Telling Iron from Steel.

The simplest way is to pour on the metal to be tested a drop of nitric acid; let it act for one minute, then rinse with water. On iron the acid will cause a grayish white, on steel a black stain. Steel may be distinguished further from either cast or wrought iron by the closeness of the grain, its toughness and its having that peculiar property called temper, which is the power of hardening when suddenly cooled after being red hot. If a bar of steel be made of a bright red heat and is then suddenly plunged into cold water, it will be found to have become harder than any other metal—so hard, indeed, that it it will scratch glass, and is as brittle and readily broken as flint. If, says an exchange, a piece of hard, bright steel is held for a moment in the hollow of a clear fire, a pale straw color appears on the surface; its hardness is slightly lessened and it is fit for razors, surgical instruments, etc.; if held in the fire for a moment or two longer it becomes of a bright golden yellow, and is fit for pen knives and other cutting instruments; held longer still, it becomes bright blue and is fit for watch springs, swords and other purposes requiring great elasticity; if the heat be carried still farther a brown tinge is seen, and it is now rather soft, but still greatly harder than iron and still elastic; saws, coach springs and other articles are made from steel at this temper. If the heat be carried to redness the steel will be quite soft when it has slowly cooled, but if suddenly cooled (as by being plunged into water) the original hard temper comes back again. The most curious manufacture in steel is that of lace, which was made several years ago, looking as fine as any Brussels lace, and said to be equally soft to the touch.—Mechanical News.

Engine Power From Liquid Fuel.

In a paper read before the Pacific Coast Technical Society, Admiral Jasper Henry Selwyn, a retired British officer, made some surprising statements about the possibilities of engine power derived from liquid fuel. Theoretically, he said, a pound of the best coal is equal to converting 16 pounds of water into steam; but, practically, only half of this effect is realized under the most favorable conditions. But with petroleum there was a theoretical value of 21, and in practice he himself secured the evaporation of 16.9 pounds of water to one of fuel.

This was with oil alone. But by blowing the sprayed oil with steam, instead of air, he claims to have raised the service to 22 or 23 pounds of water. This, he explained, was because the steam was dissociated into its component gases, and the hydrogen thus liberated did duty as fuel. Finally, he declared that under marine and Cornish boilers he was able to burn not only the hydro-carbons of the oil and the hydrogen of the steam, but also the nitrogen gas in the air, which has usually been regarded merely a diluent of the oxygen and a clog on combustion. Thus, he said, he had been able to evaporate 48 pounds of water with one of fuel. In most of his experiments he used, and he recommended that marine engineers always use, an oil of a specific gravity greater than that of salt water, and not emitting gas at a temperature of lower than 360 F.

As is customary in most scientific bodies, when the reading of this paper was finished the subject was discussed by experts, nearly all of whom were sceptical as to the possibility of attaining any such results as had been described. A gain of from 60 to 80 per cent. in efficiency by substituting oil for coal was all that they were disposed to concede. Moreover, doubt was expressed concerning the availability of a supply of the particular grade of oil prescribed. Most of the residuum produced at the refineries of the United States is burned on the spot; very little gets into the market. Admiral Selwyn was not able to produce the detailed information about his tests that was called for, but he insisted that other men's failures to parallel his alleged success were due to the imperfection of their methods.

Forced Draughts For Steam Boilers.

The object of forcing the draught of steam boilers by mechanical means, such as fans, by discharging air under the fire grate, or both above and below the grate, or at the base of the chimney or stack, is to obtain more rapid generation of steam than can be obtained by available natural draught. Many places will not admit of a chimney with diameter and height great enough to give sufficient natural draught. Artificial draught can be readily adjusted to effect the combustion of different kinds of fuel at different rates of combustion. It permits the use of fuel of an inferior quality, and enables a steady supply of steam to be maintained, independent of climate and weather. It enables the supply of air to be properly distributed to the fuel in the furnace, to effect economical combustion.

The supply of air above the fuel can be readily adjusted to effect combustion of the gases evolved by the fuel, and the supply of air below the fuel can be regulated to effect the combustion of the solid portion of the fuel, and the movement of the hot gases can be readily controlled by proper furnace arrangement.

The application of forced draught to a furnace affords a means of obtaining a higher rate of combustion of fuel per square foot of fire grate surface per hour, that is conveniently available with natural draught. The rate of combustion obtained in practice varies with the intensity of the draught, from 30 to 200 pounds of coal per square