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SOMETHING ABOUT LUBRICATORS.

What is a lubricator? A common reply to this question would be "anything that has the power of reducing friction.' But how these things act to reduce friction is a matter upon which we have no absolute knowledge, though there are some facts whereupon to base theories. While, as our readers are aware, we believe it to be the proper function of abstract theory to guide actual investigation and experience, and that the indulgence of the habit of theorizing on hypothetical premises generally proves unprofitable, it may not in this instance be amiss to base a theory upon a belief generally prevailing, though not demonstrated,, relating to the molecular structure of fluids.

The hypothesis is that the particles of liquids and fluids are spherical, and so smooth and hard as never to wear by attrition. This conception is about the only one the mind can make of bodies in which the particles are capable of moving with perfect freedom throughout the mass and among each other.

Viscosity of liquids is attributed to the cohesion of molesules, rather than to interlocking through irregularities in form. The latter will not satisfactorily account for all properties of viscous liquids. A quantity of ordinary fine lead shot approximates feebly the character of a similar quantity of liquid. The spheres of lead lack, it is true, the hardness and smoothness attributed to the molecules of fluids, but if we suppose fine shot to be obtained infinitely hard and smooth, such shot would flow almost like a liquid, and the physical properties of a mass of them would not vary greatly from those of some liquids.

These shot could be used as a lubricator, and the investigation of how they would act to reduce friction will give a clue to the probable way in which all lubricators act.

In the first place, being infinitely hard and smooth, the surfaces of the spheres cannot in the least interlock. They, therefore, slide over each other with the greatest facility. Placing a layer of these spheres between two plane material surfaces and moving one surface, we should see each of the shot rolling along under its burden, thus changing sliding fric tion to rolling friction, and notably reducing the power required to move the given surface. The sporules also flow sist in arriving at truth in so important a matter; and though into and thus rectify irregularities of the bearing surfaces. This is lubrication. Placing the shot in the same way between an ordinary journal and its bearing, we should find difficulty in keeping them in place; but could they be retained, there would still be the same conversion of sliding into rolling friction. The tendency of the shot to gravitate to the lowest point in the bearing, would gradually force out all of them except a of the subject that has met our notice, and it is the purpose single line or row, which would then sustain the weight of of this article to place some of the facts, stated in this paper the journal and would so far indent the metal as to cease and gleaned from the experience and observation of a very rolling. The conversion of sliding friction into rolling fric- large number of eminent physiologists and pathologists, betion and the lubrication would practically cease, and it would be necessary to supply more shot. If now we could supply some bond of union between the shot, sufficiently strong to overcome in great measure their tendency to gravitate, and could also supply a bond of attraction between them and the journal, without detracting materially from their power to flow about among each other,

unchanged in character, the journal would remain lubricated. 'of this narcotic, in proportion to its population, than Ger-The attraction of cohesion and adhesion are just such bonds, many or the United States. The consumption in England and it is because oils possess these attractions in higher degree than water and some other liquids that the former are sumption in Asia, Europe, America, and Australia, as combetter adapted to lubrication than the latter. There is no better lubricator than water when it is convenient to keep it most reliable data obtainable, is not less than 970,000,000 constantly supplied to bearing surfaces. As examples we may refer to Cirard's Palier Glissant, illustrated and described on page 6, Vol. XXII, of this journal, and to the water bearing of Shaw's propeller pump, illustrated and described on page 118, current volume. In these applications of water to lubrication, the water is forced between the bearing surfaces by hydrostatic pressure.

We see then that, for general use, lubricators must possess a certain amount of cohesive and adhesive attraction. But has for its principal aim to kill time and to stupefy the they must also have the power to retain their cohesion and $\pm mind$." fluidity under the action of moderate heat, heavy pressure, and contact with metals and air. The oxygen of the air attacks many kinds of oils, rendering some acid and others resinous; and moreover some oils of mineral extraction are contaminated with acids, used in their rectification, which attack increasing friction mechanically. The oxides of metals have . the power of saponifying vegetable and animal oils, and no substances. doubt this combination often takes place when oils of this kind are used on rusty bearings.

The soaps formed by the union of the saponifiable parts of oils with metallic oxides are hard and insoluble, and are, therefore, much less perfect lubricators than the oils themselves. Some oils, more particularly those extracted from petroleum, are volatile, and evaporate as soon as journals become slightly heated. Oils possessing these defects are unfit for purposes of general lubrication.

Probably nothing else has ever been discovered that possesses in so high a degree all the properties desirable in a lubricator as good pure sperm oil. There have been, however, some close approximations to it in oils extracted from petroleum. Many of the latter are, however, very inferior. Some excellent lubricating oils are also obtained from varigood for lubrication. Olive oil is, however, too expensive for general application to this purpose.

But as no amount of theory can take the place of actual nection some recent and important experiments made by Mr. A. H. Van Cleve, General Purchasing Agent for the Camden upon this subject as has yet been published.

Of late graphite has been prepared so pure, and has creasing the cough." been reduced to so impalpable a powder as to enable it to enter as a competitor with oils for purposes of lubrication. not analagous to that of oil in the conversion of sliding into rolling friction, but that it acts beneficially because its coefficient of friction on metals and wood is so much smaller than that of metals on metals or metals on wood.

As yet its value as a lubricator is not generally admitted, although we have seen the strongest testimonials in favor of or less. an article called plumbago grease, manufactured by a house in this city.

The "metalline," about which such incredible stories were told a year or two ago, and about which we hear nothing latterly, was prepared in part from graphite. It is possible that this substance (graphite) in a perfectly pure state, or mixed with other substances, may eventually take its place among standard lubricators in general use for machinery; but it has yet to earn its reputation.

TO SMOKE OR NOT TO SMOKE.

The use of tobacco is an evil, or it is not an evil. In the enormous and increasing consumption of this plant it has become a question of very great importance what effect upon the general standard of health is produced by it. The agitation of this subject has been increased during the last two years, and pamphlets, essays, and lectures have developed in full strength the arguments for and against tobacco using. As smoking is the most popular and most powerful method by which the stimulant effect of the plant is obtained, it is principally upon this habit that the battle is waged.

We have from time to time presented some of the arguments on both sides of the question, our object being to as

has very nearly doubled in twenty years. The annual con puted by the eminent German statistician Ausland from the pounds. This affords food for comment, but we will confine ourselves to facts and authorities.

M. Barral, who made the official report on specimens of tobacco exhibited at the Paris Exposition, in his surprise at the footings of his estimates of annual production, remarks: "The enormous figures which have passed before the reader's eye testify to the facility with which people fall into excessive expense for the gratification of a pleasure which

The active principles of tobacco are nicotine, a concrete oil called tobacco camphor, and an empyreumatic oil. The two last are active poisons, but not so deadly as the first, which, according to Taylor, is one of the most virulent poisons known. One drop of it kills a rabbit in three minutes metallic surfaces, the oxides of the metals thus produced and a half. We need not quote other authorities on this point, as all agree with Taylor as to the character of these

> The disease called locomotorataxy, which is a general paralysis of the nerves, is a disease that was unknown forty years ago. Now it has become quite common. Martin ascribes its origin and prevalence to the use of tobacco.

Dr. Ricnardson, himself a smoker, says: "Smoking produces disturbances-(a) in the blood, causing undue fluidity, and change in the red corpuscles; (b) in the stomach, giving rise to debility, nausea, and, in extreme cases, sickness: (c) on the heart, producing debility of that organ and irregular action; (d) on the organs of sense, causing, in the extreme degree, dilatation of the pupils of the eye, confusion of vision, bright lines, luminous or cobweb specks, and long re tention of images on the retina; with other and analogous symptoms affecting the ear, namely, inability clearly to define sounds, and the annoyance of a sharp, ringing sound, ous seeds. The olive and the castor bean furnish oils very like a whistle or a bell; (e) on the brain, suspending the waste of that organ, and oppressing it if it be duly nourished, but soothing it if it be exhausted; (f) on the nervous filaments and sympathetic or organic nerves, leading to defitest in mechanical science, we are glad to notice in this con. i cient power in them, and to over secretion in those surfaces -glands-over which the nerves exert a controlling force; (g) on the mucous membrane of the mouth, causing enlargeand Amboy Railroad, relative to the value of different lubri-; ment and soreness of the tonsils-smoker's sore throat-redcating oils. A full report of these experiments will be found ness, dryness, and occasional peeling off of the membrane, in another column, and we call our readers' attention to it as | and either unnatural firmness and contraction, or sponginess being perhaps as important a contribution to our knowledge of the gums; (\hbar) on the bronchial surface of the lungs when that is already irritable, sustaining the irritation and in-

This authority, however, claims that the diseases caused by tobacco are functional, not organic or specific. This does It is probable that the action of this substance on bearings is not matter much, except as encouragement to those who desire to recover from ill health resulting from smoking.

> M. Decaisne recognizes a functional disease of the heart (narcotism of the heart) as caused by tobacco, distinct symptoms of which were observed by him in twenty-seven out of thirty eight, boys aged from nine to fifteen, who smoked more

> It is a fact well established that before adult age the use of tobaccoproduces more serious disturbance than later in life.

M. Beau notices eight cases of angina pectoris caused by the use of tobacco.

Professor Lizars records several cases of cancer of the tongue and lips caused by the use of the pipe. The writer has known one such instance, and never wishes to see another example of such terrible suffering resulting from a worse than useless habit.

Dr. Taylor says those who suffer from functional disorders are ready "to attribute the derangement to any other causethan the real one."

Experiments made by Dr. Druhan seem to indicate that tobacco poison in an overdose may produce effects which render even small doses dangerous ever after.

Dr. Corson corroborates the opinion of M. Beau as to an. aina pectoris.

But we will make no further citations. If tobacco has any applications useful to mankind, we are satisfied that smoking, chewing, and snuffing are not of them. We may use tobacco to kill the insects which infest our rosebushes and conservatories; but, if we will continue to poison ourselves with it, let us make no pretences about it. We do it

our confirmed taste for smoking and the natural desire to find it a harmless practice have led us to peruse, with peculiar care, all that has been said in its favor, we avow that neither reading nor experience has convinced us that the general use of tobacco is other than an unmitigated evil.

The Dublin University Magazine for September of the present year contains by far the most comprehensive review ; fore the American public in a more prominent manner than they would otherwise appear.

Every page of this remarkable paper is so replete with tect of the Crystal Palace, the Great Eastern and other large references that from it might almost be compiled a bibliogworks, to form two Committees, "a Council of skilled workraphy of the history, uses, and abuses of "the weed." men," and " a Council of legislators," to whom shall be referred

The first thing that forces itself upon our attention is the the discussion of the whole question and the suggestion of enormous consumption of tobacco. The Food Journal states proper remedies.

Mr. Russell says: "While there is no finer breed of workthe journal would carry them along in its revolution against that as much money is spent upon tobacco in England as the action of gravity, and so long as the shot would remain upon daily bread, yet England undoubtedly consumes less ing men in the world than the British skilled workman, there

to gratify a depraved appetite from which we are irresolute to break loose. Let us neither believe nor pretend to believe that it is a blessing. If tobacco poisons our bodies, let it not also corrupt our morals and make hypocrites of us.

THE CONDITION OF MECHANICS AND LABORERS IN ENGLAND.

A plan has been proposed by Mr. Scott Russell, the archi-

The condition of the working classes in England has become so low and degraded that the attention of thoughtful men of all shades of opinion is attracted to it; and it is a serious question to know what remedy to apply to save a vast population from sinking to a depth of corruption and misery unparalleled in the history of modern civilization.

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