The AUTOMOBILE

STEERING GEAR REQUIRES PATIENT STUDY.

There are few visions more unpleasant for the motorist to contemplate than what might happen if the steering gear of his machine failed to function. Consequently manufacturers have taken great pains to build cars that are pretty sure to go wherever the man at the steering wheel directs. Autoists, therefore, have great faith in their cars' ability to take them where they want to go and justly so. However, it is well to know something about the steering apparatus and to check up on it often.

To make steering easy and to give the necessary strength coupled with the required flexibility the front wheels of an automobile are given certain peculiarities. At the lower end of the shaft, on which the hand-steering wheel is located, there is a gear. This is very often of the worm type, although other types are sometimes employed. This gearing makes it possible to swing the front wheels with very little effort on the part of the driver. At the same time it makes it necessary fo great pressure to be exerted on the front wheels to move the steering or hand wheel.

EASY CONTROL FOR DRIVER.

This arrangement gives the driver easy control of the direction in which he desires the car to move. It is the same principle as is demonstrated when a man with a crowbar can raise many times his own weight for a short distance.

An arm from this steering gear connects through a drag link to a steering knuckle upon which one of the front wheels is mounted. The other front wheel is made to move in unison with the first through means of a tie rod connected to its steering knuckle. These knuckle joints are necessarily points of weakness as compared with a solid axle. Therefore certain things are done to give them the desired strength.

If the front wheels were placed in a perfectly perpendicular position there would be considerable leverage exerted on the steering knuckle pins. This would not only make for weak construction but would also cause a great resistance to the turning movement incident to steering. To overcome these faults the front wheels are given what is termed undergather, that is, the distance between them at the point where they touch the ground is less than at their tops.

This construction causes the weight of the car to bear directly on a line with the steering knuckle pin. Therefore no leverage is exerted. This undergather would cause excessive wear on the tires if both wheels were pointed straight ahead, or, in other words, were set parallel. To prevent this wear the wheels are given what is called foregather, which means that they are slightly closer together at the front edge than at the rear. There is only about three-eighths of an inch difference in the measurement, but it is important that the front wheels toe-in that much.

This does not apply to the rear wheels which, in practically all cases, are directly parallel.

ACTION UPON WHEELS.

In addition to foregather and undergather, the steering knuckle pins are given a slight rake so as to give a castor effect to the front wheels. This rake consists in placing the steering knuckle pins so that they are further toward the rear at the top than they are at the bottom. The result of this when steering is that the centre of turning is a little ahead of the point of contact where the tire touches the road. This is done so that the drag incident to pushing the wheel along the road is back of the centre of turning. The result is that the wheels will always point directly forward, unless interfered with.

This action is the same as that which can be observed in a castor on a bed or piano and the same which enables one to ride a bicycle without placing the hands on the handle bars. For this reason if the tie bars between the two wheels should become disconnected, straight ahead steering and even slight turns can be made through one wheel attached to the steering gear. The other front wheel just trails along.

One other peculiarity of the steering mechanism is worthy of consideration. The tie bar which connects the two front wheels is attached at either end to the arms that form part of the steering knuckle. These arms, instead of being parallel and thus making the tie rod the same length as the distance between the steering knuckle and pins, are set at an angle which makes the tie rods shorter than this distance. The result is that when the car is turned, say, to the right, the right-hand wheel is swung more to the left than the left-hand wheel. Each wheel, therefore, follows closely its proper arc. The reverse is true when turning to the left.

THE REPARATIONS DELIBERATIONS

"My great-grandfather occupied this seat when the Reparations Conference commenced."—From London Opinion.

Sleeping Upside Down.

Every kind of animal, including man, seems to have adopted some particular posture in which to sleep.

The ordinary man sleeps, either on his right or his left side, with his knees drawn up. When, however, he has endured extreme fatigue or prolonged pain a man may sleep in all sorts of positions. Men have been observed to sleep when standing or walking, when swimming or driving a horse or even when bound to the stake.

Some animals, too, are able to sleep while standing. A dog, especially when old, may do so occasionally; a horse often does, while an elephant never lies down to sleep.

Longlegged birds, such as storks and gulls, have been observed to sleep balanced on one leg. Most birds, however, sleep with their heads turned round over their backs. Often their beaks are hidden among the feathers between the wing and the body. But there are some curious exceptions to this rule. The owl sleeps while sitting on a branch; while some Indian parrots and bats sleep only when suspended from a tree

A duck is the most unconventional of all. This bird sleeps on the open water, and during its slumbers paddles itself with one foot in circles to avoid drifting to the shore.

Even such a bulky animal as the sloth sleeps upside down, hanging by its four feet and with its head tucked between the forelegs.

The posture adopted by the domestic cat is typical of many other animals. Foxes and wolves sleep curled up with their noses and the soles of their feet all close together and often covered by their tails.

Some animals sleep with their eyes open, others with them closed. Nearly all fish belong to the latter class, as do also hares and snakes. Salmon and goldfish are said never to sleep at all.

Perhaps no other things have such power to lift the poor out of poverty, the wretched out of misery, to make the burden bearer forget his burden, the sick his suffering, as books.

A Little House.

I'm glad our house is a little house,
Not too tall nor too wide;
I'm glad the hovering butterflies
Feel free to come inside.

Our little house is a friendly house,
It is not shy or vain;
It gossips with the talking trees,
And makes friends with the rain.

And quick leaves cast a shimmer of green
Against our whited walls
And in the phlox the courteous bees
Are paying duty calls.

—Christopher Morley.

Signs of Summer

"Confound this sticky fly-paper!"

The earliest known surgical instruments are copper knives found in a tomb 1500 B.C.

"Wherefore, when we build, let us think we build forever. Let it not be for present delight, nor for present use alone. Let it be such work as our descendants will thank us for, and let us thing as we lay stone on stone, that a time is to come when those stones will be held sacred because our hands have touched them, and that men will say as they look upon the labor, and wrought substance of them, 'see this our fathers did for us,' "—Ruskin.

Saved by the Ship's Bell

A little brass bell that was caught among some floating wreckage once saved the life of a captain who, true to his calling and fearless in the face of death, would not desert his sinking ship.

During the war, on December 23, 1917, says a writer in the New York Times, the Cunard freighter Vinovia of seven thousand tons bound from New York to London was about ten miles off Land's End, Cornwall. For three days it had been tossing about in a heavy sea with a strong northerly gale The tumbling seas had smashed the lifteboats and the rafts and had carried the fragments overboard, and the steady pounding of the waves had broken the tiller; the captian—his name is Gronow—had been working with the crew for two days rigging a jury tiller in its place.

At five o'clock in the afternoon a German torpedo struck the ship and killed seventeen of the crew. A British destroyer came up shortly afterwards to take off the rest, for the freighter was badly damaged and was sure to sink in a short time. The commander asked Captain Gronow to go with them, but the captain declined and said he thought the Vinovia could be towed into shallow water near Penzance, forty miles away; he requested the destroyer to send out tugs. Soon afterwards a tug and a drifter arrived and Captain Gronow made the lines fast forward. Just as he was completing his difficult task a big sea poured over the bow and dashed him on his back against the sharp point of a paravane, an instrument that is used for cutting mines adrft. The blood began to flow from the wound, but in his excitement he did not notice it.

The gale was blowing harder than ever Two hours later the bow of the Vinovia was three feet under water, and the engine room and boiler room were flooded; then the sea poured into the cabins and the hold so that it was impossible any longer to tow the ship.

It was pitch dark, and the weather was very cold when the tug and the drifter cast off the lines from the Vinovia. When the tug came near enough Captain Gronow shouted through a megaphone to the skipper that he would stand by the ship to the end. It came at half past eight. The captain was on the bridge, very weak, for he had lost much blood and had suffered from fatigue and exposure. As the Vinovia sank under his feet he grasped the canvas awnings with the wooden stanchions that the shock of the torpedo had cast loose.

At half past twelve on the morning of December 24 the lookout man on a drifter making for Penzance heard what he thought was a small ship's bell tinkling every now and then as if it were close by on the surface of the sea. He called the skipper, who stopped the small craft, and they both listened and heard the bell distinctly. The dinghy was lowered, and two of the crew pulled in the direction of the sound. They found a quantity of wreckage amid which was a small brass bell lashed to a wooden frame—the bell had been fixed over the wheelman's head on the bridge of the Vinovia for him to strike the hours by the wheelhouse clock. By the light of a lantern the sailors in the dingy saw the unconscious captain half supported by the canvas awnings; his hair was frozen, and there was blood on his face and neck.

They hauled him into the boat and brought him to the drifter where they wrapped him in blankets. Then the craft made all speed to Penzance. Captain Gronow was unconscious for twenty-four hours after his rescue. It was midnight on Christmas Eve when he opened his eyes for the first time.

Origin of Familiar Phrases.

The expression, "a pig in a poke," originated in Northampton Market, when some wags put a cat in a bag or poke, and sold it as a pig to a countryman. When the buyer opened the bag, out jumped the cat. This also gave rise to the expression, "letting the cat out of the bag."

"Kicking the bucket" is a phrase that owes its conception to the days of the great gold rush to California and Australia in 1849-51. Many unfortunate seekers after gold, losing their all in an unavailing effort to find the precious "dust," committed suicide. The suicide tied a rope to a beam in his hut. Then, standing on an upturned bucket, he would adjust the other end of the rope round his neck. When all was ready he simpy kicked the bucket from under his feet.

"Worth a Jew's eye" probably came from the fact that King John extorted large sums of money from Jews under threats of mutilation. All the teeth of one Jew in Bristol were extracted to satisfy the King's rapacity.

From a corruption of the Anglo-Saxon we get the phrase, "as mad as a hatter." It has nothing to do with a "hatter," really. The word "mad" in Anglo-Saxon meant furious angry, or even venomous, and "atter" meant an "adder or viper." Thus the whole expression really means "as venomous as an adder."

Marrying Ages.

In Britain the age at which parties may legally bind themselves in marriage is fourteen in the case of boys and twelve in that of girls.

In Germany a man must be at least eighteen years of age before he can marry. In Portugal a boy of fourteen is considered marriageable, and a girl of twelve.

In Greece a youth must have seen at least fourteen summers and the girl twelve. In France the man must be eighteen and the woman sixteen, and in Belgium the same ages.

In Spain the intended husband must have passed his fourteenth year and the wife her twelfth. In Switzerland boys from the age of fourteen and girls from the age of twelve are allowed to marry.

In Turkey any youth and maden who can walk properly and can understand the necessary religious service are allowed to be united for life.

The earliest known physician lived in the third Egyptian dynasty, 4500 B.C.

The Laurentide Co., Ltd., of Grand Mere, P.Q., have about 20,000,000 white spruce seedlings and transplants in their nursery.

"O Canada"

O Canada, unlike most great songs, was composed backwards. The tune was made first. It was in 1881, at a great convention of St. Jean Baptiste in Quebec City, when a call arose from the delegates for some sort of nationalizing hymn that should express the aspirations of the French-Canadians as a nation in Canada. A committee was struck, with Judge Routhier as chairman, for the purpose of getting a French-Canadian composer to do this, on behalf of the convention. The only French-Canadian composer capable of such an inspiring task was Calixte Lavellee, a famous pianist then living in Quebec. So quickly was it all done, so much after the manner of an inspiration, that the very next day the composer sent word that he was ready. When the committee called upon him they found that he had composed not one, but four or five melodies, all of which he played on his plano. Unanimously they accepted the melody since become so famous as the voice of the French-Canadian race. Catching up the inspirational mood of the composer, Judge Routhier at once wrote his memorable verses to fit the tune, and, before the convention broke up, both words and music were enthusiastically acclaimed, adopted and sung. Within a few years thousands of French-Canadians had learned this majestic hymn, but it was almost twenty years before it got up as far as Ontario, where it was used first at military tattoos in Niagara Camp, later as a march-past in the reception accorded the present king, George V., in Toronto, when A. S. Vogt, then conductor of the Mendelssohn Choir, asked a bandmaster, "What is that wonderful thing?" On being told, he made a note of it, and a few years later, much thanks to the admirable choral and orchestral setting, and English translation, all made by Dr. T. B. Richardson, of Toronto, who had become familiar with the piece when an officer at Niagara Camp, the Mendelssohn Choir gave the first choral performance of O Canada. Since that time, scores of Anglo-Saxons have written English versions, one of which is now in use in Ontario schools, and a dozen composers have written various arrangements for choirs, men's voices, quartettes, etc. But the original Lavallee-Routhier setting survises as the greatest of them all, and by long odds one of the greatest national hymns ever known under any flag.—Musical Canada.

O Canada.

1. O Canada! The land our fathers found,
How bright the garlands on thy fore-head bound!
For the sword thine arm hath in battle borne,
And hath raised the Cross on high;
And the poet's pen finds its highest theme
Thy simple history.
And thy bold hearts, filled with devoted faith,
Will guard our homes and our liberty.

2. Neath Heaven's eye, beside a mighty stream,
Great grow thy sons, as they of greatness dream,
For the race they spring from is full of pride,
And a blessing hails their birth,
And the powers on high have prepared their place
With the great ones of the earth,
And the high faith that doth inspire their hearts
Counts their flag's honor as life's greatest worth,
Counts their flag's honor as life's greatest worth.
—Translation by B. Morton Jones.

Here is a new verse by Canon Scott. It was first sung in a Y.M.C.A. tent in Belgium.

3. O Canada, my country and my love,
O Canada, with cloudless skies above,
Where'er I roam, where'er my home,
My heart goes back to thee.
Thy lakes and streams, thy boundless dreams,
Thy rivers running fee,
O Canada, O Canada,
God pour His blessings on thee from above,
O Canada, my country and my love.

It does not require much imagination to visualize the things which would reduce the fatigue of the housewife and improve the family life; a stool or high chair and a rocking-chair in the kitchen, with comfortable, restful chairs elsewhere in the home; running water, in order to eliminate the carrying of water from a well or outside pump; a mid-day rest period; the services of a community nurse; prenatal care for mothers; proper and sufficient clothing to meet all emergencies and opportunities for recreation, are not luxuries, they are necessities.

Part of the Loot.

It was his first morning at the coal-yard and he was instructed to deliver a load. As he failed to return a search was instituted, and he was discovered at the house where he had delivered the coal.

After putting it in the cellar he had taken up his quarters in the kitchen, from which the cook could not get him to leave.

"What do you mean by such conduct?" his employer askid him.

"Why," he replied simply, "I thought I was sold with the coal—I was weighed with it.'

Tell-Tale Time

"Wouldn't you say she's older than she says?"

"I won't say—but time will tell."

Faith is something and enthusiasm for something make life worth living.

Luggage Increased

Ella—"Ridiculous, this ruling that everyone must wear a two-piece bathing suit! Simply increases one's luggage, you know.

Stella—"How so?"

Ella—"I couldn't possibly get such a suit in one envelope, my dear!"

A Question of Terms.

Isaac Blumstein had a toothache. A friend recommended a dentist. So Isaac went to his office. But on the door he read: First visit, $5. Subsequent visits, $2. This was pretty tough for Isaac. He thought a minute very hard and then he opened the door and walked in with a chirrupy:

"Good morning, Doctor! Here I am again."

Out of Luck.

An Irishman was one day looking into the window of a drug store. He noticed that all the drugs and medicines were being sold at a reduced price.

"Sure," said he, as he turned away, it's just my luck. I am never ill when I ought to be."

Don't Tease Swans.

Swans can fly at the rate of 100 miles an hour.

No one knows how long they can keep on the wing, but the trip from Scandinavia to Britain seems to be merely a pleasant flutter. They pass from one side of Canada to the other in huge flocks at certain times of the year, and at very high altitudes.

It is not safe to tease or seek familiarity with swans in summer time when cygnets, as young swans are called, are about. The male swan is very pugnacious then, as a bather in the Thames found to his cost quite recently.

There is a traditional impression that a blow from a swan's wing will break an average man's leg, and there is on record a case of the death of a fox from such a blow.

The force of the swan's wing blow is emphasized in a story from Buckinghamshire, which records the attack of a male swan on a boat being rowed near the nest. The pinion struck the gunwale of the craft, and as a result was laid bare to the bone, being stripped of both feathers and skin.

Caught Both Ways.

Pat was standing in the road when he noticed a motor-car coming up the street. He stepped back a little.

The car caught up with him, and, just as it was passing, the driver had occasion to turn off down a side street. As he moved the steering wheel the car skidded, causing the back end of it to swing around, striking Pat and knocking him down.

Pat was seen to get up and look after the car and say, "Now what do ye think o' that? Whin ye stand in front o' thim, they run over ye; and whin ye git out of the way to let him pass, they turn around and kick ye."

Rippling Rhymes
by Walt Mason

THE FAULTFINDERS

As I do my daily walking, to reduce my ample size, I hear people knocking, knocking, finding fault with other guys. Jasper Jinks a house is building, and intends to paint it green, with a stripe of ornate gilding round about each window screen. And the knockers stand and view it, watch each timber put in place, and they cry, "Oh, chee! Beshrew it! Such a house is a disgrace! For the doors are out of kilter and the chimney is too low, and the winter rains will filter through those shingles, don't you know; and he's gone and put the cellar where the attic ought to be, and it sure would jar a feller, such a crazy house to see." Jasper hears the idle jeering of his neighbors, at the fence, and his heart is doubting, fearing, he has fantods most intense. And his pleasure is departed, all the pride he lately knew, when his building job was started, with a cozy home in view. And his jaded soul grows sicker as he toils on day by day, for the knocking of the kicker drives the worker's joy away. There should be a law imposing fifty years in yonder pen on the gent whose dreary prosing chills the hearts of fellow men.

IN RABBITBORO

Our Pet Cowardice.

Fear is only a gap between our resources and our courage, says Tom Masson in "That Silver Lining," and if we can make a contact between the two, fear goes.

"I have always been somewhat of a believer in fear, just as I have in worry," he explains. "I have known a number of people who have written books about it, showing how to get rid of it, but I have found them to be just about as other people are. Upon occasion, they would run if any one said 'Boo!' to them.

"We are all cowards, more or less. Men who are not afraid physically will be afraid morally. A man will be a hero on the battlefield and shrink from his wife. Each one of us has a pet cowardice.

"Fear is only a void, because it is the absence of anything constructive. It is a kind of gap between one's courage and one's resources. If you can make a contact between the two, fear goes.

"The strange part of all this is, that fear is something lacking in ourselves. We never really fear anybody else. We only fear that we may not be equal to him. Isn't it curious? Think it over."

MARCONI INVENTS NEW RADIO DE

TO REVOLUTIONIZE SENT METHODS.

Wireless Communicati be Faster, Cheaper and er by Process Recen Evolved.

The fact that he has devis apparatus to revolutionize methods in wireless telegra been divulged by Marconi, returned to England from an mental cruise in his yacht, E the West African coast.

"I am convinced," he told a M.P.'s in London, "that by n the new devices which I h able to test communication will become more efficient, economical than it is at pres

As it is well known that M extremely reticent with regar ventions not as yet completed ficial hint coming as to new ments in the wireless made impression. Actual details vention are not as yet availa is known that Marconi has in transmitting messages u tances of 2,250 miles not on very much smaller amount energy, but faster and more than by existing methods.

By his new system he to from Cape Verde Islands, off Africa, to Marconi House Lon use of less power than an message from Paris to Lon has found out how to utilize that have not been used befo

"By use of the new wave we have obtained a clearer cation from small stations than bigger stations. We were in where atmospheric disturbanc and if messages had not be through the new experiment they would not have been rec the yacht at all."

The famous wireless expe fident that the invention has possibilities for the future of

"Even now," he said, "it possible to transmit over 1,0 with power as low as two kilo three to four horsepower, and strengthening of signals."

The new receiving apparatus lar to that in use at present, b slight modifications, and the value, apart from cheapening is the fact that elimination of ances is insured from the trans end by the employment of a n

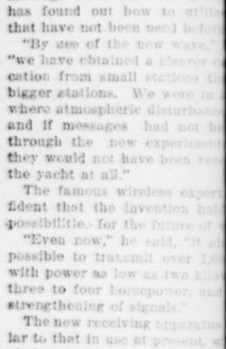
Living on Air.

Perhaps "living on air" will the near future, be so impossible sounds.

We are told that the huge deposits of South America can for an indefinite period, and t world will soon have to seek where for nitrate with which tilize its cornfields.

For ytars past, chemists and tists of all countries have been a cheap method of manufa "nitrates." It is a well-known t the air which surrounds us is composed of oxygen and ni while a "nitrate" is also a co containing these two elements tists are seeking a process by which these two gases will be ated from the atmosphere and combine to form nitrates in quantities. The method, to be mercial success, would have to tremely cheap.

When this comes about, world draws its main supply tilizers from the atmosphere, be able to say with perfect tru we are "living on air!"



Found a Use for Them.

Mr. Pester—"Where are my silk suspenders? I can't find them where!

His Wife—"You wear your o Can't you see, your new silk s ers exactly matched my dinne and I've made a bodice of them

Strategy.

A tramp stopped at a farm evening and asked for a job in for a night's lodging and meals. farmer put him to milking the but a few moments later the tra ported that the flies were so ba the cows would not stand still enough to be milked.

The farmer looked at his wat replied: "Wait about half an ho supper time. The flies will all the dining room then and you ca in peace."

Start a heaven of your own in your own heart.