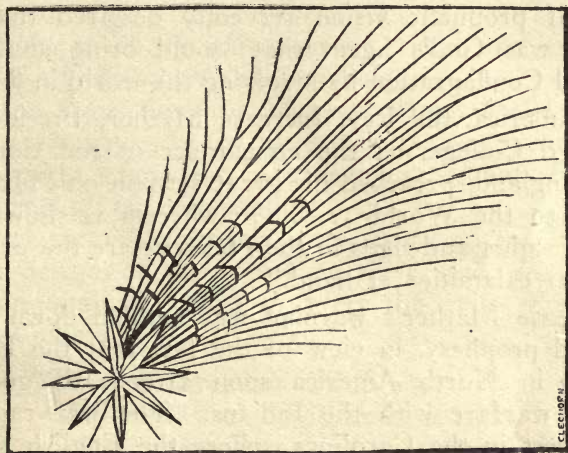
THE Comet which put Halley on the right track in his theories of Comets, first came into view on the night of August 15, 1682. It was first detected by Flamsteed's assistant at the Greenwich Observatory, while searching the northern heavens with a telescope.

Flamsteed, the first Astronomer Royal, and Halley, his successor, kept a close watch upon the Comet every night, and followed its course over the sky. Others who watched it were Sir Isaac Newton, Cassini, Picard and La Hire in Paris, Baert at Toulon, Kirch and Zimmermann in Germany, Montanari at Padua, and Hevelius in Dantsic. They observed that the tail lengthened considerably as the Comet came nearer the sun. Later a jet of luminous matter was seen shooting out toward the sun, which afterward fell back into the tail. Hevelius has left us a drawing of this phenomenon.

On November 11th, Halley found that the Comet had come within a semi-diameter of the path of our earth. This startling discovery caused Halley to reflect what might happen if the earth and the Comet had arrived at the same time at the spot in space where their two orbits intersect. Assuming as he did that the mass of the Comet was considerably larger than our earth, he declared: "If so large a body with so rapid a motion were



HALLEY'S COMET, JANUARY 9, 1683, AS DRAWN
BY HEVELIUS.



THE COMET OF 1682, AS REPRESENTED IN THE NUREMBURG
CHRONICLE.



MEDAL STRUCK IN GERMANY TO ALLAY THE TERROR CAUSED
BY THE COMET OF 1680-81.

TRANSLATION OF INSCRIPTION:

"THE STAR THREATENS EVIL THINGS—ONLY TRUST!
GOD WILL MAKE IT TURN OUT WELL."

to strike the earth—a thing by no means impossible—the shock might reduce this beautiful world to its original chaos.”

Others beside Halley took alarm at the Comet. They called it “The Chariot of Fire.”

Dr. Whiston—he who succeeded Newton in the Lucasian chair of mathematics at Cambridge—in a moment of prophetic vision fervently declared that this Comet was God’s agent that would bring about the General Conflagration by involving the world in flames.

In America, the Rev. Increase Mather, President of Harvard College, on the appearance of the Comet in New England, preached his great sermon on “Heaven’s Alarm to the World . . . wherein is shown that fearful sights and signs in the Heavens are the presages of great calamities at hand.”

Increase Mather’s warning was handed down as an inspired prophecy, in view of the fact that the English settlers in North America soon afterwards got into bloody warfare with the Indians. The war raged at its fiercest in the Carolinas, where the English settlers made war upon the redskins simply for the purpose of taking them captive and selling them into slavery in the West Indies.

To the Indians the Comet appeared as a sign of ill omen, as shown by their frequent references to it during the parleys with the white men.

The Comet was shining at its fiercest when the six greatest chiefs of the Susquehanna nation were enticed into a pretended council of peace with the white men, only to be foully murdered with all their followers.

While this was going on in America, the Comet gave the signal in India for the first hostilities there upon the white settlers from Portugal, as well as for the outbreak

of the bloody Mahratta War, which ravaged India for a generation to come.

Nearer East, the Turks, under the leadership of Mohammed Bey, ravaged Egypt, while, on the other side, a Turkish army under Kara Mustapha carried war into Hungary, to the very gates of Vienna, until Emperor Leopold felt constrained to call for help from Sobieski, the warrior king of the Poles.

In Europe the French overran Alsace, and suddenly seized the German city of Strasburg.

At the same time the bubonic plague broke out in North Germany. In the little university town of Halle alone, within a few days, 4,397 people died out of a total population of ten thousand.

It was then that medals were struck off in Germany with a design of the comet on their face, and an inscription imploring God to avert the evils threatened by the Comet:

“The star threatens evil things;
Only trust! God will make it right.”

1607

THE Comet this year was seen all over Europe. The best observations of it were made by Kepler and Longomontanus (Langberger). It was seen at its brightest in England.

Shortly after its appearance over England, there came freshets and floods which completely submerged the richest counties of England. In Somersetshire and Gloucestershire the water rose above the tops of the houses. This was followed by a visitation of the plague.

In Ireland the Comet was taken as an omen of the fate of Londonderry, where the Irish rebels, suddenly

seizing the city, massacred Sir George Powlett and all his English garrison.

In Germany the Comet was taken as a token of the war then brewing between the Emperor and the German Protestant Princes—the so-called Protestant League—which ushered in the dreadful Thirty Years' War in Germany.

Off Gibraltar, a Dutch fleet completely destroyed a fleet of Spanish war galleons, thereby crippling Spanish sea power for a generation to come.

Meanwhile, in America, the early settlers in Virginia, led by John Smith, found themselves beset by the redskins, who were incited to war by the appearance of the Comet. They called it "Red Knife in the Sky." During the war, John Smith was taken prisoner, and escaped with his life only through the intercession of Pocahontas, the daughter of Powhattan.

1531

THE Comet was first sighted by the German astronomer Bienewitz ("Apianus") in midsummer of this year. Zwingli preached about it as an omen of disaster.

German astrologers regarded it as a herald of the wars between Spain and France, which broke out in that year, and of the bloody war carried into Hungary by the Turks under Soleyman, who ravaged the Danube country to the very walls of Vienna. These wars were followed by a visitation of the black plague.

In the Netherlands the breaking of the ocean dykes caused terrific floods, in which over 400,000 people were drowned.

Toward the close of the year the Comet passed over to the Southern Hemisphere.

To the aborigines of South America it proved a star of dreadful omen. During this year the most cruel of Spanish conquerors did their bloodiest work in the New World—Cortez in Mexico, Alvarado at the Equator, and Pizarro in Peru. Before the Comet disappeared from view, several hundred thousand wretched Incas and Aztecs had been slaughtered by the Spaniards, while many more hundred thousands were worked to death as slaves.

1456

THE Comet this year was observed throughout Europe and also in China. It came into view over Europe on the 29th of May, and was seen gliding over the sky towards the moon.

Writers of that period say that it shone with exceeding brightness and spread out a fan-shaped train of fire. The Arab astronomers describe its shape as that of a Turkish scimitar, which, blazing against the dark sky, was regarded as a sign from heaven of the war then raging against the Christian infidels.

A clear story of the Comet's appearance has been left by the Bavarian Jesuit, Brueckner (Pontanus). He based his story on the record of Georgos Phranza, Grandmaster of the Wardrobes to the Emperor of Constantinople. There the Comet is described as "rising in the West; moving towards the East, and approaching the Moon."

By the Chinese this Comet was described as having a tail sixty degrees long, and a head "which at one time was round, and the size of a bull's eye, the tail being like a peacock's."

Halley wrote of this Comet in 1686: "In the summer of the year 1456 a Comet was seen, which passed in a retrograde direction between the earth and the sun. From its period and path, I infer that it was the same Comet as that of the years 1531, 1607 and 1682. I may therefore with confidence predict its return in the year 1758."

The appearance of the Comet in 1456 was so well remembered even 225 years later, because this was the scimitar-shaped Comet hailed by the conquering Turks as their guiding star, against the evil influence of which Pope Calixtus III. exhorted all Christians to pray to God.

This story has been denied by certain latter-day sceptics, but the medieval historian Platina, who was living in Rome at the time, and who knew whereof he spoke, wrote in his "Lives of the Popes" in 1470:

"A hairy and fiery star having then made its appearance for several days, the mathematicians declared that there would follow grievous pestilence, dearth and some great calamity. Calixtus, to avert the wrath of God, ordered supplications that if evils were impending for the human race He would turn all upon the Turks, the enemies of the Christian name. He likewise ordered, to move God by continual entreaty, that notice should be given by the bells to call the faithful at midday to aid by their prayers those engaged in battle with the Turk."

In truth, all Christendom appeared indeed to have fallen under the "wrath of God," for the Turks, having wrested Constantinople away from the Christians, now came ravaging up the Danube countries and laid siege to the Christian city of Belgrade. Bloody battles were fought between the Magyars and Turks on the Danube,

until Hunyadi, the great Magyar leader, at last overthrew the Turks under Mahomet II., under the walls of Belgrade, in a great battle, in which no less than 24,000 Turks were slain. This was on July 21st, on the eve of which day the Comet had been seen to blaze at its fiercest.

1378

THE Comet appeared late in the year, and was seen at its brightest over Northern Europe, in Scotland, Scandinavia, Russia and Poland.

All these countries, during the same period and immediately afterwards, were cursed by the terrible pestilence called the "Black Death," now known to have been the worst visitation of the bubonic plague known in history. Wherever the dread sickness appeared, the people "died like rats." So many succumbed to the disease, and so many others fled aghast from the pestilence, that whole cities and towns were left empty, and no labourers could be found to till the fields.

1301

THE Comet this year was first observed by German and Flemish astrologers during the late Summer and Autumn. It was interpreted as an ill omen of the wars which then ravaged Europe. Immediately after the appearance of the Comet, Emperor Albrecht of Germany ravaged the Rhine lands with fire and sword. Afterwards the German astrologers explained the Comet as a warning omen of the death of the Emperor's son Rudolf, who died within a twelvemonth of his coronation as King of Bohemia.

In Flanders the Comet was taken as a heavenly token of the fierce war which followed the blood-stained mas-

sacre of 3,000 French soldiers by the enraged people of Flanders.

Soon after this came Robert of Artois' bloody defeat at Coutrai, the famous "Battle of the Spurs," so called from the thousands of gilt spurs that were taken afterwards from the feet of the slain French cavaliers.

1222

THE Comet during this year is recorded by the Chinese astronomers in the months of September and October. During these months, and immediately afterwards, Jenghis Khan, the bloody Mongol conqueror, with his fierce Mongol hordes, was ravaging all China, Persia, India and the Caucasus country as far as the River Don.

The Comet was taken as a special omen of the terrible fate of the City of Herat and its surrounding country, where the bloodthirsty conqueror caused to be slaughtered over a million of people. Jenghis Khan, who believed in stars and omens, having been born with bloodstained hands, hailed the Comet as his special Star. Under its rays he extended his immense Empire to its outermost boundaries from the China seas to the banks of the Dniepr in Russia. After the Comet's disappearance, Jenghis Khan regarded the planets that had crossed its orbit as stars of ill omen, betokening his death, so he set his face backward from his march of conquest, and soon afterwards died in Mongolia.

1145

THE Comet appeared over Europe early in Spring. It was seen at Rome in March and April.

Inspired by the appearance of the Comet, Pope Eugenius III. called for a crusade against the Moslems.

St. Bernard in France took up the cry, and preached a holy war all over France. On Easter Sunday, King Louis VII. of France, his Queen and all his nobles, received the Cross from St. Bernard at Vizelay.

In Rome, however, the Comet was taken as a token of the Pope's downfall. Arnold of Brescia preached against the Pope and aroused the Roman populace against him. The Holy Father had to flee.

On the disappearance of the Comet, the Pope returned and excommunicated the Patricians of Rome. Arnold of Brescia was taken and strangled in his cell. Later historians, like Lubienitius, accordingly interpreted the Comet as a sign of warning rather than as an ill omen.

1066

THIS is the most famous appearance of the Comet now known as Halley's Comet. Under its seven rays, that year, William the Conqueror felt inspired to fall upon England, while Harold, the Saxon, on the other hand, saw in the Comet a star of dread foreboding and of doom.

The medieval chronicles of this year all make special mention of the Comet. A picture of the Comet, as it appeared to the doomed Harold, was embroidered by Matilde of France, on the famous coloured tapestry of the Norman Conquest, which is still preserved at Bayeux in Normandy.

Zonares, the Greek historian, in his account of the death of Emperor Constantinus Ducas (who died in May, 1067), writes of the Comet as "large as the full moon, and at first without a tail, on the appearance of which the star dwindled in size."

The Chinese astronomers have recorded that this Comet had seven tails, and was seen for sixty-seven



HALLEY'S COMET, 1066. (From the Bayeux Tapestry.)

days, after which "the star, the blaze, and the star's tails all drew away."

The Christian chroniclers record that this Comet, "in size and brightness equalled the full moon, while its tail, slowly lengthening as it came near the Sun, spread out into seven rays and arched over the heavens in the shape of a dragon's tail."

Sigebert of Brabant, the Belgian chronicler of that time, wrote of it: "Over the island of Britain was seen a star of a wonderful bigness, to the train of which hung a fiery sword not unlike a dragon's tail; and out of the dragon's mouth issued two vast rays, whereof one reached as far as France, and the other, divided into seven lesser rays, stretched away towards Ireland."

William of Malmesbury wrote how the apparition affected the mind of a fellow monk of his monastery in England. His words were: "Soon after the death of Henry, King of France, by poison, a wonderful star appeared trailing its long tail over the sky. Wherefore, a certain monk of our monastery, by name Elmir, bowed down with terror at the sight of the strange star, wisely exclaimed, 'Thou art come back at last, thou that will cause so many mothers to weep; many years have I seen thee shine, but thou seemest to me more terrible now that thou foreteldest the ruin of my country.'"

Another old Norman chronicler, by way of defending the divine right of William of Normandy to invade England, wrote: "How a Starre with seven long Tayles appeared in the Skye. How the Learned sayd that newe Starres only shewed themselves when a Kingdom wanted a King, and how the sayd Starre was yclept a Comette."

William himself appealed to the Comet as his guiding star. It shone at its brightest during the Summer

months while William was preparing his expedition at St. Valery. When the spirits of his followers failed them, William pointed to the blazing Comet and bid monks and priests who accompanied his expedition to preach stirring sermons on the "wonderful Sign from Heaven."

The trip across the English Channel, late in September, was lighted up by the Comet, and under its lustre the Norman invaders first pitched their camp at Pevensey.

Once more, when William's Norman followers quailed at the fierce work before them, William pointed to the Comet as a token of coming victory.

A fortnight later, directly after the disappearance of the Comet, the Battle of Hastings was fought, in which King Harold and his Saxon thanes lost their lives and their country.

Afterwards, when Queen Matilda and her court ladies embroidered the pictorial story of her husband's Conquest of England in the huge tapestry of Bayeux, they did not forget the Comet. They represented Harold cowering in alarm on his throne, whilst his people are huddled together, pointing with their fingers at the fearful omen in the sky, the birds even being upset at the sight. The Latin legend over the picture "Isti Mirant Stella" (they marvel at the star), makes it all plain.

As I. C. Bruce, the editor of "The Bayeux Tapestry Elucidated," has said: "This embroidery is remarkable for furnishing us with the earliest human representation we have of a Comet."

The Comet of 1066 will ever be famous for ushering in a new era for England. Even to-day Halley's Comet is remembered as "The Comet of the Conquest."



WILLIAM THE CONQUEROR.

(An English Dream.)

Halley's Comet appeared in 1066—When William the Conqueror took England. Halley's Comet is here to-day.—Kladderadatsch (Berlin).

THE appearance of the Comet this year was marked by bloody wars all over Europe. The Lombards under Otho were harrying the ancient Roman Empire, while the heathen Danes and Wends ravaged Germany.

THE Comet appeared early in the year and was seen over Germany, as noted in the chronicles of the monks of St. Gallus in Switzerland. Immediately after the appearance of the Comet, Germany was ravaged by war, both inside and outside, the Empire being invaded on all sides by the Danes in the North, the Slavs in the Northeast, and the Magyars from Hungary.

THE Chinese Astronomers record two Comets for this year, one in February, and the other in April. But the modern view is that this was the same Comet, as seen going to the Sun, and afterward, when it was coming away from the Sun.

Immediately after the appearance of the Comet there followed a widespread rebellion in China with much bloodshed and fierce reprisals.

The only Christian record of the Comet we have is that of Eginard, an astrologer employed at the Court of Louis the Debonair, in France. This is Eginard's account of the Comet: "In the midst of the holy festival of Easter there shone forth in our sky a sign always ominous and of sad foreboding. As soon as the Emperor—who was in the habit of gazing up into the sky at night—first saw the Comet, he had me called be-

fore him, together with another learned star gazer. As soon as I came before him he asked me what I thought of the sign in heaven.

" 'Let me have but a little time,' I asked of him, 'that I may study this sign and see the exact constellation of the other stars around it, thus to gather from the stars the true meaning of this portent,' promising him that I would tell him on the morrow of the results of my studies.

"But the Emperor, guessing that I was trying to gain time—as was indeed the truth, lest I be driven to tell him something unlucky and fatal to him—he said to me:

" 'Go up on the terrace of the palace and look. Then come back at once and tell me what thou hast seen! For I did not see this star last night; nor didst thou point it out to me; but I know that sign in heaven is a Comet. Thou must tell me true what it forebodes to me!'

"Then, before I could say anything, he said: 'There is another thing thou art hiding from me. It is that changes in Kingdoms and the deaths of rulers are foretold by this sign.'

"To soothe him I reminded the Emperor of the words of the Prophet Isaiah, who said: 'Fear not signs in the Heaven, like unto the Heathen.'

"But the Emperor smiled sadly and said: 'We should believe only in God on High, who has created us and also all Stars in Heaven. Since He has sent this Star, and since this unlooked for Sign may be meant for us, let us look upon it as a warning from Heaven.' "

Thereupon Louis the Debonair betook himself to fasting, prayers, and the building of churches and shrines, he and all his Court. Shortly thereafter he died.

The French chronicler, Raoul Glaber, afterward wrote in his chronicle: "Comets never show themselves to man without foreboding surely some coming event, marvellous or terrible."

760

A Comet appeared in the Spring of this year, which without any doubt whatever was Halley's. It was recorded in detail both by European and Chinese annalists, and its orbit has been calculated and identified by Laugier.

A Greek record of Constantinople tells how "a Comet like a great beam and very brilliant was observed in the twentieth year of Emperor Constantine V., surnamed Copronymus, first in the East and then in the West, for about thirty days. Its appearance was followed next Winter by a biting frost throughout the Orient, which endured 150 days, from October until February, blighting all crops in Egypt and elsewhere in the Eastern Empire.

684

CHINESE annals record a Comet observed in the West in September and October. This accords with the computed time for the course of Halley's Comet that year. Immediately after the Comet's appearance, China and the Far East were ravaged by the black plague. Millions died of it. Baeda the Venerable, in his "Chronicle of the English People," records that the plague also reached England.

ALL Europe and the former Roman Empire were in such dire confusion during this period that no records of this year, either astronomic or historical, have come down to us. Messrs. Cowell and Crommelin, however, have computed astronomically that the Comet must have appeared during this year. All we know is that Italy and the Latin World were overrun by ravaging Slavonian hordes from Hungary, who made all the country run with blood.

OF THE Comet this year, likewise, there is no astronomic record. All we know is that the appearance of a Comet is noted in European chronicles. It was followed by a virulent outbreak of the black plague.

In the legendary history of Merlin, the ancient British seer, it is stated that on the appearance of a Comet this year he prophesied that Uter, brother of Ambrosius, on the death of the latter, should rule the kingdom; that a ray from the Comet which pointed toward Gaul presaged a son who should be born to him and who should be great in power; and that the ray "that goes toward Ireland represents a daughter, of whom thou shalt be the father, and her sons and grandsons shall reign over all the Britons." These prophecies all came true.

THE Comet which appeared over Europe this year has been proven by Laugier to have been Halley's Comet.

It was seen in France just before the monster battle

on the Catalaunian Fields (Châlons-sur-Marne), when Aetius, the last of the Romans, together with King Theoderic and his Goths, stemmed the tide of Hunnish invasion led by Attila, the "Scourge of God."

Theoderic, together with 148,000 warriors on both sides, were slain in this tremendous fight, which alone saved Europe from Tartar savagery.

373

CHINESE annals of this year record a Comet seen in the northern constellation of Ophiuchus in October. This year marks the beginning of the tremendous migration of peoples, which started in Mongolia and Tartary, and crossing the Volga gradually overflowed all the known world, like a huge human deluge.

295

THE appearance of a Comet this year (identified by Hind with Halley's) was followed by a bloody rebellion of the ancient Britains against the Romans, and by another rebellion against Rome by the Egyptians. These patriotic uprisings of the people were suppressed with fire and sword and both countries ran with blood.

218

THE Chinese catalogue of Ma-tuan-lin records a Comet with a path exactly analogous with the orbit of Halley's Comet computed for that year by Hind. In the Chinese record the Comet is described as "pointed and bright." Its coming was connected with the death of Emperor Ween-te directly afterward, and the Civil Wars between various claimants to the throne of the Celestial Empire, which then rent China asunder.

Dion Cassius, the Roman historian, describes the Comet of this year as "a very fearful star with a tail stretching from the West towards the East."

The Roman augurs explained the Comet as a portent of the bloody death of Emperor Macrinus of Rome, who was murdered by his own soldiers on the night after the disappearance of the Comet.

141

IN THIS year the Chinese astronomers recorded a Comet in March and April (the time computed for Halley's Comet), which they described as "a star six or seven cubits long and of a bluish-white colour." The coming of the Comet was followed by a virulent outbreak of the plague in China and the Far East, which spread all over the known world. So virulent was this pestilence that in the City of Naples alone 400,000 people died of the disease.

65-66

HALLEY'S Comet, according to astronomic calculations, must have made its reappearance during the winter months of 65-66 A. D. The Chinese have recorded "two Comets," one in 65, which was seen for fifty-six days, and "the other" in February, 66, which remained visible fifty days.

This was the Comet which St. Peter and Josephus saw over the City of Jerusalem, before the fall of the Holy City. Josephus wrote of it: "Amongst other warnings, a Comet, of the kind called Xiphias, because their tails appear to represent the blade of a sword, was seen above the doomed city for the space of nearly a whole year.

Jerusalem was ravaged by pestilence and famine and soon afterward was stormed by the Roman soldiery led by Titus. The Temple was burned down and the streets of the Holy City ran with blood. It was the end of Jerusalem and of the Jews as a free city and people.

B. C. 11

THIS is the farthest back that the appearances of Halley's Comet have been traced in history. For earlier appearances there are no sufficiently trustworthy computations or records.

Dion Cassius in his "History of Rome" has recorded "a Comet which hung suspended over the City of Rome just before the death of Agrippa," who ruled over the Roman Empire during the absence of Augustus in Greece and Asia. Agrippa was so universally beloved, and his death was held to be such a loss to Rome that he was buried with imperial honours in the tomb intended for Augustus.

The death of Agrippa occurred in the year 12, shortly after the disappearance of the Comet which Hind has identified with Halley's.

THIS completes the record of all the known appearances of Halley's Comet. The record fully justifies Chambers' dictum, that the "Comet known as Halley's is by far the most interesting of all the Comets recorded in history."

This historic record also appears to justify in no small measure the popular beliefs of the last two thousand years concerning Comets, as expressed by Leonard Digges in his book on Prognostics, published 350 years ago:

"Cometes signifie corruption of the ayre. They are signs of earthquakes, of warres, of changing of Kyngdomes, great dearth of food, yea a common death of man and beast from pestilence."

THE STORY OF EDMUND HALLEY

THE great French astronomer Lalande considered Halley the greatest astronomer of his time. This opinion is still held. Halley's "time" means the age of Kepler, Sir Isaac Newton, Flamsteed, Hevelius, and Leibnitz, all of whom achieved first rank in Astronomy.

Halley's greatest achievement in Astronomy was the discovery that our solar system was but an atom in immeasurable space whence wandering stars could be caught within the influence of our Sun, our Earth and the other Planets swinging around our Sun.

Halley was the first to discover and to prove that the Comets that come within the vision of man have fixed periods of return. He made this discovery during the appearance of the great Comet of 1682, which has since been known by his name.

In his studies of the motions of Comets, of which Halley computed the orbits of twenty-four, he observed that a Comet of similar phenomena, recorded by Appian in 1531 and by Kepler in 1607, had swung through the same orbit as the Comet under his observation in 1682. Halley surmised from this that these Comets might be one and the same, whose intervals of return appeared to cover a period of seventy-five or seventy-six years. Halley's surmise seemed to be confirmed by the recorded appearance of similar bright Comets in the years 1456, 1378, and 1301, the intervals again being seventy-five or seventy-six years.

Halley was deeply imbued with Newton's new discovery of gravitation, for the publication of which Halley paid the expenses, so he brought the principles of

Newton's theory of gravitation to bear on his own new theory of the motions of Comets. He rightly conjectured that Comets were drawn to our Sun across the disturbing orbits of our planetary system, and that the comparatively small differences of one or two years in the recorded intervals of this one Comet (Halley's Comet) were due to the attraction of the larger planets.

During the previous year, 1681, Halley computed that the Comet had passed near the planet Jupiter, the attraction of which must have had a considerable influence on the Comet's motion. Making due allowance for this disturbing influence of Jupiter, he computed that the Comet would return to the vicinity of our Sun about the end of 1758 or beginning of 1759.

Halley did not live to see his prediction fulfilled (he died in 1742), but he wrote shortly before he died: "If this Comet should return according to our predictions about the year 1758, impartial posterity will not refuse to acknowledge that this was first discovered by an Englishman."

All through the year 1758 the most noted astronomers of Europe were on the lookout for the return of the predicted Comet. One of these astronomers, Messier, looked for it through his telescope at the Paris Observatory every night from sunset to sunrise throughout that whole year. On Christmas night, 1758, the Comet was first seen by a German peasant near Dresden, who had heard about the Comet and was looking for it. He was a man of unusually good eyesight, yet his discovery was doubted until Messier, nearly a month afterward, at Paris, "picked up" the Comet with his telescope.

From that time forth this Comet, which returned in 1835, and is reappearing in this year (1910), has been known as Halley's Comet.



EDMUND HALLEY.

Besides this achievement, Halley accomplished many other noteworthy feats in astronomy, such as his discovery of the proper motions of the fixed stars; his detection of the "long inequality" of Jupiter and Saturn, and of the acceleration of the moon's mean motion; his theory of variation, including the hypothesis of various magnetic poles, with his suggestion of the magnetic origin of the aurora borealis; and his indication of a method still used for determining the solar parallax by means of the transits of Venus.

On the strength of these achievements, Halley for many years was elected to serve as secretary to the Royal Society. Commissioned as a Captain in the Royal Navy, he also commanded a vessel on a long cruise of exploration, and late in life he was made Astronomer Royal.

Although in his sixty-fourth year, he then undertook to observe the moon through an entire revolution of her nodes (eighteen years), and actually carried out his purpose. To appreciate the full significance of so painstaking an achievement it should be borne in mind that astronomical observations must be made in a temperature equal to that of the open air. Observatories cannot be heated because the heat would impair the accuracy of the instruments.

Great astronomers, like poets, are born, not made. Edmund Halley was one of these. At the age of seventeen he had already observed the change in the variations of the compass. At nineteen he was recognized as an astronomer of reputation, having supplied a new and improved method of determining the elements of the planetary orbits. His detection of considerable errors in the tables then in use led him to the conclusion that a more accurate determination of the places of the fixed Stars was indispensable to the progress of astronomy.

With this end in view he set out on a voyage to the other side of the globe, St. Helena, where he undertook the task of making complete new observations of the entire Southern Hemisphere. Though the Heavens proved clouded he succeeded within two years in registering three hundred and sixty stars, a colossal achievement which won for him the title of the "Southern Tycho." This was when Halley was barely of age.

(The famous astronomer Tycho Brahe, long before this had won his fame by mapping the stars of the Northern Heavens.)

No one could well have begun with prospects more remote from so high a career, for Edmund Halley was born in 1656, the son of a soap boiler in a shabby London suburb. From the refuse of rancid fat and lye the boy was rescued by friends, who procured for him a scholarship at Saint Paul's school. By his brilliant attainments in mathematics he won another scholarship to Oxford University.

While at Oxford the youth published a treatise on the planetary orbits and argued the Sun's axial rotation.

On his graduation from Oxford, the young would-be astronomer conceived the project of turning his attention to the southern Stars, of which no good observations had been made. Shortly before this time a Dutch astronomer, named Houtman, had observed these Stars in the island of Sumatra; and Blaeu, the best globe maker of the age, had used these new observations in the correction of his celestial globes. Halley, on examining these corrections, came to the conclusion that he himself could do better. He also concluded that the Island of St. Helena might be a better point for southern observations. His father, unable to pay the expenses of so long a trip, broached the project to some friends. The

young astronomer was recommended to King Charles II. by Williamson and Jones Moore, and the King in turn recommended the youth to the Indian Company, which then had control over the island of St. Helena.

After this all was plain sailing. The India Company placed a ship at his disposition and promised him all the assistance he required. Young Halley provided himself with telescopes, and micrometers, and other instruments of the latest approved pattern. In November, 1666, at the age of twenty, he sailed for St. Helena. Among his luggage was a sextant of five and a half feet and a telescope twenty-four feet in length constructed under the supervision of Flamsteed, the Astronomer Royal.

Halley was disappointed in the climate of St. Helena. Frequent rains and a constantly hazy sky scarcely permitted any observations in the months of August and September. Notwithstanding these difficulties, he succeeded in observing and cataloguing some 360 Stars.

In addition to his work on the Stars, Halley made some investigations on the Moon's parallax, combining his observations at St. Helena with those made in northern skies. He also evolved a new theory of the Moon's motion, which proved of great aid in the determination of longitudes.

On November 7, 1677, Halley observed a transit of Mercury which suggested to him the important idea of employing similar phenomena for the calculation of the Sun's distance.

Halley returned to England in November, 1678, and was hailed by his fellow astronomers as the "Southern Tycho." He was elected a fellow of the Royal Society, and by the King's command the degree of Master of Arts was conferred upon him by the University of Oxford.

Six months later Halley set out for Dantsic for a personal conference with Hevelius, the Polish astronomer. Halley wanted to satisfy himself as to the accuracy of observations claimed by Hevelius without the aid of a telescope. Halley convinced himself that the errors of the observations made by Hevelius were less than had been supposed, and did not exceed a minute of an arc. The two became life-long friends. Halley proceeded to other cities of Europe where there were observatories. In Paris he observed with Cassini the great Comet of 1680. This was the beginning of Halley's special study of Comets.

Returning to England, the young astronomer married the daughter of Mr. Tooke, auditor of the Exchequer, with whom he lived harmoniously until her death, fifty-five years later. The young couple settled at Islington, where Halley erected an observatory of his own and engaged in constant lunar observations with a view toward finding a method for computing longitudes at sea.

Halley's mind at the same time was busy with the momentous problem of gravity, upon which Isaac Newton was working then. Independently of Newton, Halley reached the conclusion that the central force of the Solar System must decrease inversely as the square of the distance. Having applied vainly to his fellow astronomers, Hooke and Wren, Halley in August, 1684, made a special journey to Cambridge to consult Isaac Newton, who confirmed his conjectures.

Halley and Newton became life-long friends. Halley had Newton elected to the Royal Society, and when Newton became too poor to pay his quarterly dues, Halley, through his influence with the leading members of the Society, had them remitted. It was Halley who

encouraged Newton to put his momentous discovery and elucidation of the forces of gravity into permanent form in his "Principia," the first volume of which, "De Motu," was presented to the Royal Society at Halley's suggestion.

In the proceedings of the Royal Society for December, 1684, there is an entry that "Mr. Halley had lately seen Mr. Newton at Cambridge, who had told him of a curious treatise 'De Motu,' which at Mr. Halley's desire he promised to send to the Society to be entered upon their register. Mr. Halley was desired to put Mr. Newton in mind of his promise for the securing this invention to himself, till such time as he could be at leisure to publish it."

Early in the following year Newton sent his treatise to the Society, to whom it was read aloud by Halley. This treatise "De Motu" was the germ of the "Principia" and was intended to be a short account of what the greater work was to embrace.

During the next two years Newton was hard at work on his "Principia," while Halley was equally hard at work on his computations of the Comet of 1682, and on his theory of the orbits and the periodical returns of Comets which grew out of his observations.

On April 21, 1686, Halley read to the Royal Society his own "Discourse Concerning Gravity and its Properties," in which he stated that his "worthy countryman, Mr. Issac Newton, has an incomparable treatise on Motion almost ready for the press," and that the law of the inverse square "is the principle on which Mr. Newton has made out all the phenomena of the celestial motions so easily and naturally that its truth is past dispute."

Shortly afterward Newton sent in the manuscript

of his great work. The Society voted "that a letter of thanks be written to Mr. Newton and that the printing of his book be referred to the consideration of the council and that in the meantime the book be put into the hands of Mr. Halley."

The truth was that the Royal Society, at that time, did not have money enough to print the book. The Society went through the empty form of "ordering" that the book be printed "forthwith," but no printer was forthcoming until Halley himself undertook the publication of the great work at his own expense.

The delicacy of Halley's feeling is revealed by his correspondence with Newton, in which he informed Newton that the book had "been ordered to be printed at the Society's charge." The preliminary delay about printing he explained to Newton "arose from the President's attendance on the King, and the absence of the vice-presidents, whom the good weather had drawn out of town."

Later Newton came to realize how much he owed to Halley in this matter. In his letters to Halley henceforth he always referred to his book as if it had been Halley's book. When the great work was finished at last Newton wrote to Halley under the date of July 5, 1687: "I have at length brought your book to an end, and hope it will please you."

The finished work contained a note to this effect: "The inverse law of gravity holds in all the celestial motions, as was discovered also independently by my countrymen Wren, Hooke, and Halley."

The book was dedicated to the Royal Society, and to it was prefixed a set of Latin hexameters addressed by Halley to the author, ending with the well known line:

"Nec fac est propius mortali attingere divos."

("It is not given to a mortal to get in closer touch with the gods.")

Halley was fifty years old when he made his famous prediction of the return of the Comet of 1682. This was in his "Synopsis of Comet Astronomy," which ended with these words: "Hence I may venture to foretell that this Comet will return again in the year 1758."

Besides being an astronomer of the first class, Halley was also a good navigator. In 1698 he was commissioned a captain in the Royal Navy and was put in command of the King's ship, "The Paramour Pink." With this vessel he set out on a long cruise to the Pacific for the purpose of making observations on the laws which govern magnetic variations. This task he accomplished in a voyage which lasted two years and extended to the fifty-second degree of southern latitude, when the ice compelled him to turn back. On the return voyage his crew mutinied and his lieutenant sided with the mutineers. Halley quelled the mutiny by sheer force of personality, and returning to England got rid of his lieutenant. The results of his voyage were published in his "General Chart of the Variation of the Compass" in 1701. Immediately afterwards Halley set out on another King's ship and executed by royal command a careful survey of the tides and coasts of the British Channel, an elaborate chart of which he published in 1702.

Next Halley was sent by the King to Dalmatia, for the purpose of selecting and fortifying the port of Trieste.

On Halley's return to England, he was made Savilian professor of geometry at Oxford, and received an honorary doctor's degree. He filled two terms of

eight years each as secretary to the Royal Society, and early in 1720 he succeeded Flamsteed as Astronomer Royal.

He died on January 14, 1742, at the age of eighty-five in the full possession of his faculties, the foremost astronomer of the day and a man universally beloved and respected. His gravestone stands at the Greenwich Observatory.

Halley's works fill several shelves in the library of the Royal Society. His fame is kept green by the periodical return of the wandering star known by his name.

WHAT ARE COMETS?

THE modern answer to the question "What are Comets made of?" is this:

Probably the heads are a mixture of solid and gaseous matter. The tails are gaseous—the result of the volatilisation of the solid matter of the heads.

The spectroscope shows that gases appear to be a constituent of all Comets. The spectra of Comets are very similar to those of a Bunsen flame. Recent spectroscopic photographs have revealed the presence of hydrocarbons, nitro-carbons, of cyanogen and of the vapours of sodium, iron and other metals.

The connection between Comets and Meteors implies the presence in Comets of solid matter. A modern theory, voiced by Schiaparelli, is that meteor showers are broken up Comets.

The tails of Comets appear to be composed of luminous gases ejected from the head of the Comet through a solar force held to be "Light Pressure," which causes these tails to shoot off and disperse into space at the rate of 865,000 miles an hour.

The length of some Comets' tails has been estimated at 125,000,000 miles, while the Comets' heads themselves are generally much larger in size than our Earth. Halley's Comet is more than ten-fold the size of our Earth.

E. W. Maunder, of the Royal Observatory of Greenwich, a modern astronomer, has thus summarized the latest theories of the substance of Comets:

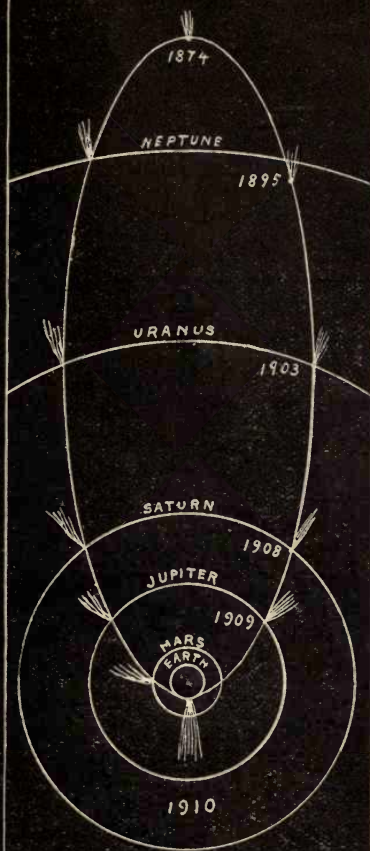
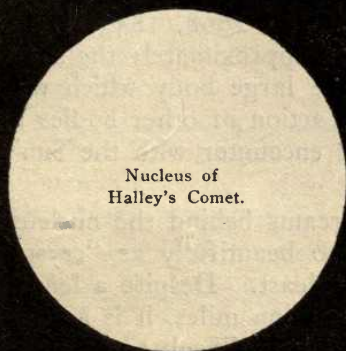
"Though the bulk of comets is huge, they contain extraordinarily little substance. Their heads must con-

tain some solid matter, but it is probably in the form of a loose aggregation of stones enveloped in vaporous material. There is some reason to suppose that Comets are apt to shed some of these stones as they travel along their paths, for the orbits of the meteors that cause some of our greatest 'star showers' are coincident with the paths of Comets that have been observed. But it is not only by shedding its loose stones that a Comet diminishes its bulk; it loses also through its tail. As the Comet gets close to the Sun its head becomes heated, and throws off concentric envelopes, much of which consists of matter in an extremely fine station of division:

The orbits of Comets visible to human eyes are all governed by the Sun. In the words of C. L. Poor: "The attraction of the Sun is to the Comet like the flame to the moth. The Comet flutters for a moment about the Sun, and then swings back into outward space. But not unscathed; like the moth, the Comet has been singed. The fierce light of the Sun has beaten upon it, and spread out its particles and scattered them along its path."

As a comet swings toward and away from the Sun, it travels at a tremendous rate of speed—over a million miles an hour. The distance covered from one end of the orbit to the other is 3,370,000,000 miles.

The great majority of Comets appear to travel in parabolas, open curves leading from infinite space to and around the Sun, and thence back into infinite space to some other fixed star invisible to us. As a matter of fact, though, the parabolic curves of Comets' orbits through the gravitational attraction of the planets, whose orbits are crossed by it, may be changed into hyperbolic curves and ellipses by planetary perturbations. Hence the differences in time between the returns of certain Comets, like Halley's, for instance.



RELATIVE SIZES OF THE EARTH,
THE MOON'S ORBIT AND
HALLEY'S COMET.

ORBIT OF HALLEY'S COMET.
THE TAIL ALWAYS POINTS
AWAY FROM THE SUN.

In a general way, it may be said that every Comet comprises a nucleus, an envelope (called the "coma") surrounding the nucleus and measuring from 20,000 to 1,000,000 miles in diameter, and a long tail which streams behind the nucleus from sixty to a hundred million miles or more.

Astronomers have decided that the nucleus is probably a heap of meteorites varying in size from a grain to masses weighing several tons each; a heap, moreover, so easily sundered that its elements are distributed gradually along the orbit. It follows that every Comet must eventually perish unless it restores its nucleus by collecting stray meteors. That disintegration does occur has been observed time and time again.

For example, Biela's Comet, which was discovered in 1826, burst into two fragments, which drifted apart a distance of one million miles. Thus it became a twin Comet. Eventually it disappeared as a Comet, and in its stead we see a shoal of meteors whenever we cross its track every six and a half years.

It is possible that the Comets of 1668, 1843, 1880, 1882 and 1887, all travelling in approximately the same path, are fragments of a single large body which was broken up by the gravitational action of other bodies in the system, or through violent encounter with the Sun's surroundings.

The luminous tail which streams behind the nucleus, which Shakespeare described so beautifully as "crystal tresses," is startling, to say the least. Despite a length which may exceed a hundred million miles, it is so diaphanously light and subtile that it is difficult to compare it with any earthly fabric. The air that we breathe is a dense blanket in comparison. Several hundred cubic miles of the matter composing that wonderful luminous

plume would not outweigh a jarful of air. By reason of its fairy lightness, it is possible for a tail occupying a volume thousands of times greater than the sun to sweep through our solar system without causing any perturbations in planetary movements.

No celestial phenomenon has caused more perplexity than the ghostly sheaf of light we call a Comet's tail. In a day, in a few hours even, the form of that wonderful gossamer may change. Hence it is that periodic Comets are identified when they return, not by the length and arch of their tails, but by their orbits. These alone are permanent.

When a Comet is first seen in the telescope, it appears as a diminutive filmy patch, often unadorned by any tail. As it travels on toward the Sun, at a speed compared with which a modern rifle bullet would seem to crawl, violent eruptions occur in the nucleus.

The ejected matter is bent back to form the cloak called the "coma." With a nearer approach to the sun, the tail begins to sprout, increasing in size and brightness as it proceeds. Evidently there is some connection between the Sun and the tail, something akin to cause and effect.

When the Comet rushes on toward the Sun, invariably the tail drifts behind the nucleus like the smoke from a locomotive. But when the Comet swings around the Sun and travels away from it, a startling change takes place. The tail no longer trails behind, but projects in front, as if some mighty solar wind were blowing it in advance of the head.

This phenomenon has long been an astronomical riddle. Here was a kind of matter that refused to obey the laws of gravitation and yield to the enormous pull of the Sun.



OCTOBER 5.

OCTOBER 9.

DONATI'S COMET OF 1858.

It was thought for a time that the tail was flung away from the Sun by stupendous repelling electrical forces. That electricity plays its part in the formation of the fairy plume is conceivable, and even probable; but recently the physicist has discovered a new source of repellent energy which very plausibly explains the mystery of a Comet's tail.

This new source of energy is nothing less than the pressure or push of the Sun's light. Solar gravitation is a force more powerful than we can realize. If it were possible for us to live on the Sun, we would find ourselves pulled down so violently that our body would weigh two tons. Our clothing alone would weigh more than one hundred pounds. Running would be a very difficult athletic feat. Light pressure must indeed be powerful if it can conquer so relentless a force.

Because we have never seen objects torn from our hands by the pressure of light, it may be inferred that this newly discovered force affects only bodies that are invisibly small. With the aid of instruments that feel what our hands can never feel and see what our eyes can never see, the modern physicist has critically analyzed the radiation that beats upon the earth from the distant Sun.

Light really does sway infinitely small particles, as was first experimentally proved by the Russian Lebedev. Two American astronomers, Nichols and Hull, improved upon his method. They cast the solar effulgence into mighty mathematical scales and found that the earth sustains a light-load of no less than 75,000 tons.

Most city-bred people are familiar with the so-called "Sun Motors"—little mills with black and white wings, enclosed in airtight vessels, which spin around in "perpetual motion" under the effect of "Sun Pressure."

It remained for the broad mind of a Swedish physicist, Svante Arrhenius, to apply the principle of light-pressure cosmically. He explained, very simply, that because a Comet's tail is composed of a very fine dust it can easily be driven away from the Sun by radiation pressure.

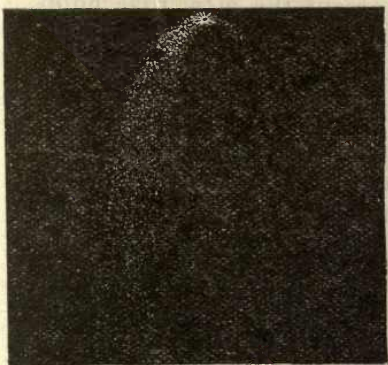
To understand how it is possible for so immaterial a thing as a sunbeam to produce so huge an effect, we have only to take a very simple example.

Assume that you have before you a block of wood weighing one pound. The block exposes a certain amount of surface to the Sun's light. Saw the block in half, and you increase the amount of that surface. Divide each half again into half, and the exposed surface is further augmented. If this process of subdivision is carried on far enough, the block will be reduced to sawdust.

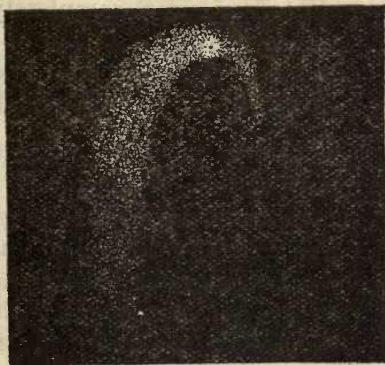
The entire mass of sawdust still weighs one pound; but its surface has been vastly enlarged. Indeed, the particles of sawdust, individually considered, may be said to consist of much surface and very little weight. If it were possible to take each granule of visible sawdust and subdivide it into invisible particles, a point would be reached where the pressure of light would exactly counterbalance the pull of gravitation, so that the particles would remain suspended in space, perfectly balanced in the scale of opposing cosmic forces.

Finally, if the subdivision be continued beyond this critical point, the particles will be wrenched away from the grip of gravitation and hurled out into space by the pressure of light.

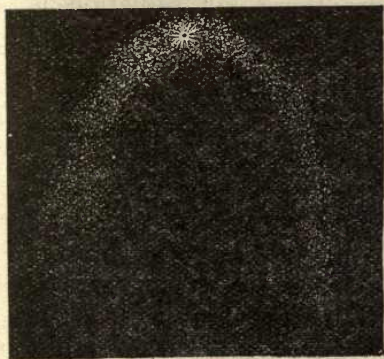
So much has been discovered about the particles that compose a Comet's tail that the more progressive scientists of our day have accepted this ingenious theory. Thus it has been decided by them that the delicate tresses of a Comet are to a large extent composed of fine particles of dust and soot.



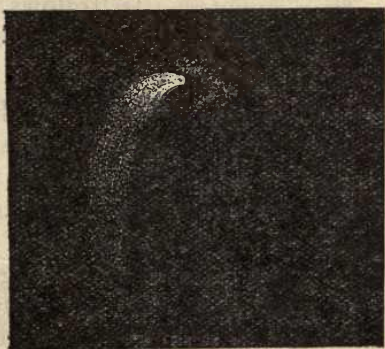
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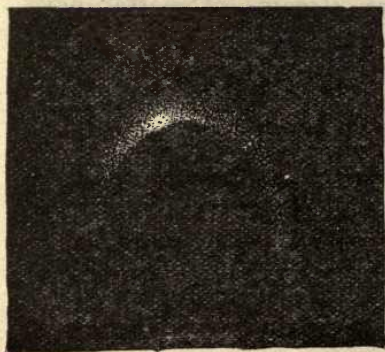
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July 8.

CHANGES IN THE COMET OF 1863.

Before we can completely accept the view that light-pressure forms this train of soot we must ascertain whether the pressure of light is capable of accounting for the flash-like rapidity with which a Comet's tail changes.

A Comet may throw out a tail sixty million miles long in two days. Is it actually possible for light-pressure to accomplish that astonishing feat? Arrhenius has computed that 865,000 miles an hour is the speed of a light-flung particle of one-half the critical diameter. Because they are only one-eighteenth as large as this particle of critical diameter, the dust grains in a Comet's tail would be propelled over the same 865,000 miles in less than four minutes. It follows that the solar radiation is amply strong enough to toss out a tail of sixty million miles in two days.

Photography in the hands of Prof. E. E. Barnard, of the Yerkes Observatory, has revealed some extraordinary changes in Comets' tails, changes which are not apparent to the eye and which cannot be explained by light pressure or by solar electrical forces. He has collected a formidable mass of photographic evidence which seems to show that there are other influences at work besides the Sun's radiation, and that these influences manifest themselves in distorting and breaking a Comet's tail. In some Comets of recent years, streams of matter have been shot out in large angles to the main direction of the tail without being at all bent by the pressure of light. In Morehouse's Comet of 1908, tails were repeatedly formed and discarded to drift bodily out into space and melt away. Sometimes the photographic plate has shown the tail twisted like a corkscrew and sometimes it has revealed masses of matter at some distance from the head, where apparently no supply had reached it. At one time the entire tail of Morehouse's Comet was thrown vio-

lently forward, a peculiarity so utterly opposed to the laws of gravitation that Professor Barnard suspects some unknown force at work in planetary space besides a force which undoubtedly resides in the Comet itself. If Halley's Comet serves no other purpose than to throw light upon this mystery, its return will more than repay astronomers for all their observatory vigils.

From the fact that the matter is ejected from the head to form the tail, it would follow that, unless it has the means of rejuvenating itself, a comet must eventually be disintegrated. Instances of this fragmentation and, eventual disappearance of a Comet are not wanting in astronomical annals. It has been stated previously that when Biela's Comet appeared in 1846 it became distorted and elongated, that it eventually split up into two separate bodies, that in 1852 it again appeared in its double form, and that it has since disappeared.

In a way, Comets may be said to bleed to death. At each return of Halley's Comet, future astronomers will find it less brilliant than it was seventy-six or seventy-seven years before. Some time there will be no Halley's Comet left, and the most famous Comet of its kind will be reduced to a shoal of meteors varying in weight from a few ounces to several tons and faithfully pursuing the orbit which their parent traced and retraced century after century.



COGGIA'S COMET, 1874: ON JULY 13,

THE PERIL OF THE COMET

IT WAS Edmund Halley who first revealed a source of danger from Comets, of which even medieval superstition had never dreamed.

While he was patiently plotting out the orbit of the Comet of 1680, which had inspired no little dismay among his contemporaries, Halley found that the Earth's orbit had been approached by the Comet within four thousand miles—half the diameter of the Earth.

If the Earth had been struck by that fiery wanderer? None had ever thought of the possibility.

Halley began to do some mathematical figuring, and decided that, if a Comet's mass were comparable with that of the Earth, our year would have been changed in length because the Earth's orbit would have been altered. He also speculated what would happen to the Earth, and reached this conclusion:

"If so large a body with so rapid a motion were to strike the Earth—a thing by no means impossible—the shock might reduce this beautiful world to its original chaos."

Halley even thought it probable that the Earth had actually been struck by a Comet at some remote period, struck obliquely, moreover, so that the axis of rotation had been changed. Thus he was led to infer that possibly the North Pole had once been at a point near Hudson's Bay, and that the rigour of North America's climate might thus be accounted for.

The seed which was thus sown by Halley has borne fruit. In Halley's own time, learned men were brood-

ing over the ultimate destruction of the Earth by collision with a Comet.

Dr. Whiston, who succeeded Newton at Cambridge in the Lucasian chair of mathematics, was sure that a Comet caused the Deluge, and went so far as to prophesy that a Comet, as it passed us on its outward course from the Sun, would ultimately bring about a "General Conflagration," and thus envelope the Earth in flames.

One century after Halley, the French astronomer Laplace, whose mathematical attainments were surpassed only by those of Newton, applied his brilliant mind to the possibility of a collision with a Comet, and arrived at this conclusion:

"The seas would abandon their ancient beds and rush towards the new equator, drowning in one universal deluge the greater part of the human race. . . . We see, then, in effect, why the ocean has receded from the high lands upon which we find incontestable marks of its sojourn; we see how the animals and plants of the south have been able to exist in the climate of the north, where their remains and imprints have been discovered."

The famous French mathematician Lalande showed that if a Comet as heavy as the Earth were to come within six times the distance of the Moon, it would exert such a powerful attraction upon the waters of the globe as to pull up a tidal wave 13,000 feet above the ordinary sea-level and inundate the continents. Every European mountain would be submerged except Mt. Blanc, and only the inhabitants of the Rockies, the Andes and the Himalayas would escape death.

Since Lalande's day there has been more than one Comet "scare." One of these startled Europe in 1832. On October 29th of that year, Biela's Comet crossed the Earth's orbit. The announcement was received with

stupefaction. It was only when Arago soothingly pointed out that the Earth would not reach the exact point where the Comet had intersected the Earth's orbit until November 30, at which time the Comet would be 50,000,000 miles away, that the popular excitement subsided. A similar alarm seized the world in 1857. Some prophet declared that on June 13 the world would collide with a certain periodic Comet having a period of revolution of three centuries. It is related that the churches and confessionals were crowded for days. Still another prediction, made in 1872 by Plantamour, the distinguished director of the Geneva Observatory, set Europe in a ferment. His calculations were based on errors, which were pointed out by other astronomers, and the public mind was quieted.

Although more than two centuries have passed since Halley was in his prime, the possibility of a collision with some vagabond star still haunts the mind of the astronomer.

That a collision is apt to occur is an admitted astronomical fact. The latest estimate, made in 1909 by Prof. William H. Pickering of Harvard University, would seem to prove that the core of one Comet in about 100,000,000 Comets will hit the earth squarely. An encounter with some part of a Comet's head will happen once in 4,000,000 years. Since Comets' orbits are more thickly distributed near the ecliptic than elsewhere in the celestial sphere, the collisions will occur according to Pickering, perhaps more frequently than this.

Because Pickering's figures differ from those of other astronomers—Arago and Babinet, for instance—it must not be inferred that his predecessors are wrong and that he is right in his calculations. The problem is too complex

for that. Pickering, Arago and Babinet differ partly because they have assumed different average sizes for their Comets, and partly because their definitions of visible Comets are not in accord.

That the possibility is very real, we shall all have an opportunity of judging on May 18, 1910. On that date the Earth will be plunged in the tail of Halley's Comet, and the head will be less than 15,000,000 miles away—a mere hand's breadth in the vastness of the universe.

What will happen?

Nobody knows for certain.

By means of the wonderful instrument called the spectroscope, an instrument which analyzes a distant star as readily as if it were a stone picked up in the road, it has been discovered that a Comet's tail is composed of gases called "hydrocarbons" (combinations of hydrogen and carbon), and that it bears a close chemical resemblance to the blue flame of a kitchen gas-stove.

Illuminating gas, as we all know, is poisonous. If a Comet's tail were dense enough, it is conceivable, therefore, that every human being on this planet might be asphyxiated by breathing the Comet's poisonous vapour as the Earth plowed through it. There is also this possibility, suggested by Flammarion, that the gases of a very dense tail might so combine with the nitrogen which constitutes nearly 80 per cent. of the air we breathe, that the atmosphere would be converted into the "laughing gas" employed by dentists. The world would die in a delirium of joy. At first a delightful serenity would settle upon mankind. Then would follow a contagious gaiety, febrile exaltation, a paroxysm of delight, and then madness. Flammarion even conceives the world merrily dancing a joyous, hysterical sarabande in which it perishes laughing.

The tail of a Comet is fraught with still other possible dangers. Our atmosphere contains a certain amount of hydrogen, a marvellously light gas to which balloons owe their buoyancy. Besides its lightness, this gas is characterized by an extreme inflammability. The law of the diffusion of gases teaches us that part of this hydrogen in the air is mechanically mixed with other gases, and that part of it probably floats in the upper air, far beyond the reach of any balloon. A Comet may be regarded as a huge lighted torch whirling through space, which may be brought dangerously near that upper layer of highly inflammable hydrogen. If the gas shall ever be touched off by this flying torch, our planet will be ignited. The whole atmosphere will become a seething ocean of flame, in which forests and cities will burn like straw, in which oceans will boil away in vast clouds of steam, and in which all animal life will be snuffed out of existence before it shall realize that the world is on fire. In a word, the globe will become a planetary funeral pyre. Since water results from burning hydrogen in oxygen, this same fierce and terrible flame must be speedily extinguished by a mighty deluge which will engulf the Earth.

A spectroscopic analysis of Halley's Comet has furthermore revealed the presence of cyanogen gas in the tail. Cyanogen is a compound of nitrogen and carbon, one of the most poisonous compounds with which the chemist is familiar. Prussic acid, potassium cyanide and many other cyanides, all of them almost instantaneously fatal if taken into the human system, are compounds of cyanogen. If that gas is present in large enough quantities, one flick of a Comet's tail will end all human and animal existence.

So much is certain. A collision of the Earth with a Comet will undoubtedly prove disastrous—how disas-

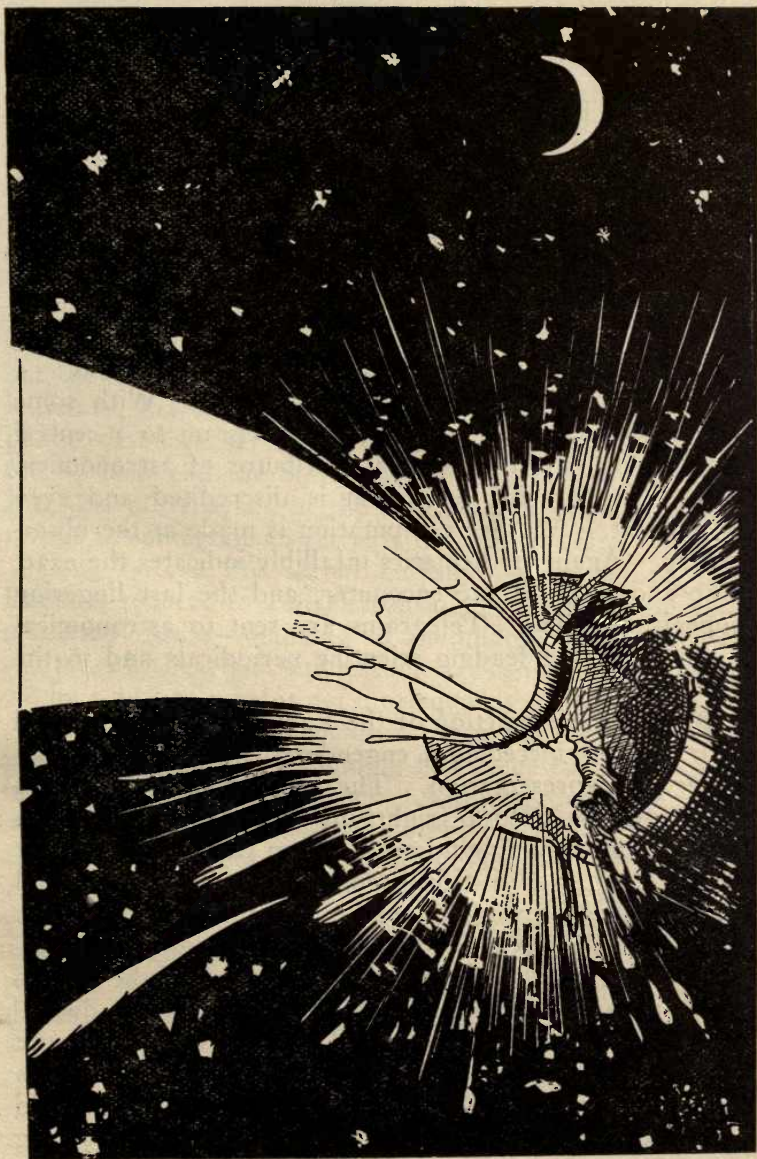
trous will depend largely on the size of the Comet's head and on its speed. That a violent heat will be developed, we have every reason to believe, from our knowledge of meteors. The mere movement of a meteor through the thin upper layers of our atmosphere produces a dazzling trail and reduces the meteor itself to a molten metallic mass. Arrest a body in swift motion, and you must dissipate its energy in some way. As a rule, the energy is converted into heat. A bullet discharged from a rifle is often melted when suddenly stopped by steel armour. A Comet travels at a pace compared with which a projectile, fired from the most powerful twelve-inch gun, seems only to crawl. What, then, must be the frightful effect when it strikes the Earth?

A Comet rushes through space not at the bullet's rate of thousands of feet an hour, but of a million miles an hour. The bigger it is, and the faster it moves, the greater will be the heat developed by its stoppage.

"At the first contact with the upper regions of the atmosphere," writes Prof. Simon Newcomb, "the whole heavens would be illuminated with a resplendence beyond that of a thousand Suns, the sky radiating a light which would blind every eye that beheld it, and a heat which would melt the hardest rocks." The same conclusion was reached by Prof. Faye.

When the time comes for a collision with a Comet of formidable size, the human race will be in the horrible predicament of knowing the exact hour and minute of its doom. The newspapers will print a dispatch from some great observatory, reading perhaps like this:

"A telescopic Comet was discovered by Caxton in right ascension 7 hours 13 minutes 1 second, and declension 17 degrees 28 minutes 31 seconds. Moderate motion in a northwest direction."



"If so large a body with so rapid a motion were to strike the Earth—a thing by no means impossible—the shock would reduce this beautiful world to its original chaos."—EDMUND HALLEY.

At first the discovery produces not even a ripple of excitement. Telescopic Comets are discovered too frequently. Three days later the discoverer has worked out an ephemeris, which gives the date when the body will pass around the Sun, and which indicates the Comet's path. He finds that on a certain date and at a certain hour the Earth and the Comet must crash together. Again and again he repeats his calculations, hoping that he may have erred. The utmost permissible allowance for accelerations and retardations caused by the outer planets of the solar system fails to change the result.

The Earth and the Comet must meet. With some hesitation the astronomer sends a telegram to a central observatory, which acts as a distributor of astronomical news. At first his prediction is discredited and even laughed at. Another computation is made at the observatory. Again mathematics infallibly indicates the exact time and place of the encounter, and the last lingering hope is dispelled. Telegrams are sent to astronomical societies, to the leading scientific periodicals and to the newspapers.

At first the prediction of the Earth's doom is received with popular incredulity, engendered by years of newspaper misrepresentation. The world's end has been too frequently and too frightfully foretold on flamboyant double-page Sunday editions. When the truth is at last accepted, after days of insistent repetition of the original announcement, a wave of terror runs through the world.

There is no escape. International committees of astronomers meet daily to mark the approach of the Comet. Bulletins are published announcing the steadily dwindling distance between the world and the huge projectile in the sky. The great tail, arching the Heavens as the Comet approaches, seems like a mighty, fiery sword held in an unseen Titanic hand and relentlessly sweeping

down. The temples, churches and synagogues are thronged with supplicating multitudes on bended knees, in a catalepsy of terror. The stock exchanges, banks, shops and public institutions are deserted. Business is at a standstill. The roar of the street is hushed. No wagons rattle over the pavement; no hucksters call out their wares.

As the Comet draws nearer and nearer, night changes into an awful, nocturnal day. Even at noon the Comet outshines the Sun. There is no twilight. The Sun sets; but the Comet glows in the sky, another more brilliant luminary, marvellously yet fearfully arrayed in a fiery plume that overspreads the sky. The Moon is completely lost, and the Stars are drowned out in this dazzling glare. Warned by the astronomers, mankind takes refuge in subterranean retreats to await its fate.

Long before the actual collision—long before the Earth is reduced to a maelstrom of lava, gas, steam and planetary debris—mankind is annihilated with merciful swiftness by heat and suffocation. A candle flame blown out by a gust of wind is not more quickly extinguished.

When the Comet encounters the upper layers of the atmosphere, there is a blinding flash, due to friction between the air and the Comet. A few seconds later the crash comes. From within, molten rock and flame, pent up for geologic ages, burst forth, geyser-like. The Earth is converted into a gigantic volcano, in the eruption of which oceans are spilled and continents are torn asunder, to vanish like wax in a furnace.

When it is all over, the Earth swims through space, a blackened planetary cinder,—desolate and dead.

THE END OF THE WORLD

CAMILLE FLAMMARION, the French astronomer, in his story, "The End of the World," gives this graphic description of the results of a collision between a Comet and our Earth:

In Paris, London, Rome, Berlin, St. Petersburg, Constantinople, New York and Chicago—in all the great capitals of the world, in all the cities, in all the villages—the frightened people wandered out of doors, as one sees ants run about when their ant-hills are disturbed. All the affairs of every-day life were forgotten.

All human projects were at a standstill. People seemed to have lost interest in all their affairs. They were in a state of demoralization—a dejection more abject even than that which is produced by sea-sickness.

All places of worship had been crowded on that memorable day when it was seen that a collision with a Comet had become inevitable.

In Paris the crowds in the churches were so great that people could no longer get near Notre Dame, the Madeleine and the other churches. Within the churches, vast congregations of worshippers were on their knees praying to God on High. The churches rang with the sounds of supplication, but no other sound was heard. The great church organs and the bells in the steeples were hushed.

In the streets, on the avenues, in the public squares, there was the same dread silence. Nothing was bought or sold. No newspapers were hawked about.

The only vehicles seen on the streets were funeral hearses carrying to the cemeteries the bodies of the first victims of the Comet. Of these there were already

many. They were people who had died from fright and from heart disease.

With what anxiety everyone waited for the night!

Never, perhaps, was there a more beautiful sunset. Never a clearer sky. The sun seemed to dip into a sea of red and gold.

The huge red ball of the sun sank majestically to the horizon. But the stars did not appear. Night did not come.

To the solar day succeeded a new day, the daylight of the Comet. Its intense light resembled that of an Aurora Borealis, but more vivid, coming from a great incandescent spot, which had not been visible during the day because it was below the horizon, but which would certainly have rivalled the splendour of the Sun.

This luminous spot rose in the East almost at the same time as the full Moon. The two luminous bodies rose together, side by side. As they rose, the light of the Moon seemed to pale, but the head of the Comet increased in splendour with the disappearance of the Sun below the western horizon.

Now, after nightfall, the Comet dominated the world—a scarlet-red ball with jets of yellow and green flame which seemed to flutter like fiery wings.

To the terrified people it seemed like a giant of fire taking possession of all Heaven and Earth.

Already the outermost jets of flame had reached the Moon. From one instant to the next the flaming rays would descend upon the Earth.

All eyes were distended with horror when it was seen that the horizon was lighting up with tiny violet flames as from a vast fire.

An instant afterward, the Comet diminished in brilliancy. This was apparently because the Comet, upon touching the atmosphere of our Earth, had come within

the penumbra of our planet and had lost part of its reflected light coming from the Sun. But in reality this apparent extinction was the effect of contrast. When the less dazzled eyes of the awestruck, human spectators had grown used to this new light, it appeared almost as intense as at first, but paler, more sinister and sepulchral.

Never before had the Earth been lit up with so sickly a light.

The drouth of the air became intolerable. Heat, as from a huge burning oven, came from above. A horrible stench of burning sulphur—due, no doubt, to electrified ozone—poisoned the atmosphere.

All the people then saw that their time had come. Many-thousand-throated cries rent the air. "The World is burning. We are on fire!" they cried.

All the horizon, in fact, was now lit up with flame, forming a crown of blue light. It was, indeed, as had been foreseen by scientists, the oxide of carbon igniting in the air and producing anhydrid of carbon. Clearly, too, hydrogen from the Comet combined with it.

On a sudden, as the people were gazing terrified, motionless, mute, holding their breath, and scared out of their wits, the vault of Heaven seemed to be rent asunder from the zenith to the horizon. Through the gaping breach there seemed to appear the huge red mouth of a dragon, belching forth sheaves of sputtering green flames.

The glare of the atmosphere was so fierce that those who had not already hidden themselves in the cellars of their houses, now all rushed helter-skelter to the nearest underground openings, be they subway steps, cellar doors or sewer manholes. Thousands were crushed or maimed during this mad stampede, while many others, frantic from fright and stricken with the heat, fell dead from apoplexy.

All reasoning powers seemed to have ceased. Among those cowering in dark cellars and subterranean passages below, there was nothing but silence, begot by dull resignation and stupor.

Of all this panic-stricken multitude, only the astronomers had remained at their posts in the Observatories, making unceasing observations of this great astronomic phenomenon. They were the only eye-witnesses of the impending collision.

Their calculations had been that the terrestrial globe would penetrate into the core of the Comet, as a cannon ball might into a cloud. From the first contact of the extreme atmospheric zones of the Earth and of the Comet, they had figured, the transit would last four hours and a half.

It was easy to compute, since the Comet, being about fifty times as large as the Earth, was to be pierced, not in its centre, but at one-quarter of the distance from the centre, with a velocity of 173,000 kilometers an hour.

It was about forty minutes after the first atmospheric impact with the Comet, that the heat and horrible stench of burning sulphur became so suffocating that a few more moments of this torment would put an end to all life. Even the most intrepid of astronomers withdrew into the interior of their glass-domed observatories, which they could close hermetically as they descended into the deep subterranean vaults.

The longest to stay above was a young assistant astronomer, a girl student from California, whose nerves had been steeled during the ordeal of the San Francisco earthquake. She remained long enough to witness the apparition of a huge, white-hot meteorite, precipitating itself southward with the velocity of lightning.

But it was beyond human endurance to remain longer above. It was no longer possible to breathe. To the

intense heat and atmospheric drouth, destroying all vital functions, was added the poisoning of our air by the oxide of carbon.

The ears rang as from the tolling of funeral bells, and all hearts were in a flutter of feverish palpitation. And always, everywhere, there was that suffocating stench of sulphur.

Now a shower of fire fell from the glowing sky. It was raining shooting-stars and white-hot meteorites, most of which burst like bombs. The fragments of these, like flying shrapnel, crashed through the roofs and set fire to the buildings.

To the conflagration of the sky were added the flames of fire everywhere on earth.

Claps of ear-splitting thunder followed each other incessantly, produced partly by the explosions of the meteors, and partly by a tremendous electric thunderstorm. Rifts of lightning zig-zagged hither and thither.

A continuous rumbling, like that of distant drums, filled the ears of the cowering people below, awaiting their fate. This low rumble was interspersed with the deafening detonations of exploding meteors and the high shriek of hurtling aerial fragments.

Then followed unearthly noises, like the seething of some immense boiling cauldron, the wild wailing of winds, and the quaking of the soil where the earth's crust was giving way.

This unearthly tempest became so frightful, so fraught with agony and mad terror, that the multitudes groveling below were overcome with paralysis, and lay prone. Laid low like dumb brutes, they met their doom.

The end of all had come.



COLOPHON

POST HOC, NON PROPTER HOC:

Sic veteres de multis rebus opinabantur,

Eodemque dicto eas jugiter absolvisse

Recte sibi visi sunt,

Vt puta quaecumque et qualiacumque

Cometarum saeculares reditus sequuntur.

CVR TV ITAQVE, forsitan quaeras,

Haec auditu minime jucunda nobis narrasti,

Terrae motus, fluminum inundationes, annonae defectus,

Pestes mortiferas, incendia, bella,

regumque magnorum excidia?

Si tibi cordi est,

LECTOR BENEVOLENTISSIME,

rationem nostram didicisse,

eia, veram accipe:

MVNDVS VVLT DECIPI.

FINIS.

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