

New and Interesting Facts from Science and Life

SAVING the DAYLIGHT

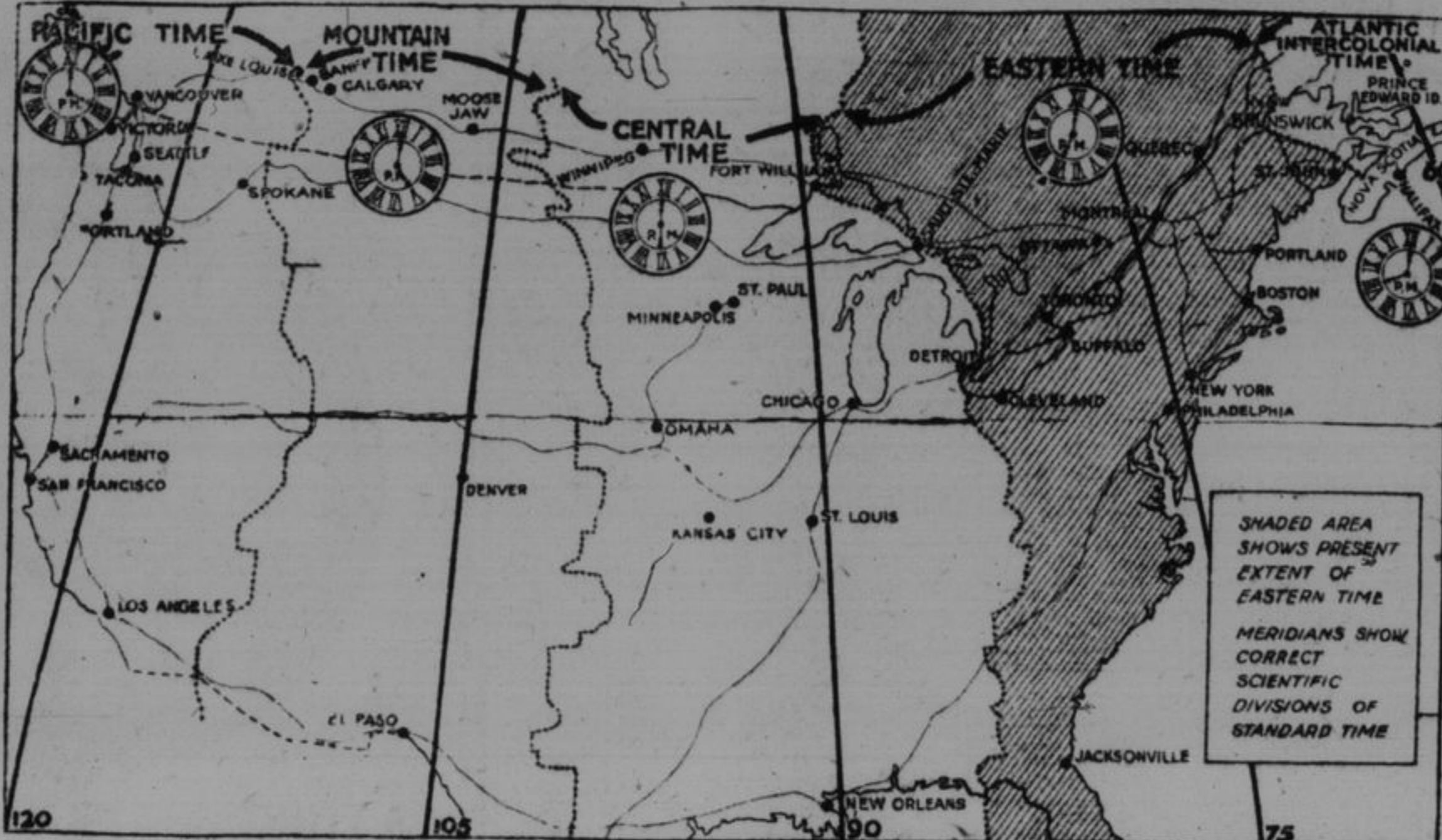
By Miles Murray

BORN of the war, the question of daylight saving is still the subject of more or less heated debate in which business men, city councils, farmers with cows to milk, mothers with children of school age to look after, and last but not least, railroads with time-tables to print and trains to run to the minute, demand to have their say. The advocates for daylight saving point out that in England the economy in coal consumption affected by daylight saving during the summer months amounted to \$2,500,000, whereas the dairy farmers of the middle West protest that the morning dew and the natural milking time for cows cannot be regulated by clock, while in the Northwest, where the summer sun shines 18 or 20 hours a day, the mother of seven children wishes to goodness that the darkness and the hour for bedtime came as soon and lasted twice as long. What she wants is a darkness saving law.

As the accompanying map shows, "sun" time as measured on meridians does not accurately conform with the arbitrary time divisions established in the United States. Astronomers years ago discovered that the sun travels 15 degrees longitude in one hour and, therefore, the time changes in America should be marked along the 60th, 75th, 90th, 105th and 120th meridians instead of along the arbitrary division indicated on the map by broken lines.

"Standard" time has been carried too far east of the 75th degree and now covers Quebec, New England and part of New York state, including New York City, all of which naturally belong to the "Atlantic" time zone, which is one hour earlier than "Eastern" time. In these places,

WHY the FIVE ZONES of TIME Should Be INDICATED by MERIDIANS



from May to September, the sun rises from two to three hours before the average person is up, hence the natural demand for daylight saving. If New England, part of New York state east of the 75th degree, Quebec and the Maritime Provinces of Canada were to adopt "Atlantic" standard time, which is their natural specific time, they would save hundreds of thousands of dollars the year round for fuel and lights, and the agitation for daylight saving would come to an end.

For example, when it is 8 A. M. at New York and Montreal by "Atlantic" time (instead of 7 by "Eastern" time as at present), it would still be 7 by "Eastern" time in Ottawa, Washington, Buffalo, Cleveland and other places now governed by "Eastern" time, while all cities covered by "Central," "Mountain" and "Pacific" time

would be 6, 5 and 4 A. M. respectively, just as at present.

The demand for daylight saving, however, is almost insistent in eastern Canada and the eastern states, and for every insistent demand there is usually a real reason. The reason apparently is that the so-called standard time in force in the area in question varies considerably from the mean sun time upon which the actual length and intensity of daylight is based. Standard time is a convenient artifice established in order to secure uniform time for neighboring communities or places. The sun is traveling from east to west and the noon hour originally traveled with it, but it was found advisable to fix definite areas in which the noon hour and other hours should remain the same for the convenience of the operation of railroads and telegraphs and the transaction of business wherein contracts involved definite time limits.

Such standard time was adopted for the United States in 1883 on the initiative of the American Railway Association, and as the time of the civilized world is by general consent based on Greenwich, England, the meridians selected for the division of the various standards were fixed at the 90th, 75th, 90th, 105th and 120th degrees west of Greenwich. Atlantic standard time theoretically extended from the 60th to the 75th meridian and Eastern standard time from the 75th to the 90th meridian; Central standard time from the 90th to 105th; Mountain standard time from the 105th to 120th, west of which was Pacific standard time. These times were adopted by law in a number of the individual states, but

municipalities have not all followed suit as public sentiment and habits have proved more potent factors in fixing the time standards for time for the municipalities than have state statutes.

Prince Edward Island and Nova Scotia, on the eastern boundary of Atlantic time zone, have used their own standards for time for the municipalities than have state statutes. Now it is noticeable that the demand for adoption of daylight saving time by the larger towns and cities is almost exclusively confined to eastern Canada, New England states and the city of New York. On examination this appears to be due to the fact that Eastern standard time, which theoretically extends only between the 75th and 90th meridians, has been carried in actual practice a very considerable distance east of the 75th degree. According to this meridian all places in the Province of Quebec, all New England, New York City and part of New York state in the Atlantic should belong to the Atlantic time zone. If this time were reinstated there would be little or no call for daylight saving now. The railroads have carried Eastern time too far East, and the states, provinces and municipalities which have adopted the same time for the sake of uniformity are realizing that this does not correspond with natural time. On the railways, Eastern standard time is carried from Gaspe in eastern Quebec to Fort William in Ontario, a distance of 25 degrees, or 1500 miles instead of the 71.70 miles of 15 degrees.

On Eastern standard time, as at present maintained in New England and Quebec, the sun rises from May to September two to three hours before the average person is about in the morning and sets at an equally unworkable hour. Hence the natural demand for daylight saving legislation in these parts. If New England, Quebec and the Maritime Provinces were to adopt Atlantic standard, which is their natural specific time, they would gain all the advantages claimed for daylight saving, thus incidentally solving the problem.

The situation was complicated, particularly in the eastern states and eastern Canada, by the railroads themselves, where in actual practice it was found necessary to fix the time-breaking zones at terminals or division points. As branch lines have been constructed, the carriers have extended on these the standard time observed at the junction point or upon the main line. There are instances where the branch lines radiate out of one zone into another, thus introducing a time at variance with the theoretical time of that zone. The contention of the railroads is that time should be changed only at the points at the termini of train dispatching districts when train crews are relieved. They claim it is hazardous to require train crews to change from one standard operating time to another during a trick of duty, and impracticable to have train dispatchers operate trains under two standards of time.

Conflict between the states which have adopted Eastern standard time based strictly upon the 75th to 90th meridians and the railways which have found this to be not sufficiently elastic, has naturally resulted, as for instance in the state of Vermont, where a bill has been introduced into the House of Representatives in which one section reads:

"A common carrier engaged in commerce within this state or between this state and any other state or territory shall not change its time schedules for the movement of trains within the state in order to accommodate itself to conditions outside the state arising by reason of the adoption of any other standard of time by any other state."

Why Your Teeth Chatter

THE little muscles which close the jaw are acted upon by the cold in such a way that they pull the jaw up and then let it fall by its own weight. This, repeated many times, causes the teeth to click together and produce what is called "chattering."

You think of it in connection with your teeth because it is the teeth which makes the sound, but the cause lies in the muscles used in chewing or in opening your mouth when you speak. The chattering occurs in the spine of the will or brain. You have little control over it, and can stop it only by clenching the teeth. It is really a mild variety of spasm caused by the cold, which acts on the jaw muscles in much the same way that some poisons produce muscular spasm which cannot be controlled.

Water CURTAIN to Protect FIREMEN

AMONG the most recent devices to protect the lives of firemen is that of a water curtain by means of which it is claimed that it is possible for a man to walk right into the hottest fire with flames playing all around him, without in the least endangering his life. The accompanying illustration perhaps shows the idea better than words.

As described in Science and Invention by J. R. Schmidt it is simply a curtain of water which sprays the fireproof uniform with a continuous



The Latest Fireman's Suit Sprays a Sheet of Water Down Between the Inner and Outer Coverings, as Well as Providing an Outer Water Curtain Which is Supplied from the Main Fire Hose.

stream of water, enshrouding the fireman entirely with it. The water being transparent, he can see far enough ahead providing the flames do not cut off the view. He can then do all sorts of rescue work. For instance, hold a child closely to his breast, while the protecting water curtain not only protects him but the child as well.

The fireman can stand right in the midst of flames and will not get burned. He need not fear the glowing embers around his feet. He can walk right into the fiercest fire and it will dwindle away and go out around him.

As for the uniform, it is made of fireproof canvas of two thicknesses, between which water flows constantly. The water enters by means of

a perforated brass tube which encircles the neck between the two thicknesses of canvas and flows down between the layers through the arms and legs, finding exit at the finger tips and around the soles of the feet.

Water flowing only between the two thicknesses of canvas would not offer complete protection to the wearer, so, to keep him cool and comfortable while standing in the hottest fire, the brass perforated circular tubes encircle the helmet and give him a constant shower bath from the outside as well as within the folds of the uniform. This not only keeps him from becoming overheated but also acts to extinguish the fire around him.

Encased in this air-tight water-bathed uniform, some provisions must be made to get fresh air to the fireman. He need not fear his air supply giving out as long as water continues flowing through the hose he is holding. The air supply comes from the atmosphere surrounding him no matter how much smoke, flame or gas is contained in it. It is sucked into a patented collar which fits on to the hose just back of the nozzle. In the mechanism of the collar the contaminated air is washed and made pure and sent by the pressure of the water flowing through the hose up into the helmet for the fireman to breathe. The foul air or gases find their exit through vents in the helmet.

The same collar which washes and purifies the air for the fireman to breathe also has the water hose connection which supplies the water curtain. With this uniform a fireman stood in the flames of a burning wood fire for 10 minutes without becoming uncomfortable. Although the fire was kept burning fiercely all around him he came out with a grin on his face and not even perspiring!

The water which flows to the helmet is secured from a bypass which is attached to the main water hose.

How to MAKE the AIRPLANE SAFE

THE modern airplane, in fact, will soon be made so safe that the ordinary civilian will think no more of taking a flying journey than he would of going for a trip on a scenic railway at a summer amusement park.

One of the greatest things the average man who knows little about airplanes is scared about is the machine catching fire in the air. A new fireproof gasoline tank has been invented, which completely does away with this danger. So safe is this tank, in fact, that incendiary bullets can be fired right through it without any danger of it catching fire.

The secret of the tank lies in its patent internal construction, and a special form of india rubber covering which automatically closes up any hole which may have been caused by accident. "Something may break in the air, however," says the timid civilian. Well, the modern airplane is provided for even against that. The reason for this is that all the chief parts of an

airplane are either duplicated, so that if one member breaks there is another to take its place, or they are made five or six times stronger than necessary for ordinary flying, and the chances of them breaking are practically negligible.

Some violent forms of stunting will break any airplane ever made, but pilots are expressly warned against these stunts.

But supposing after all the airplane did break in the air? Well, then, the modern form of parachute will save the passenger from being dashed to pieces, unless the accident takes place very close to the ground.

More accidents take place due to bad landing, so that the undercarriage is smashed and the machine turned over, than from any other cause. The war airplanes had to be fitted with as light a landing carriage as possible, so as to save weight, but weight is not so important in the ordinary passenger machine. There are several kinds of landing carriages in existence now which will be fitted to machines and enable them to land safely under conditions where they would have been bound to crash before.

If an airplane is one which travels regularly along the sea coast and may accidentally find itself forced to land at sea, it will be fitted with a special bulb enabling it to float for a long time, and it will, like all other aircraft, be fitted with wireless, so it can call for help.

The worst enemy of an airplane is a fog, and landing in a fog is dangerous because the pilot doesn't know his height from the ground, and may hit it suddenly.

An ingenious device is now being experimented with which will do away with a great deal of this danger. It consists of a small bulb attached to a wire hanging from the airplane. When the bulb touches the ground an electric connection immediately switches on a small light in front of the pilot, who knows then that he is within so many feet of the ground, and can act accordingly and so save his machine from disaster.

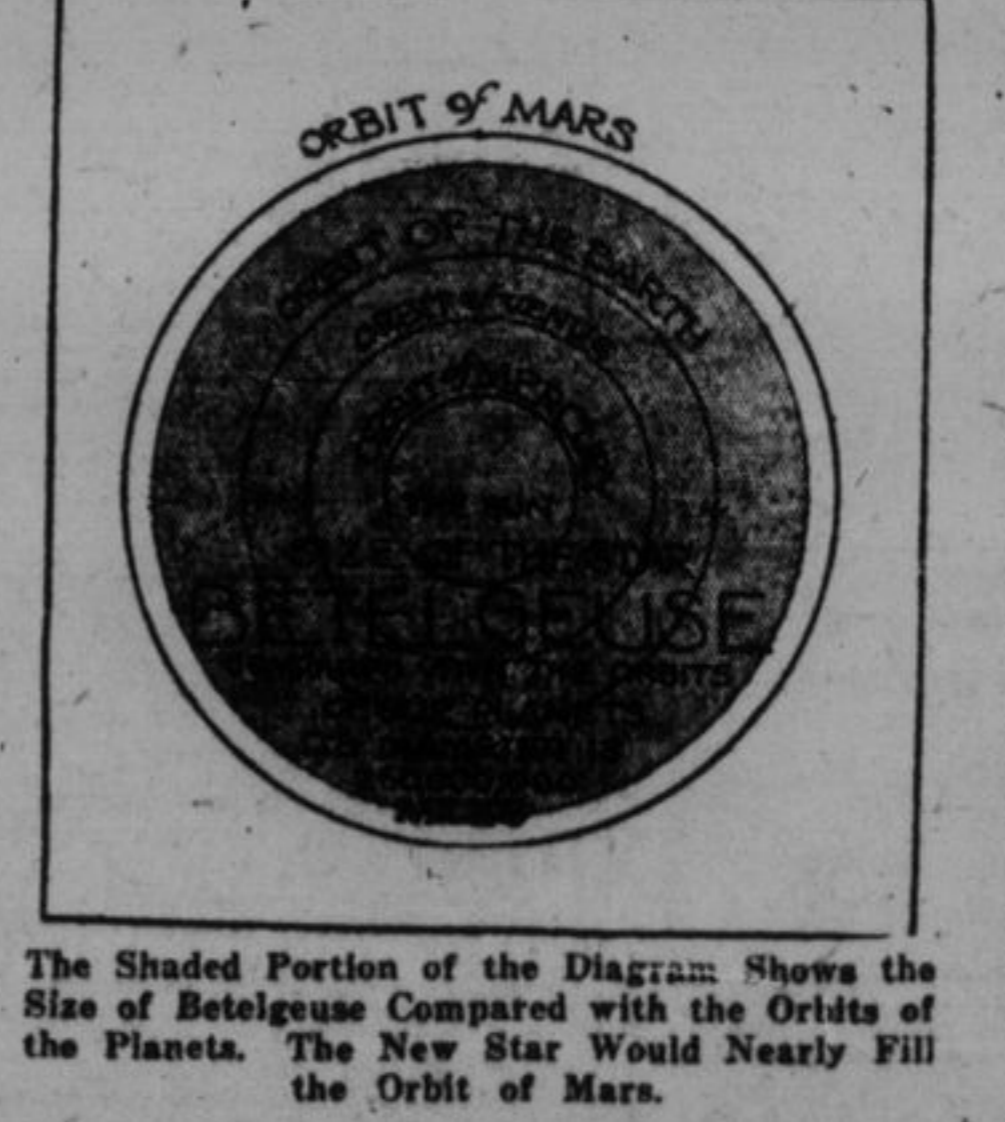
Is This NEW PLANET the GREATEST of All WORLDS?

THERE is a new giant in the heavens and his recent discovery, due to the invention by Prof. Albert A. Michelson, Chicago University, of a new method of measuring the size of stars, is hailed as among the greatest astronomical achievements.

The name of this giant is Betelgeuse. He is located in the constellation of Orion and his size is beyond human comprehension, for he is 40,000,000 times as large as the sun and 150 light years distant from the earth. In other words, if we were to place about 350 suns side by side, we would then have a star of the diameter of this new giant, Betelgeuse.

"Figures of this kind, while tremendous,

mean nothing to our imagination, because our microscopic minds simply fail to grasp them," writes H. Gernsback, editor of Science and In-



The Shaded Portion of the Diagram Shows the Size of Betelgeuse Compared with the Orbits of the Planets. The New Star Would Nearly Fill the Orbit of Mars.

vention, who gives a few illustrations which will make the enormous size of Betelgeuse more apparent. "A man on the earth, let us say, weighs 150

pounds. Transported to the sun the same man would weigh 4146 pounds, or over two tons. This is due to the greater gravitational attraction, just as on the moon the same man would weigh less than 25 pounds, the moon being much smaller than the earth. But on Betelgeuse the same man would weigh 2,494,146 pounds, or 1242 tons, if we estimate that Betelgeuse has the same density as the sun, which, by the way, it has not.

"Suppose you live on Betelgeuse and you have a friend living on the other side of the globe. You call him up on the telephone, and it takes your voice exactly 42 1/4 minutes to travel half way around Betelgeuse, although electricity as we know travels 186,000 miles per second. In this case you would speak your message into the telephone receiver, go out and have lunch for over an hour, and when you returned the words from your friend would just begin to pour from your receiver.

"A train traveling 60 miles an hour speeding along the equator without stopping would take 419 hours or a little over 17 days to complete the circle on our own globe. The same train on Betelgeuse running at the same speed would take 1792 years to cover the trifling circumference. In other words, a train which had started during the downfall of the Roman empire would just now arrive at its destination!

"Betelgeuse is 62,430,000,000,000 times the size of our earth. This means nothing to our mind. If, however, we asked you to count these billions of globes that you could tick away into Betelgeuse, at the rate of 100 per minute, it would take 1,000,000 years to count them all, not forgetting that each globe is the size of our earth."

Will the COLORED RACES Ever RULE the WORLD?

TAKING the broadest possible view of the racial maps of the globe as it existed before the recent war, it will be found that out of a total number of human beings amounting to 1,700,000,000, 850,000,000 were white, 1,150,000,000 were colored. Thus the colored races outnumbered the whites more than two to one.

Speaking by continents, the really white world consists of Europe, North America to the Rio Grande, the southern portion of South America, the Siberian part of Asia, and Australasia, the last two, of course, being very thinly inhabited. On the other hand, the world of color consists of the bulk of Asia, virtually the whole of Africa, and most of Central and South America.

The great bulk of the white race is, of course,

concentrated in the European continent, and in 1914, before the war, the population of Europe was, approximately, 450,000,000. Thus, quite apart from the fact that many millions of European souls were destroyed in the war, it is true that four-fifths of the entire white race lives on less than one-fifth of the white world's territorial area.

Of the colored races the yellow are naturally the most numerous, living in Eastern Asia, and numbering over 800,000,000. The browns number more than 450,000,000, while the blacks, whose centre is Africa, south of the Sahara Desert, total about 150,000,000. The reds are, of course, of less consequence, amounting at most to 40,000,000—the so-called American Indians of the Western Hemisphere located south of the Rio Grande.

When the VOICE Develops CORNS

WHENEVER anyone addresses you in a caustic tone you are justified, in view of the latest discovery of surgical science, in concluding that the speaker has developed corns on his vocal cords. When the human voice loses its vibrant quality or becomes impaired through what specialists are pleased to call "vocal corns," the removal of these impediments to clear tones becomes a delicate surgical operation, which already has been made a specialty by some physicians.

What is known as singers' nodules—a growth on the vocal cords—is a common occurrence among singers. It is more frequently referred to and understood by the layman as a relaxation of the vocal cords and is principally brought on by a tendency of the singer to attempt to reach outside his or her range.

The one thing in the world that will cause palpitation to the heart of an opera singer is the thought of losing his or her voice. They will submit to any treatment to overcome that fear. The treatment generally given is complete rest, but, in many cases, the patient must also

submit to absolute silence and, in most cases, is put to bed. The reason for this is that the singer is of such a nervous temperament that complete relaxation is the only way to bring about results. The patient is not ever permitted to use his voice above a whisper.

Very frequently on the eve of a singer's performance, he will have a physician examine his throat and, in the majority of cases, a spray with a special solution is used on the larynx. A serious condition is avoided by the singer submitting to these treatments. In cases of nodules, it requires three to four weeks to bring back the voice to normal.

In the case of a noted singer, who suffered with this ailment, it required six months' complete rest and silence. But, after much treatment and a surgical operation, she finally was given back the power of her voice.

A specialist in such matters, who attends many opera singers, does not approve of the surgical operation, if it is possible to cure the patient by medical treatment. However, in many cases, it is necessary to submit to surgery.