shortest axis; such being the case, according to the principles of dynamics, the axis of figure must revolve around the axis of rotation, giving rise to the changes of latitude. But on account of the changes incessantly taking place in the distribution of matter upon the earth's surface, and perhaps also within the surface, the amplitude of the polar displacement, and perhaps the principal period of revolution of the one axis about the other, are changeable, the changes taking place in an undetermined way.

In connection with this explanation we should not lose sight of the fact that all the material moved through meteorological, volcanic, and seismic agencies is probably almost infinitesimal as compared with the total mass of the earth, and no one has as yet shown that the shifting masses are sufficient in magnitude to account properly for the observed annual and other unexplained components of the polar motion.—Abstracted from the Popular Science Monthly.

An International Sport Exposition.

An exposition devoted to sports and games is to be held in Frankfort-on-the-Main in 1910. Frankfort is annually the scene of many sporting contests, for which reason the selection of the city for the purpose of an international exposition is certainly wise. An executive committee has been formed, the first task of which was to give the organization its name, which rings imposingly "Verein Internationale Ausstellung fuer Sport und Spiel." The exposition will be divided into the following groups: 1. Horses and vehicles (harness, riding and driving equipment, stables, horse breeding and care). 2. Automobiles and motor-driven vehicles. 3. Turf sports, such as gymnastics, fencing, open-air athletics (tennis, football, golf, handball, polo, cricket, gymnastic apparatus, weapons, etc.). 4. Aquatic sports (rowboats, sailboats, motor boats, swimming, and fishing). 5. Winter and Alpine sports (skates, skis, snowshoes, sleds, huts, climbing outfits). 6. Hunting (guns, sportsmen's apparatus, stuffed animals). 7. Aerial sports (free balloons, dirigible airships, flying machines, models, aeronautic instruments). 8. Tourists' exhibits, such as photographic and optical apparatus (charts, guide books, history and literature of traveling, telescopes, etc.). 9. Application of sport to therapeutics (gymnastic apparatus, life-saving devices, transportation of invalids). 10. Sporting outfits of all kinds. 11. The artistic side of sport. 12. Toys. 13. Miscellaneous.

Award of a Medal for the Discovery of Bakelite.

At the second regular session of the New York Section of the American Chemical Society, held at the Chemists' Club, 108 West 55th Street in this city, on the evening of November 5th, Dr. Leo H. Baekeland, president of the Electro-Chemical Society, was awarded and presented with the Nichols medal for his papers on "The Synthesis, Constitution, and Industrial Application of Bakelite" and "Soluble and Fusible Resinous Condensation Products of Formaldehyde and Phenol."

In accepting the medal Dr. Baekeland expressed his thanks for this expression of regard for his work, and alluded feelingly to the friendly co-operation and aid he had received from the fellow members of the section. He then exhibited several industrial applications of the new compound bakelite, and made an experimental comparison of the resiliency of a ball of bakelite the size of a billiard ball with an ivory billiard ball. A stand three feet high was set upon the lecture table. The ivory ball was then dropped from the upper side of the stand to the table, the height of its rebound was noted, and the length of time of the rebound until it came to rest, which was six seconds, by the use of a stop watch. The ball of bakelite passing through the same height to the table rebounded at least six inches higher and came to rest in ten seconds, showing much greater resiliency than ivory.

Bakelite is used very successfully in the manufacture of electro-magnet spools, and is claimed to be superior to gutta percha in that it will stand a greater degree of heat, in the event of a short circuit.

The Current Supplement.

The opening article in the current SUPPLEMENT, No. 1768, deals with Henry Farman's new biplane. An excellent picture of the machine with Farman seated in it is presented. The first installment of an article on bakelite, a new composition, is given by L. H. Baekeland, its inventor. Samuel K. Patteson writes instructively on the measurement of humidity. The relation of Charles Darwin to Mendelism is set forth by Dr. A. E. Shipley. Recent models of superheated steam locomotives are described and illustrated. An illustrated description of the fast turbine yacht "Winchester" is published. Major H. L. Hawthorne critically points out the advantages and defects of balloons and dirigibles in war. Mr. Snowden B. Redfield concludes his article on the making of automobile tires. Hervey J. Skinner tells how tar is applied to the surface treatment of roads. The usual electrical, engineering, and trade notes and formulæ will be found in their accustomed places.

Correspondence.

FIGHTING POWER OF THE "INFLEXIBLE."

To the Editor of the SCIENTIFIC AMERICAN:

May I call the attention of your correspondent, Emerson B. Manley, whose letter appeared in your issue of October 23rd, to the fact that the "Inflexible" is not a sister ship of the "Dreadnought"? The "Inflexible," despite the number and power of her guns, is not rated as a battleship, but belongs to the cruiser class.

In an engagement between such a ship and a battleship carrying four 12-inch guns and a powerful secondary battery of 8's and 7's, it is most improbable that the ship of the "Inflexible" type would engage—and her excessive speed would give her the range decision—at such a range that her enemy's secondary battery could be effective. Her preponderance in big gun power—eight 12's against four—would enable her to demolish the secondary battery before the 8-inch and 7-inch guns could get a single effective shot home.

M. LATOUCHE THOMPSON.

St. John's Rectory, Manitou, Man.

WHY WATCH SPRINGS BREAK.

To the Editor of the SCIENTIFIC AMERICAN:

Being an old subscriber to your most valuable paper, I take the liberty of writing you regarding the unusual, or I should say peculiar, action of main springs in watches. My father, an horologist of over fifty years, and I, who learned the trade from him, have had some, as we think, remarkable experiences in the main-spring line. We think climate has much to do with their breakage; but if a watchmaker with sweaty hands handles a spring, there will be trouble. Also one who uses gasoline or any of the similar fluids will have the same trouble.

Our trouble has been mostly in the season when electric storms prevail, or a sudden change of temperature. We always advise our customers not to put watches on a marble dresser or any cold surface, but leave them in their pocket. The temperature in the vest or other garment changes gradually, and thus does away with any sudden expansion or contraction. We have been in the Mississippi Valley for many years, and our experience has been that, specially during the fall and spring seasons, during thunder storms we have more trouble with main springs. Sweaty hands do no good to a main spring. Tissue paper, in our experience, is the proper thing to wipe a spring with. May be slightly oiled. My father has been very successful in that line of watch repairing.

Natchez, Miss. F. T. BESSAC, M.O.

RAILWAY MOTOR CARS.

To the Editor of the SCIENTIFIC AMERICAN:

In your last issue I notice that you are to have a special issue on the middle West. I wish you would call attention through your valuable magazine to the need of some kind of a motor car that will run on railway tracks. It should be an independent motor car, run by its own engines. There is an opening for thousands of miles of so-called interurban railways in Iowa and other middle West States, where it would not pay to build an electric railway line on account of the large expense; but if some economical and reliable form of independent motor car could be perfected, such cars could be used for passenger traffic, and small steam locomotives for freight cars, and such roads would pay well. The track should be built on modern lines, with easy grades and curves and independent right of way, so that trains and cars can make good time for passenger service and can also handle freight cheaply, by use of regular freight cars from the steam roads, and thus would be valuable feeders and distributers for the steam roads, where branch steam lines would hardly pay. Such motor cars for passenger service should also be used on many branch steam railway lines, where better passenger service is badly needed, and where steam passenger trains are too expensive to run often enough to give good service.

Motor cars of this sort to use gasoline for power have been perfected and are in use in several places, but they are gradually being abandoned on account of the constantly increasing cost of gasoline. It seems that little or no progress is being made in perfecting such motor cars to use alcohol or kerosene. Might not the producer-gas engines for small boats requiring less than 500 horse-power be adapted for these motor cars? In your issue of September 18th, 1909, on page 191, you made mention of a very remarkable demonstration of the possibilities of producer-gas engines of this sort by Mr. H. L. Aldrich, using pea-anthracite, which at a cost of $4 per ton is stated to be one-tenth the cost of operation of a gasoline engine with gasoline at 15 cents a gallon, to produce equivalent power.

For a long time it has seemed to me that there is an excellent opportunity for invention in the production of such an independent motor car, operated by some power other than gasoline. Some cars of this sort are in apparently successful operation which generate electric power by means of a gasoline engine, but it seems that in so roundabout a system, there must be a large waste of power.

Equipped with motor cars of the sort suggested, such railways could be built much cheaper than trolley lines, and also operated much cheaper, until the business grows to a point where it would pay to change to electric power. The perfecting of such a car would mean the building of many miles of new railways, and possibly the cars would also be adopted in time by the steam railways to give better local passenger service. Many good towns in Iowa are made "whistling stations" by the steam roads in their mad race for through business.

Lack of better railway facilities, and lack of many miles of new railways that should have been built long ago, are factors that are holding back the development of a great deal of this middle West country.

Steam railways want through business, long hauls, and great tonnage; electric railways are too expensive as yet in many places; if a motor car that is light, reliable, and not expensive to operate, can be perfected, using producer-gas engines, there is no question but that there is a great opportunity and opening for such a car, as above suggested.

I trust that you will deem this communication as important as the number of our ancestors, for instance.

Belle Plaine, Iowa. H. R. MOSNAT.

ANOTHER EVIL OF DEFORESTATION.

To the Editor of the SCIENTIFIC AMERICAN:

One of the recognized evils produced by the woodmen who spare no tree (but leave where once the lord of the forest stood, the earth all bleak and bare) is the reduction in the yield of water power. But it seems that the fact that deforestation also increases the cost of what water power you do get, has never been mentioned.

Suppose that the flood level of a normal river is such as to require a 25-foot dam for power purposes. After the valley has been skinned of its foliage, the flood level will be so much greater that a dam 30 feet or more in height will be necessary.

As the cost of dams increases with the squares of the heights (because the higher up the thicker), the 30-foot dam will cost nearly fifty per cent more than the 25-foot, and yet it will yield less power than the 25-foot would yield in the normal river, because deforestation has diminished the flow of water in the dry season.

The yield in the dry season is the available yield, because the larger yield at other seasons is of little value, for almost all users of power want power all the year around.

It is true, as I showed in my article in Cassier's Magazine of September, 1909, that if we would use both turbines and current motors in the same dam, high dams would not be necessary in many rivers; but this truth may be disregarded, because it will probably be a hundred years before the system there mentioned will meet the right man—the man who will introduce it. SYLVESTER STEWART.

Brooklyn, N. Y.

The Death of Theodore R. Timby.

Theodore R. Timby died on November 9th, 1909, at Brooklyn, N. Y. He was chiefly known because of his claim to having invented the revolving turret of the famous "Monitor," and that, accordingly, he should have received the fame history accorded to John Ericsson. For more than forty years he had tried to collect $500,000 from the United States for two inventions, one the revolving turret on warships and the other a device that points and fires heavy guns with electricity. Other things which Timby invented, and from which he obtained both recognition and financial reward, were a floating drydock, a system of coast defense, and a turbine wheel which proved especially successful.

A Book of Fourth-Dimension Essays.

The subject of the fourth dimension seems to have aroused so much interest among the readers of the SCIENTIFIC AMERICAN that we have decided to publish in book form the prize essay, the three essays that received honorable mention, and about sixteen of the best essays which were submitted in the recent Fourth Dimension Contest. The entire collection will be edited by Prof. H. P. Manning, who will prepare an introduction of considerable length, in which the subject of the fourth dimension will be simply and lucidly discussed. The book will be ready about the latter part of December.

The meeting of the British Association in Winnipeg on August 25th, is the third which has been held in the Dominion. The first Canadian meeting took place in 1884 at Montreal; the second thirteen years later at Toronto. The fact that the third was held at Winnipeg may be regarded as significant of the enormous development of the West during the past few years.