

THE GATHERER:

AN ILLUSTRATED RECORD OF INVENTION, DISCOVERY, LITERATURE, AND SCIENCE.

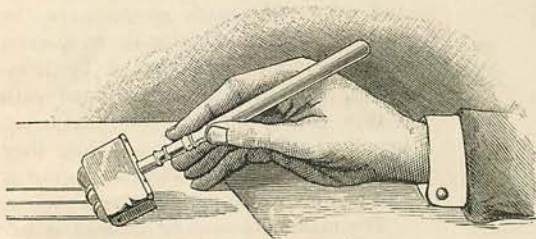
Correspondents are requested, when applying to the Editor for the names and addresses of the persons from whom further particulars respecting the articles in the GATHERER may be obtained, to forward a stamped and addressed envelope for reply, and in the case of inventors submitting specimens for notice, to prepay the carriage. The Editor cannot in any case guarantee absolute certainty of information, nor can he pledge himself to notice every article or work submitted.

Telling the South.



A SIMPLE method of determining the south point without the aid of a compass has recently attracted some attention, but for several years it has been taught to our Royal Engineer officers. As it is worthy of being generally known, and may be useful to Colonists, we shall briefly describe it. Hold a watch horizontally in your hand with the hour hand pointing to the centre of the sun. The south will then lie midway between the position of the hour hand at the time and twelve o'clock on the dial, counting backwards. Thus, if the hour hand points to 3 o'clock, the south will be in the direction of the 1.30 p.m. line. Again, if the hour hand is at 10 o'clock, the south will lie at 5 o'clock. The method is most correct a few hours before and after noon.

A Money-Column Ruler.



The ruler which we illustrate is intended to draw a set of money-columns at one operation. It consists of a roller with the necessary edges or ridges for the lines, which are inked by a spring-pad, so as to trace the lines when simply drawn down the paper.

Oil as an Insulator.

Oil promises to become the insulator of the future, especially for electric currents of very high potential and frequency; that is to say, the intense see-saw currents obtained from alternating-current dynamos and transformers. Such currents cannot be properly insulated with gutta-percha, india-rubber, or other solid insulators; but they can with liquid insulators. Moreover, when a solid insulator is penetrated by the spark, it is useless until the fault is cut out; whereas a liquid closes up the puncture, and repairs itself. Oil as an insulator was patented by Professor Hughes, F.R.S., as far back as 1859, but the time was not ripe for its adoption. He found that rosin oil was the best, and proposed to confine it in tubes with the wires inside. Rosin oil is thick, but it can be rendered more viscid by the addition of gum rosin and the residuum of palm oil. Professor Hughes has recently made

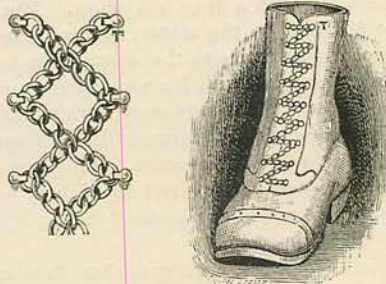
further experiments with it, and finds that a layer $\frac{1}{16}$ inch thick is a better insulator than 5 inches of air. The spark from a Wimshurst influence machine will turn aside from this thickness of the oil and prefer to leap through the air. This is shown by the experiment of placing a layer of the oil in a glass vessel having a copper plate in the bottom connected in circuit with the machine. On bringing the sparking knob of the machine over the oil, the electricity, rather than go through the film of oil between it and the copper plate, flows up out of the vessel and down its outside through the air in a luminous sheet resembling the electrical cascade of Gassiot.

Balatah.

The chicle gum tree or balatah of British Guiana and Venezuela, is commonly called the "bullet tree." A somewhat different species of it grows also in Jamaica and Trinidad. The milky juice of the tree is drawn off by parallel incisions made in the bark and collected in a calabash. A tree twenty inches in diameter yields about 3 pints. The milk is poured into shallow wooden trays greased on the inside, and then allowed to dry in the sun. It is now fetching a high price as a superior sort of gutta-percha, for while it insulates electricity as well as the more familiar material, it is able to stand exposure better.

A Chain Lace.

The woodcut illustrates a handy device for fastening boots. The metal tags, T, T, are joined by a chain



or chains in the manner shown, the links passing over the tags. The method appears an improvement on the ordinary lace, which is apt to work loose and draggle or wear out and break.

The Heliochromoscope.

Some twenty-seven years ago Mr. Henry Collen, painting master to Her Majesty the Queen, suggested

that colour photographs might be obtained by the composite process of making three pictures; one for each of the three primary colours and cementing one over the other on a white ground. A good many attempts to realise this method have ended in comparative failure; but at length Mr. Frederic E. Ives of Philadelphia has achieved success. According to the old theory of light advocated by Sir David Brewster, the primary colours are red, yellow, and blue, and a mixture of these was believed to produce white light. Helmholtz and others showed that instead of primary colours, there are primary or fundamental colour sensations, due possibly to the presence of three kinds of visual nerves in the eye, and that these simple sensations are red, green, and blue. All other colours are compound sensations; yellow, for example, can be produced by a mixture of red and green, and the yellow rays of the spectrum appear so only because they have power to excite both of these sensations at once, and equally. It follows that if we could take three photographs of an object, one reproducing the effect upon the nerves of the red sensation, one the effect upon the green, and a third the effect upon the blue, we might combine these into a single picture that would reproduce the original tints of the object. We cannot, however, take photographs giving even a single colour or monochrome, and hence it is necessary to take colourless or transparent images and to illuminate them by coloured light. This can be done by means of transparent coloured screens, and it is here that Mr. Ives has made one of his great advances on his predecessors in the same field. A screen of yellow glass, for example, interposed between the camera and the object, cuts off the blue rays from the latter and allows the red, yellow, and green, to pass to the camera. By careful experiments Mr. Ives has produced composite screens made chiefly of coloured glass, and gelatine films stained with aniline dyes, which permit only the

required rays from the object to pass. One screen allows the rays that excite the red sensation, another the rays that excite the green sensation, and a third the rays that excite the blue sensation, to reach the sensitive plate and produce the impression. Three transparent pictures or partial pictures of the same object are thus obtained, by means of the rays emitted by it, and by a new "triple camera" invented by Mr. Ives, they are taken on the same sensitive plate by a single operation. In reproducing a coloured picture of the

object from these, each transparent photograph is illuminated by coloured light of the kind which it represents, and the three images are blended in one. The coloured light is got by interposing screens of the proper colour between the image and a source of white light. The pictures can be projected on a screen by means of a magic lantern of special construction; and in his recent lecture at the Royal Institution Mr. Ives projected a number of lifelike views taken by himself in the Yellowstone Park. Mr. Ives also exhibited a small hand apparatus for reproducing the pictures. It is about as large as a drawing-room stereoscope, and fitted with an eye-

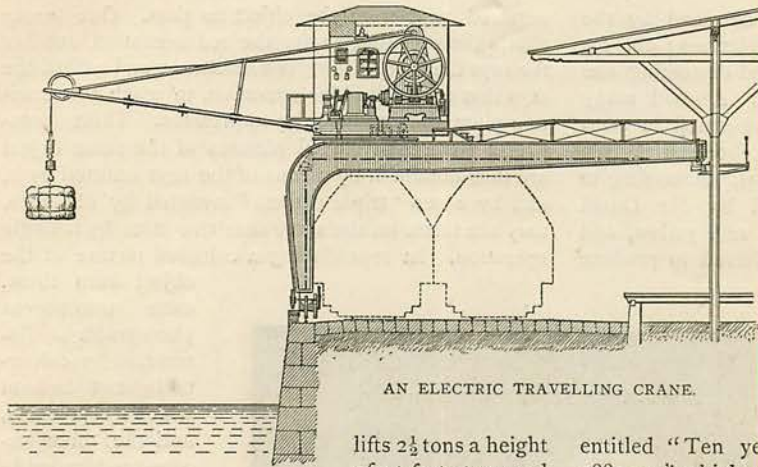


MR. F. E. IVES USING THE HELIOCHROMOSCOPE.
(From a photograph by Mr. Cameron Swan.)

piece. On looking into it the observer saw a bouquet of English flowers reproduced in their natural tints. It is probable also that a means will be worked out for printing the photographs in the natural colours of the objects, and for this purpose Mr. Ives considers the Woodburytype process the most promising. Although the method of Mr. Ives is not, strictly speaking, a solution of the problem how to photograph colours by simple exposure, it aims at the same end, namely the photographic depiction of objects in their natural hues, and it appears to have a great career before it.

An Electric Travelling Crane.

The electric travelling crane shown in our engraving is at work in the harbour quays, Hamburg, where it



AN ELECTRIC TRAVELLING CRANE.

lifts $2\frac{1}{2}$ tons a height of 45 feet at a speed of 200 feet a minute.

and traverses at a speed of 400 feet a minute. Wire rope is employed instead of chain, and toothed wheels are avoided in the winding gear to secure silent motion. An electric motor drives one of three guide-wheels under the turn-table by worm gearing, and causes the crane to travel; while another works the hoisting gear by a worm spindle. Suitable electric brakes are provided to control the motions.

The Brains of Men and Women.

At a recent meeting of the Medical Society of London, Sir James Crichton Browne, F.R.S., expressed his opinion that the difference between the intellects of men and women was real, not seeming, and deeply founded on the structure of the brain. He showed, amongst other matters, that the average female brain is lighter than the average male brain, and would still be so were women as large and heavy as men. Moreover, the specific gravity of the grey substance of the male brain is higher than that of the female, while the specific gravity of the white substance is the same in both. While the total supply of blood to the brain is much the same in men and women (allowing for the comparative poverty of female blood in corpuscles), the distribution of the blood is different, the larger part going to the front of the male brain, and to the back of the female brain. The front is the seat of cognition, volition, and the ideo-motor processes, while the back is mainly concerned in the discharge of sensory functions. These anatomical considerations bear out the conclusions of such great writers as Milton and Thackeray, and, assuming them to be accurate, Sir James Crichton Browne uttered a warning against the present tendency to over-educate women by instructing them like men.

Climate and Sunspots.

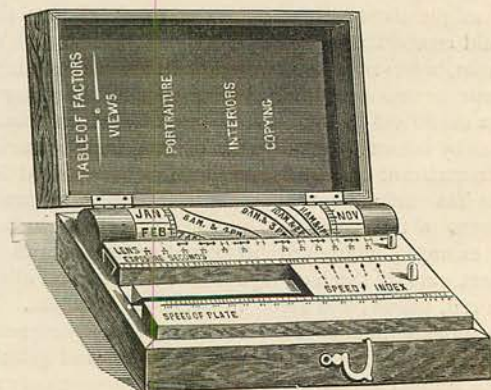
It is believed by many meteorologists that when the number of spots on the sun is at a minimum, which it is every eleven years or thereabout, the general temperature of the earth's atmosphere is higher, and, speaking roundly, the weather is warmer. Dr. Köppen has shown that this relationship holds well

for the tropics, but is not so evident in approaching the poles. Mr. A. B. MacDowal, however, has recently demonstrated by curves of the mean temperature, and solar spots from the year 1812 to 1892, that in spite of our cloudy skies the connection is apparent even at London. Sunspots are supposed to be solar cyclones, and it would appear that when these are scarce the earth receives more sunshine. We may also mention that the Meteorological Council has issued a pamphlet

entitled "Ten years' Sunshine in the British Isles 1881-90," which may be useful to persons in search of health or pleasure. The observations were made at forty-six stations all over the country. For sunny weather the island of Jersey stands at the head of the list, except during the month of November. London, with its damp air and cloudy skies, is very low in the scale. The seaside is sunnier than inland, a remark which many have made for themselves on running out of town for a change. The country is sunnier as a rule than the large manufacturing towns. Ireland as a whole is sunnier than most parts of England in the late autumn, which is the holiday time of a good many. As to months, May is the sunniest and December the gloomiest. June and July are good months, February and April have also a considerable share of sunshine; so has August, except in the north-western parts of Ireland and Scotland. September and October show a falling off in sunshine, nevertheless the month of September, especially the first half, is a good month in many parts of Scotland.

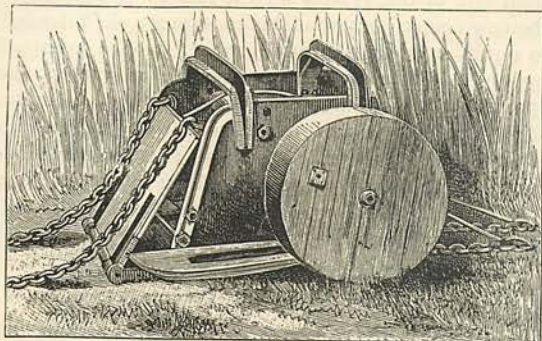
The Actinograph.

The apparatus which we illustrate is designed to calculate the time which a photographic plate should be exposed in the camera. It does not require the use of any exposure tables. All the operator has to do is to turn round the small barrel seen next the hinges of the box, on which are engraved the iso-actinic lines for every hour of the day throughout the year. Scales are



also provided which indicate the apertures of lenses employed, the different intensities of lights, and another is used to agree with the speed of the plate, which is known. The instrument is small and will be useful to the amateur as well as to the professional photographer.

A New Pond-Dredger.



The mud scoop for cleaning ponds and canals which we illustrate was recently tried with success at Froyle Park, Alton, Hampshire. It consists of a box-shaped receiver mounted on hollow wheels allowing the bottom of the machine to slide on the ground. When it has been drawn to the other side of the pond, the end is closed up by means of chains, and in drawing it back again the box acts as a scoop. A hauling engine can be employed, and a ton of mud taken out of the bottom at every journey.

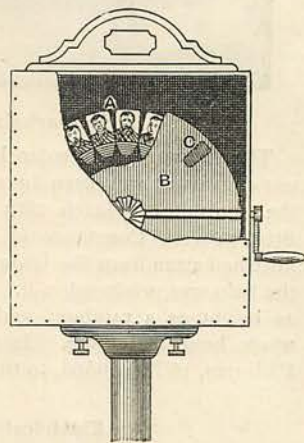
The Railway up Pike's Peak.

The mountain railways up the Rigi, Mount Pilatus, and Vesuvius have now a rival in that recently opened in the Far West, from Manitou to the summit of Pike's Peak in Colorado. This noted prairie landmark was discovered and named by Major Zebulon Pike in 1806, and is 14,336 feet above the level of the sea. Its summit is covered with perpetual snow, and it affords a magnificent prospect of the Rocky Mountain chain on the west, and the illimitable plains on the east. Manitou, which lies among the picturesque foot-hills at its base, is becoming celebrated as a watering place, owing to its nearly perfect climate, the medicinal properties of its mineral springs, and its charming scenery. Manitou was only founded a few years ago, and now it has as many as 125,000 visitors a year. The Peak was first utilised by the War Department as a signal station, and tourists ascending to the station spread the reputation of its scenery. Horse trails were made along the streams. That known as Ruxton Trail, bordering on the beautiful Ruxton Creek, and the most direct and interesting road from Manitou, became the favourite path to the summit, seven miles distant. It is by this route that the new railway passes. The preliminary surveys were begun on April 1st, 1888, by Mr. D. E. Briggs, chief engineer of the Denver and Rio Grande Railroad, when Mr. Richardson, a surveyor, and his assistants were snowed-up in the old Government signal-house for four days, till hunger compelled them to join the main

party, which was only one and a half miles distant. It took them ten and a half hours to accomplish the distance. Grading began on September 28th, 1889, and finished the following year. The track is of the standard gauge, with steel rails, and the locomotive climbs the steep grades by means of six cog-wheels working into two serrated rails laid between the ordinary rails, after the manner of a rack and pinion. The system is that of Abt employed in Switzerland, and is perfectly safe. The line is eight and three quarters miles long, and rises 7,500 feet; the steepest grade having a rise of one foot in every four feet of horizontal distance. Nearly half the line is on curves, the bridges are of iron and masonry, and the steepest parts of the track are securely anchored. There are two coaches to a train, each holding fifty passengers, and the journey is made in less than two hours, including a stoppage at Halfway House; a beautiful retreat in Ruxton Park. Splendid views are to be had, on the way up, more especially that from "Windy Point" beyond the headwaters of Ruxton Creek. From here a distinct view of Manitou, Colorado City, and Colorado Springs, is obtained, together with the "Cathedral Spires," and the "Great Gateway" of the "Garden of the Gods." The summit is of granite, and an hotel has been built there for the convenience of tourists. There is little doubt that Pike's Peak, which is familiar to readers of Ruxton's "Life in the Far West" and other "trappers' books," will henceforth become an objective point for the ubiquitous tourist, and the seeker after health.

The Phonoscope.

In a recent GATHERER we announced that M. Dumeny had succeeded in taking a series of instantaneous photographs of the lips and face of a speaker, and in recombining them by a zoetrope arrangement so as to give a single photographic image which reproduced the original movements of the lips. The figure gives a view of his combining apparatus or phonoscope, with part of the back removed. The transparent positives are arranged in a series round the periphery of a revolving disc, A, which is turned by the handle, and a circular screen, B, having a single aperture or window, C, is also revolved at a much higher velocity from the same spindle by suitable gearing. An eye-piece, not shown, allows the observer to see the photographs through the window, and the velocities of the plates and window are so adjusted as to combine all the images in one while giving it the appearance of animation; an effect due, as is



well known, to the fact that a luminous image lingers on the retina for about a tenth of a second. A deaf-mute accustomed to read what a person is saying by the motion of his lips can do the same thing on looking at the "speaking photograph," and it would seem that we may in future possess albums of photographs which actually smile at us and speak inaudibly. Of course, with the addition of a phonograph the actual sounds might, at the same time, be heard by the observer.



A Remarkable Halo.

The extraordinary solar halo which is depicted in our engraving was seen between seven and eight on the morning of March 28th last, on the road from Steckborn to Constance in Switzerland. A fog or mist had risen from the Untersee on the left hand, and the halo was produced in it. Each arc and circle was as bright as a rainbow, and the effect lasted for a whole hour and more. It was seen by Mr. C. A. Philippin, of Neuchâtel, to the E.S.E of the road.

An Electrical Wedding.

Electricity was made to minister at the shrine of Hymen recently in a way which deserves to be recorded. As soon as the wedding guests sat down, the room was brilliantly lit up by clusters of particoloured glow lamps hid amongst the foliage and other decorations. The advent of the bride and bridegroom was hailed by the ringing of electric bells and the playing of electrical instruments. After the first

course of the wedding feast, the lights were turned half-down and miniature glow-lamps, concealed amongst the flowers on the table, began to shine like glow-worms and fireflies. Translucent vases of the finest glass and porcelain were also lighted up from within. A tiny lamp gleamed in the bride's hair. A toast having been given, two artificial serpents uncoiled from one of the vessels on the table, and confronted the new couple; but what this movement was intended to signify must be left to conjecture. Coffee prepared by an electrical heater was served at table; the speeches were loudly applauded by an automatic *claque* in the shape of an electrical kettledrum placed under the table; and as the company dispersed, the electric current fired off a pyrotechnic display in the garden. It is perhaps needless to add that the wedding took place in Baltimore.

New Memorial Tablets.

The comparatively high price of marble, granite, and other stone memorials of the dead, for graves, and the perishable nature of wood, has led to the introduction of a cement head-stone. The piece is moulded of the desired pattern and with the names in relief or intaglio. Slots are also left for the insertion of other names at a future time, the slots being temporarily filled up. The tablet is only about one-fourth the price of a stone one, and it is estimated to last for a century at least.

A Land-link with America.

The ancient tradition of a lost continent of Atlantis in the western ocean may have some foundation in fact after all, and America, as has been thought, is perhaps the missing region. At a recent meeting of the French Academy of Sciences, M. Emile Blanchard read a paper setting forth a remarkable array of facts tending to prove that within our own geological period Labrador was connected to Europe by a tongue or link of land running from Scotland through the Orkney and Faroe Islands to Iceland and Greenland. Many years ago the same idea occurred to Sir John Richardson, and Professor E. Forbes, the naturalist. The sea over this tract is comparatively shallow, and the islands in question are, he thinks, vestiges of the submerged land. The most convincing evidence for his theory is found in the fact that European animals and plants exist in America along with species which are peculiar to the western continent. Anemones, violets, roses, even orchises and lilies are common to both; certain beetles, spiders, and other "creeping things" of slow gait are also to be found on either side of the Atlantic; the reindeer of Lapland is plentiful in Hudson Bay; the beaver is a native of the two continents, and so is the river perch, which never leaves fresh water. Perhaps the most striking proof, however, is the fact, not cited by M. Blanchard and but recently made out, that while the flora of West Greenland is peculiarly American, that of East Greenland is European. This revived theory may help to explain that crux of anthropology, the origin of the American-Indian races.

Indigo Green.

Herr V. H. Soxhlet, a German chemist, has discovered a fine green dye by treating indigo-carmine with liquid ammonia. One part of carmine to five parts of ammonia gives a beautiful shade, after the mixture has stood some time. The green solution mixed with dilute sulphuric acid till it has a slight acid reaction is used for dyeing wool, and the colour is quite fast. The discoverer is preparing to manufacture the new dye on a large scale.

"In Rosby Village."

We have received from Messrs. Oliphant, Anderson, & Ferrier, a copy of this short but very readable story by one of our prize-winners, "Mary Hampden," the author of "The Heiress of Aberstone." It is a story of a coast village, and has a measure of adventure in its composition which gives it great interest.

Object Lessons in Science.

We have spoken before of the "Elementary Science Lessons" which have been prepared by Mr. W. Hewitt,


B.Sc., for Messrs. Longmans. In the form of practical object lessons with simple and easily-managed experiments, Mr. Hewitt manages to teach some of the elementary facts of the physical world with great lucidity, and in a manner well calculated to fix the matter upon the minds of scholars. We have now before us the volume in this series for the Fourth Standard, in which are given thirty-six eminently practical and very varied lessons.

"Heroes of Britain."

Messrs. Cassell have just completed the issue in two volumes of a new edition of their "Heroes of Britain in Peace and War," which is now published at a price which brings it within the reach of almost every household. As the title implies, the heroes are not only those of the battle-field, but also those whose laurels were won in the fields of philanthropy, discovery, and industry. The two volumes are full of illustrations, and would form a handsome present, particularly for any boy.

NEW STORY COMPETITION.

OPEN TO ALL READERS OF "CASSELL'S MAGAZINE."

 All the Competitions which have been opened in connection with this Magazine, the most generally popular have been the Story Competitions, which have been instrumental in bringing forward many writers formerly unknown to the MAGAZINE. The Editor has, therefore, pleasure in offering three Prizes of £50, £40, and £30 respectively for the First-, Second-, and Third-best stories of domestic interest, bright in style, original in plot, and adapted for family reading, and for serial use in this Magazine. Each story must be divided into six parts of not less than 7,500, or more than 9,000, words each. Every manuscript must be accompanied by a short outline (about 500 words in length) of its plot, and also by a plan showing how that plot is developed in each of the six parts of the story. All manuscripts must comply with the general regulations given below, and be in our hands not later than December 1st, 1892.

The following are the GENERAL REGULATIONS under which these Prizes are offered :—

1. Every reader of the Magazine (not being an ordinary contributor to its pages, or the winner of the first prize in a former story competition, in connection with this Magazine) is eligible to enter the competition.
2. The Editor cannot undertake to answer inquiries having reference to the treatment of manuscripts in detail. *The particulars given are sufficient for the purposes of the competition, and everything else is left to the judgment and discretion of the competitors.*
3. All communications regarding MSS. entered for the above competition must be sent in the same packets with the MSS. No previous or subsequent communications (except under Rule 7) can receive any consideration. The award of the judges will be published in the Magazine as soon after the close of the competition as possible, and no information respecting the award will be given to any competitor before this publication.
4. Each MS. must have inscribed on it, or otherwise securely attached to it, the name and postal address of the author, together with a declaration *that the work is original and entirely the sender's own*, to be signed by the author and countersigned by some other trustworthy person—*i.e.*, a magistrate, minister of religion, or householder—with the postal address in both cases.
5. The copyright of the prize work, or works, will become the property of the proprietors of this Magazine.
6. Should two MSS. be, in the opinion of the judges, of equal merit, any prizes may be divided between their authors at the discretion of the Editor. Any, or all, of the prizes may be withheld in the event of no MSS. being thought by the judges to be worthy of distinction.
7. All packets containing MSS. should be prepaid. The Editor will not be liable for loss or miscarriage of any work. Unsuccessful competitors may have their MSS. returned to them at their own risk, upon application to the Editor, *after the publication of the award*. Any such application must be made without delay and be accompanied by stamps to defray the cost of carriage. (Competitors should *not* send stamps, or instructions for return, *with their MSS.*, as no notice can be taken of any communications of this nature, made before the award is published.)
8. All MSS. must reach the Editor on or before December 1st, 1892, and should be addressed—The Editor of CASSELL'S MAGAZINE, La Belle Sauvage, London, E.C. Each packet should bear on the top left-hand corner of the envelope or wrapper in which it is enclosed the words, "Six-Part Story Competition."