of the results obtained by Friend, Bentley, West and Chappell in their investigations on corrosion of iron and steel, recently presented before the Iron and Steel Institute in London:

Influence of Carbon on Corrodibility.—(*a*) In rolled, normalized, and annealed steels the corrodibility rises with carbon content to a maximum at saturation point (0.89 per cent. carbon), and falls with further increase of carbon beyond this point. (*b*) In quenched and tempered steels a continuous rise in corrodibility occurs, with increase of carbon within the range investigated (up to 0.96 per cent. carbon), no maximum corrodibility at saturation point being found in these steels.

Influence of Treatment on Corrodibility.—Quenching increases the corrodibility to a maximum; annealing tends to reduce it to a m'nimum; and normalizing gives intermediate values. The influence of tempering varies with the tempering temperature.

Factors Determining Corrodibility.—The electromotive forces between the pearlite and ferrite, and between the components of the pearlite itself, are the principal factors determining the corrodibility of unsaturated pearlitic steels above 0.4 per cent. carbon. In mild structural steels, the galvanic action, due to differences of potential between the constituents, is accompanied by galvanic action betweeen the ferrite crystals themselves. These differences of electro-potential between the ferrite crystals are the result of differences in their orientation. The state of division of the pearlite, and the presence of internal stresses in the steel, may also exert a considerable modifying influence on the foregoing factors. Decarbonization increases the resistance to corrosion. Three per cent. of tungsten produces practically no change in the corrodibility of carbon steels. The influence of time on the rate of corrosion varies with different steels.

USES OF ALUMINUM.

The article by Seligman on "Modern Uses of the Metal Aluminum" (*Science Progress*) calls attention to the applications of the metal in various industries. The sudden demand for aluminum in 1905 was due to the requirements of the motor-car industry; but since additional supplies were not forthcoming, the automobile industry turned to the use of thin steel sheets and frames of special steels, which were often found to be actually lighter than aluminum parts of equal strength. The increased output from 9,000 tons in 1905 to 34,000 tons in 1910 resulted in a fall in price to about one-half, and a certain increase in the earlier demand for aluminum in motor-car work. However, other uses were required to consume the enlarged supply, and in England a very important outlet has resulted from the discovery of methods whereby, with the aid of a special flux, sheets of aluminum may be fused together without the use of any extraneous solder. Vessels made in this way are of special value for chemical industries, and most of all in those involved in the manipulation of food materials. The metal resists corrosion and has the further advantage that it imparts no coloration to the materials in contact with it. In the brewing industry, fermenting tanks up to 30,000 gallons have been constructed, and vessels for fermenting under a pressure of 45 lbs. per sq. in. have been made of 1800 gallons capacity.

In this connection it may be noted that the aluminum companies of France have organized the Southern Aluminum Company, capitalized at $8,000,000.00, and a plant is to be erected at Whitney, N. C., under the direction of the electrometallurgist Héroult.

BRIQUETTING METALLIC WASTE.

A correspondent of the *Scientific American* (**106**, No. 21, 477) states that an Austrian, Arpad Ronay, has recently perfected and patented a process for briquetting metallic wastes without a binder. Ronay applies enormous pressure to the particles, but the application is slow, so that the individual particles may associate and come together to permit of the exclusion of air and water. No binding material whatever is employed, and the process is conducted without heat.

Metallic turnings, chips, filings, etc., are delivered into a large hopper, gravitated into the hydraulic press, and the mass is slowly subjected to increasing pressure. The briquette is then submitted to further compression, up to 2,000 atmospheres.

It is said that briquettes made by the Ronay process from cast iron borings, with a low percentage of phosphorus, can be advantageously substituted for the white iron as used in tempering furnaces; and that Bessemer plants and steel foundries, having Siemens-Martin furnaces using scrap material, find briquettes made from steel and wrought iron turnings a cheaper and more efficient fluxing medium. A number of plants have been erected in Germany for briquetting waste materials by this process, the largest being that built for the Tegel Works of Borsig, which has a capacity of six tons an hour.

THE REVIVAL OF THE KELP INDUSTRY.

Kelp, the ash produced by the incineration of various kinds of *Algae* obtainable in large quantities on the west coasts of Ireland and Scotland, and the coast of Brittany, possesses the following composition: potassium sulphate, 10 to 12 per cent.; potassium chloride, 20 to 25 per cent.; sodium carbonate, 5 per cent.; other sodium and magnesium salts, 15 to 20 per cent.; and insoluble residue, 40 to 50 per cent. One ton is procurable from 20 to 22 tons of wet sea-weed.

It is contended with much show of reason in the *Times Engineering Supplement* for May, 29, 1912, that the manufacture of kelp products would prove to be commercially successful if carried out on a comparatively large scale, with modern chemical engineering methods. The sea-weed should be heated in a retort, as proposed by Stanford, and ammonia and acetic acid recovered from the distillate. Stanford obtained 50 to 80 pounds of ammonium sulphate and 6 to 18 pounds of calcium acetate per ton of air-dried sea-weed. The residual charcoal gives up its soluble salts to hot water and can afterwards be used as fuel. The iodides become con entrated in the mother liquors and may be recovered to the extent of 12 pounds per ton of dry sea-weed in the form of free iodine.

LIGHTING BY NEON TUBES.

According to *Engineering* (**92**, 807), while it has been long known that a vacuum tube charged with neon gives a brilliant light with but little absorption of electric energy, yet there is a progressive absorption of the gas and the light finally extinguished. Claude has described a number of experiments made to overcome this. He found that when the tubes had small electrodes, these heated rapidly nearly to redness, and a metallic deposit formed on the glass in their vicinity. After 88 hours this deposit amounted to 1.6 g. Upon examination, neon was found occluded in the metal. Consequently, as the disappearance of the gas was due to the vaporization of the metal, Claude reasoned that the life of the tube would be lengthened by using larger electrodes, which would keep cooler. He constructed a neon tube, 45 mm. in diameter, with copper electrodes equivalent to a surface of 300 sq. cm. per ampere of current. One of these tubes worked satisfactorily for 210 hours and was then accidentally broken. Therefore, with a tube 6 m. long, with electrodes giving a surface of 500 sq. cm. per ampere, Claude found that the potential difference necessary to maintain the current only changed 4.0 per cent. in 400 hours. The efficiency was excellent, being only 0.8 watt per candle. It is of interest to note that were the energy wholly convertible into that light to which the eye is most sensitive, the output would be 55 candles per watt, according to recent measurements by Buisson and Fabry.