

THE LARGEST TELESCOPE

BUILT IN ENGLAND AND PURCHASED BY HARVARD UNIVERSITY.

Took Two Years to Put in Place—Has Measured Four Thousands Stars.

The biggest telescope in the world is the Common telescope, 5 feet full in diameter and 20 inches wider than the lenses. It was constructed about ten years ago by Dr. A. A. Common, a well-known astronomer of England, who wanted it for research work that he was doing. He died soon afterward and his fine telescope became idle. Two years ago it was purchased by the Harvard College Observatory, which proceeded at once to mount it on the observatory grounds at Cambridge, Mass. The first sod was turned Sept. 28, 1904. Since then the work has gone on steadily, but it has been necessarily rather slow, for mounting a great telescope is not like building a house. Moreover, this telescope has a very unusual kind of mounting. Most large telescopes are supported by a metal or foundation pier of cast-iron, cement or masonry firmly built upon the ground, but this telescope is held in position by a big hollow cylinder that floats in a tank of water.

In the first place a deep excavation was made on the spot where the telescope was to stand and a tank was constructed with thick walls of concrete 15 feet deep at the farther end, and 21 feet long, the bottom of which slopes upward from the deep end at an angle of about 45 degrees to the surface of the ground.

In this tank the water-tight steel float or cylinder, which is 18 feet long and 7 feet 8 inches in diameter, is built and lasts at the same angle as the bottom of the tank, the buoyancy of the water supporting its weight, and delicate pivots at each end serving to steady it in position. Above this, and securely fastened to it by a strong iron fork and bolts, is the great tube of the telescope.

The tube is not circular, as one might suppose, but rectangular. Nor has it solid walls. The upper part of it is a kind of skeleton, constructed of angle iron, which is now covered with canvas, and has a side measurement six feet square. The lower end, which supports the mirror and is bolted to the float, is made of steel plate.

The whole structure weighs a number of thousands of tons, but it is so delicately poised that it appears to have no weight at all. So strong are the bolts and pivots that it can be moved in any direction, up, down, or sideways, without the least disturbance. The telescope is in most observatories are handled by clockwork that runs by a system of weights, but the Common telescope is to be controlled entirely by electricity.

Not a bit of machinery is to be seen, says the Boston Herald. The motors are far away in the power house. In the observing room, at the top of the telescope, there is a switchboard on which are a number of small switches and "clutches" that are connected by wires with the telescope outside, and which receive the electric current by other wires from the main power house at the top of the hillside. The switchboard also has little dials on it that tell always just where the telescope is pointing, so that it is not at all necessary "to look out to see."

The observing room is in a small building built for the purpose. It is a comfortable room on the second floor, with a desk for the observer, and another nearby with the switchboard for the recorder, as the man is called who more than 200 feet above the telescope while the observer is at work.

People are apt to think of an astronomer as perched on a ladder high in the air, winter night, yet gazing up eagerly through a telescope tube, with hardly more in response to his number of fingers. Here, while sitting comfortably in a warm room, merely looking down an ordinary appearing little tube, the observer may see all the wonders of the sky pass before him, and with the aid of the telescope, without a single effort beyond the touch of a button or the moving of a switch, turn the great instrument outside here or there, to reach any part of the starry sphere from horizon to horizon as the observer wishes.

It may sound rather odd to speak of looking down a tube at a star. This requires some explanation. There are kinds of telescopes, reflecting and refracting. The reflecting telescope has a mirror of glass covered with a thin coat of silver, and shows the star in the same way as the mirror over your dressing-table shows your image after the room behind you, by throwing back the light that falls upon it. The refracting telescope has a lens made of two or more disks of clear glass that are set in the tube at the upper end, and through them the light rays from the star pass down the tube to the eye of the observer just as though he were looking through a big magnifying glass.

The Common telescope is a reflector, and its great mirror, five feet in diameter, is placed at the lower end of the tube, so that the light from any star that is to be examined reaches it by passing down the length of the tube. Then other smaller mirrors placed along the tube above reflect this light back again up the tube to the "eyepiece," or smaller tube which passes through the wall of the observing room to the observer. The end of this telescope through which the observer looks is closed by a powerful magnifying lens,

so that the image of the star, which appears as a very small point on the mirror, is a little enlarged.

The great telescope is intended chiefly for photo-metric work, that is, measuring the light of the stars. Professor Edward C. Pickering, who is the director of Harvard College Observatory, has spent a good many years in this work, and he intends to devote the rest of his life to it. Of course, he has many other duties, but this photo-metric work is his personal work, and he spends three or four hours each clear night at it. He has already measured more than 4,000 stars, and has made about 100,000 measures of them. These include only the brighter stars, for the observatory has never before owned a large telescope that could be used in this work, so that Professor Pickering has had to use small instruments. Now, however, he will be able to measure less bright ones, for the Common telescope is so large that it will show much fainter stars than can be seen by any other telescope.

SKYSCRAPERS OF OLDEN DAYS

ROME HAD THEM TWO HUNDRED AND SIXTY FEET HIGH.

Flats Invented in the Ancient City, Which Also Had Apartment Houses.

"How an old Roman would laugh if he should suddenly pop in here and hear us talk about the apartment house as a product of modern civilization," said the scholarly appearing man with glasses as he squinted at a very ornate apartment building which was in process of erection.

"Get up to date," he would probably say. "Why, we had apartment houses as early as 455 B. C., and big ones, too; some of them sixty to seventy feet high. Why don't you think of something new?"

Those apartment houses were called insula (islands), and a very appropriate name it was, considering that they housed a floating population. The tenants had their troubles, too, just as they have today, for many of the insulae were poorly built, and there were probably leaks about the poor wooden roof, the faulty ventilation, clumsy stairways and the thinness of the partitions.

"Yes, and there were the janitors, too, for the nobles who owned such real estate employed agents, called insulari, to care for these buildings, and look after the collection of the rents. Rents were very high, and thrifty souls would hire a whole apartment and sublet rooms, just as a thrifty New York woman must earn her own living these days.

"There was the same hue and cry then about the height of the buildings, and in the time of Augustus there was a law restricting the height of dwelling houses to seventy feet, but this law was evaded with all the ingenuity of the twentieth century. The offenders went unpunished, for there were in Rome at the time of Augustus more than ten million—which was crowding the city some—of course the natural tendency was to build up rather than out.

"As for skyscrapers. Well, those old Romans knew something about them. The pediment of the Temple of the Sun rose about 260 feet above the Campus Martius, in which it was situated. The palace of Septimius Severus rose to the height of more than 225 feet above the arena of the Circus Maximus.

"Another thing that would make an old Roman bowl with delight is the enthusiasm with which we call attention to the glorious future in store for concrete. We point out that houses of concrete are to be built of it, that roads are to be paved with it, that it is to enter widely into manufacturing processes, that it has properties of endurance never before dreamed of in a building material.

"The future of concrete? My dear fellow, don't you know that concrete has a glorious past, and that it was the agent that made Rome an eternal city? Don't you know that although all the rest of Rome decayed and crumbled away, yet its wonderful concrete structures remain today as on high foundations of this cement, called podiums. The podium consisted of four stone walls, forming a box, into which the concrete was poured even with the top. These podiums you will never see in Rome, but nothing but ruins remain of the magnificent structures which were set on them.

The scholarly looking man settled his spectacles a little more comfortably on his nose.

"There is nothing which will so take the wind out of the sails of our boastful up-to-dateness as a little contemplation of ancient Rome," he said as he dodged into his own insula.—New York Sun.

ENGLAND'S GREAT CARTOONIST

THE KNIGHTING OF FRANCIS CARRUTHERS GOULD.

Is a Great Political Force in the Old Land—His Methods and Aims.

Lord Rosebery once described Francis Carruthers Gould, the famous cartoonist of the Westminster Gazette, as "one of the most remarkable assets of the Liberal party." His cartoons figured in thousands on the boards at the general election, and there can be no doubt that his clever skills won more votes for his party than were gained by the speeches of the most brilliant of its orators. It was therefore eminently fitting that he should get something when the King's birthday honors were distributed. Most of the recipients of these dignities, it is well known, are chosen by the prime minister. Sir Henry Campbell-Bannerman would have played the part of a rank ingrate had he failed to include among his nominees for titles the genial, stout, white bearded little man who has done so much to place him on the top perch among the seats of the mighty.

Sir Francis, as he will be called hereafter, now that he has been knighted and kissed the King's hand, has for years been acknowledged to be the most influential of English cartoonists—the man whose pictorial satire accomplishes most in the way of molding public opinion. He has shaped policies and shaken governments.

To do Sir Francis justice, he is well aware of his own limitations. With fine manliness and modesty, he has said: "I do not profess to be a good draughtsman, and I am painfully conscious of hardness and crudeness, but my leading motive is to get a grip of the life I wish to convey and to give the life expression of a face. I am consoled for my shortcomings as an artist by the feeling that sometimes good academic drawings take the real life out of a thing. For caricature is not a mere matter of careful drawing; it is more of a faculty of appreciation. This faculty enables one to seize in the memory the lines which make up and give the life expression to a face, and to put subjects before the public in a form which may be crude, but which bears the impression of reality. Caricatures are not made. Like fogs, they grow, and like some larvae, they eat their way out through the husks of their surroundings."

As regards technique, Sir Francis is not to be mentioned in the same breath with Sir John Tenniel. But working for Punch, Tenniel is never required to make out a cartoon every day. Sir Francis is far more prolific. He excels in the lightning rapidity with which he sizes up a situation and the directness and simplicity of his appeal. He always makes his point clear. "The object of a cartoon," he has written, "is to show at a glance, in the simplest and most concrete form possible, a critical view of a situation. If the picture be an elaborate and complicated one, it becomes a puzzle instead of an illustration. The great essential is that it should appeal swiftly and unmistakably to the eye. To aid this, there must be no excuse for hesitation as to the identity of the person used; the meaning of the cartoon must be patent almost instantaneously.

"As for his effect is just." Sir Francis was born 62 years ago at Barnstaple, in Devon, the town which recently placed his name on its civic roll as the first of its freemen—a graceful recognition of the ancient saying: "The prophet that is not without honor save in his own country." The son of an architect of great talent, to whom Barnstaple owes some of its finest buildings, he was from his earliest years "always in the midst of paper and pencil, and he has a great liking for the art of drawing." But he did not take to architecture after the parental example. It has been said that he used to make comic sketches of his nurse as he lay awake in his cradle, but while that is a quaint exaggeration he pieced out his education by a candidate at a local election when only 19 years old, and it was published.

Still the boy's gifts with the pencil did not make so much of an impression on his father as to lead him to give his son an art training. That he never had, long before he began to draw ministers of state and politicians he had put his nose to the grindstone at less engaging work. At 16 years of age he went into a bank. "There," he says, "I amused myself by caricaturing the customers as well as the different executives in the town." One would like to see some of the covers of the Barnstaple bank books of those days. They might bear no remote resemblance to that of the artist, but they would certainly be a Latin grammar which page reproduced in the "Roundabout Papers." But after four years at a bank the days of caricaturing in Barnstaple came to an end. They had been occasionally eventful. The town jester highly resented the irreverent manner in which he was being treated by the young artist whose caricatures of themselves are now treasured by cabinet ministers. Sir Francis appears to have used him as a species of zoological freak. "I turned him into animals of all kinds," he says, "much to his exasperation." In the long run the persecuted jester went to the mayor and complained.

"Oh," said the mayor, "he is only a youngster. You mustn't take any notice of him."

"That ain't the worst," said the jester. "He's been a—'sketching' you."

The jester and the mayor, too, doubtless rejoiced when young Gould betook himself to London to continue his exercise in caricature in a stockbroker's office, and likewise to learn the art and mystery of dealing in stocks. Then the young artist began to "sketch" the "animals of all kinds," as he continues to do to this day, for he is a naturalist and especially a bird lover. He knows the field and the farmyard, the zoo and all its captives, and forest and all its wild creatures. For twenty years the anxious business of the stock exchange was the main concern of the prolific artist, but while thinking in thousands, there was always one corner of his brain bent on sketching. So busy was his facile pen in oft moments during this period that a book of his sketches was published for private circulation.



RED ROSE TEA

"IS GOOD TEA" Always Good

It was Labouchere who gave Sir Francis his first introduction to the realm of illustrated journalism by publishing a series of his sketches in the Christmas number of Truth. The Pall Mall Gazette next sought his services. Mr. Stead was then its editor. "In those days," he says, "Mr. Gould used to come to the office for instructions once a week. Editor, proprietor and staff would club their brains in order to suggest ideas to Mr. Gould, who, being essentially a modest man, was always ready to abandon his own notions and adopt those of his editorial chief. He was a jewel of an artist. Whatever defects he might have had in the technique of his drawings were more than compensated for in his loyalty to the ideas of his chief, and in his unswerving conviction that in political cartoons the idea is everything. Too many people who use pencils seem to imagine that their pictures are published for the purpose of displaying their artistic talent in the show window of the world. Mr. Gould knew better. We wanted his pencil to explain, to emphasize, to accentuate political ideas. He accepted the position frankly and has stuck to it ever since."

When William Waldorf Astor, the ex-magnate American millionaire, bought the Pall Mall Gazette and transformed it into an out and out Tory organ, the cartoonist declined to devote his nimble pencil to the aristocracy, and because like some larvae, they eat their way out through the husks of their surroundings."

What design the new knight may claim as his armorial bearing is yet unknown, but beyond doubt his trademark—or perhaps one should say his professional mark—is the face of Joseph Chamberlain, with his features accentuated to the boldest degree. There is no other public character whom he has anything like so frequently caricatured. Years ago he fixed on the chamberlain as the central figure of English politics. He has turned him into a whole menagerie of animals. At the time of the home rule split, when Joe set the whole town laughing by a drawing of the statesman as a recalcitrant goat on a railroad platform, sending a question beneath it, "Where did he come from? Where's he going to?" To which the puzzled porter replied, "I dunno! He's swallowed his ticket."

In explaining once why he so frequently portrayed Mr. Chamberlain in his cartoons, Sir Francis said: "It is because he has been for years a foremost figure in politics, a man with strong characteristics rendered picturesque by Protean changes. Not only has it been impossible to ignore him as a political type, but everything about him lends itself to the pen or pencil. He has been a caricature of a caricature. I do not mind confessing that if Mr. Chamberlain's face were difficult to draw, if his likeness were elusive, I might not draw on him quite so much as I do, but when the hour and the man are so constantly presenting themselves, the cartoonist would be flying in the face of Providence if he forbore to take advantage of his opportunities. It is a face that a cartoonist is naturally prone to, because he can use it in many different ways. It works admirably for the character of the mad hatter, or the fox. It does for a red Indian, a tiger, a poster girl, or a young lady of uncertain age. In fact, there is no limit to its possibilities. There is one character in which I occasionally depict Mr. Chamberlain, which, I am told, is sometimes objected to. It is when I let the dog loose. But then I only let him loose occasionally, and when I do this, it is off and a 'raging tearing' excursion is on, I feel it to be a solemn political duty to warn the public so that they may escape and avoid being bitten. It is not malice; it is merely a precaution."

It is a pleasant trait of political fighting in England that there is seldom any aftermath of bitterness. On the continent—in France, for instance—Chamberlain and Sir Francis would have been deadly enemies and probably would have fought a duel long ere this. But when Sir Francis puts up his original drawings for sale, Mr. Chamberlain generally buys those in which he is the conspicuous figure. In Mr. Chamberlain's house at Highbury there is a study plastered with the caricatures of the owner who gladly welcomes the caricaturist to dinner and criticism.

One reason for the popularity of Sir Francis even among those with whose "phizzes" he takes the greatest liberties is that he always fights fair. He never hits below the belt. "Personally, I am in political cartoons," he says, "ought not to be and need not be offensively personal. I etch with vinegar, not with vitriol."

Sir Francis is a cartoonist with a purpose. There is real conviction behind his work, as well as an unusually quick perception and an ever present sense of humor. He says himself: "Political caricature, when taken up seriously and earnestly, is pleasant, but it is hard work and not play. The more laborious, the more difficult part is the knowing what to draw. For this the cartoonist must qualify himself, and to do this he needs political knowledge, a power of concentration and constant application. Without a fair equipment of the first qualification he will often either miss or mess his points, and the more interested and earnest he is in the political questions of the day the more telling will be the morals he wants to convey."

IF THE SUN WERE BLUE. It is amazing to consider the possible results if our sun were green, blue or red, instead of what it is. If it were blue there would be but two colors in the world—blue and black. If it were red, there would be red and black. If it were yellow, everything would be yellow or black. The light of our sun, of course, consists of several colors, and

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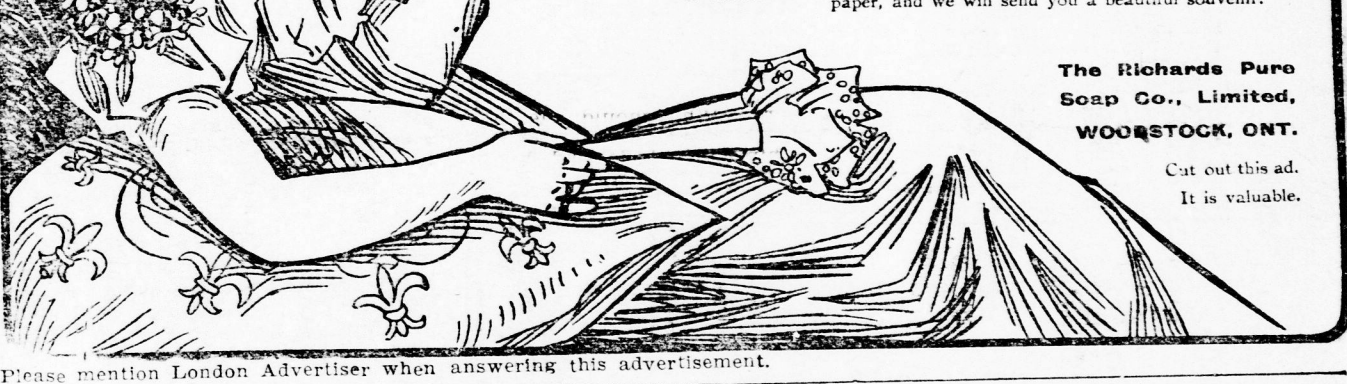
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