

Mail Automobiles in Denmark.

The automobile commission recently sent abroad by the Danish government on a tour of inspection with a view to reporting as to the adaptability of the automobile for short-route mail service has just returned to Copenhagen. The commission is composed of officials from the post-office and other governmental departments and engineers appointed by the government. The following comments upon their work, which appeared in a recent issue of the *Dannebrog*, a leading Copenhagen daily, may be of interest to automobile manufacturers:

"The members of the commission visited a large number of places in north and central Germany, France, and England. The object of the commission was to investigate to what degree the automobile might be made a substitute for secondary railways.

"From what we have learned it was evident to the commission that the automobile offers the best of service in places where the modern machine has been employed in the public service. The automobile reaches its destination on time, and has advantages over the railway train, which often in foreign countries, especially in England, fails to arrive on schedule time. It is, however, only on the shorter routes that the automobile has as yet been introduced into the postal service.

"The greater number of foreign automobile manufacturers have hitherto paid little attention to the construction of automobiles for practical purposes. The few manufacturers who have, however, given special attention to this subject have been successful, as is evidenced by the cordial reception which the public has given the automobile omnibus, for instance.

"If speed were not a consideration, it was evident to the commission that it would not be advisable to replace the present stage service with automobiles. On the other hand, if quicker delivery is the main object, the automobile will best meet the requirements.

"It is the intention here in Denmark, possibly, to replace the day coaches (stage service) by automobiles. It will be required that the automobiles have a speed of about 12 miles an hour on the average, which is about the speed maintained in the public mail service in foreign countries."

The Danish government has recently entered into a ten-year contract with a local company for the delivery of mails over the stage routes in Denmark proper. This company proposes, with the consent of the post-office department and under its supervision, to install automobile coaches in place of horse-drawn vehicles. This is an important branch of the postal service, since there are so many small islands without railways. The passenger and freight traffic makes many of the routes quite profitable.

Four automobile omnibuses of French and, probably, German and Scotch manufacture will be given a three months' trial, beginning with September of this year. It is confidently expected that the experiment will be successful, and if so, that there will be a large demand during the next two or three years for automobiles of the omnibus type.

The following are the rather severe conditions to be met before any particular make of automobile will be purchased:

The body of the car (exclusive of machinery) must be approved by the commission. The machine must be run 2,000 kilometers (1,243 miles), after coming from the factory, at the maker's expense, an inspector appointed by the commission being on board all the distance. The car is then to be taken apart and each part carefully inspected, cleaned, and readjusted, and the car is to be run for three days at expense of maker. The car will then be forwarded to Copenhagen and run for three months by a driver furnished by the maker, who shall be accompanied by an agent of the commission. The commission will pay the salary of the driver, will furnish gasoline and oil, and provide housing for the car. The commission will pay one-third the price of the car on ordering it, one-third on its delivery in Copenhagen, and one-third at the end of the three months' trial, if it is found satisfactory. The trials are to be conducted under the supervision of the post-office department, and from their decision there is no appeal.

The car must accommodate sixteen persons, including the driver, and be capable of carrying 1 ton of freight besides, at an average speed of 12 miles an hour on a 5 per cent grade. The commission has prac-

tically determined to try the "Schneider-Creuzot" French omnibus, a car with a quadruple gasoline cylinder of 24 horse-power, costing \$3,600, and accommodating twelve passengers inside and three on the platform. This car is at present most in favor with the commission.

THE IGUANA.

Among the interesting specimens brought back from the Bahamas by the expedition sent out by the Museum of Natural History of New York was a live iguana about three and a half feet long. This example of the *Pachygllossa* was found on the Island of Andros where, as in the other islands of the group, the natives regard the animals as delicacies, hunting them by smoking them out of their burrows in the pine thickets.

The iguanas, a family of lizards, belonging to the sub-order mentioned above, comprise fifty-six genera and 236 species. With a single exception, all the genera of this extensive family belong to the New World, being especially characteristic of the Neotropical region, where they occur as far south as Patagonia, while extending northward into the warmer parts of the Nearctic region as far as California and British Columbia. The iguanas are characterized by the peculiar form of their teeth, these being round at the root and blade-like, with serrated edges toward the tip, resembling in this respect the gigantic extinct reptile the *Iguanodon*. The typical forms belonging to this family are distinguished by the large dewlap or pouch situated beneath the head and neck, and by the crest, composed of slender, elongated scales, which extends in gradually diminishing height from the nape of the neck to the extremity of the tail. The prevailing color is green; and, as the majority of them are arboreal in their habits, such coloring may be generally regarded as protective. Those, however, which



AN IGUANA BROUGHT FROM THE BAHAMAS.

reside on the ground have much duller, though as a rule equally protective, lines. Iguanas possess to an extent exceeded only by the chameleon the power of changing their colors. Though the natives of the Bahamas claim that these lizards live on fruits and the tender shoots of plants, many scientists assert that they are insectivorous.

Col. Renard, the chief of the French military aerostatic department, has devised a new type of marine boiler. For some years past this officer has been engaged in the designing of a specially light yet powerful motor for aerial purposes, and it was in the course of these experiments that he has designed this marine boiler. Col. Renard has laid it down as an axiom that the true solution of the problem of aerial navigation depends upon the construction of a motor which shall not weigh more than one kilogramme per horse-power. Although he has not yet succeeded in building an explosion motor conforming with this condition, he has succeeded in designing a steam engine, the weight of which he has reduced to 1.5 kilogramme per horse-power. The particulars of the boiler are preserved a secret by the French government, which has procured the invention and is now developing it, since it means an economy of 75 per cent both in weight and space as compared with the ordinary type of steam generator. Col. Renard has built one of these boilers of 80 horse-power, the weight of which is only 120 kilogrammes, and so satisfactory has it proved under test, that he is now engaged in the construction of two marine engines, one of 1,000 horse-power and the other of 1,200 horse-power, weighing 1,500 and 1,800 kilogrammes respectively, for trials in torpedo boats. Another advantage of this type of boiler is the economy in the consumption of fuel. Gasoline is used at the rate of only 434 grammes per horse-power hour. Steam is raised in seven minutes, and full pressure in fifteen minutes, while scarcely any heat is lost by radiation.

New Method of Manufacturing Steel.

It is reported that successful experiments have just been made by the Iron, Steel and Metals Manufacturing Company at Melbourne, Victoria, for the purpose of proving the value of certain patent rights for the direct production of wrought iron and steel without first producing pig iron. Only a rough idea of the process may at present be had, though trial runs with New Zealand magnetic iron sand are now being made on a somewhat larger scale than hitherto. The sand is first separated from its gangue by electro-magnetic separators, this treatment leaving a pure magnetic iron oxide. The sand is then fed from a bin into the furnace, which is entirely novel in its features, being chiefly mechanical and automatic in its operation.

The ore drops from the bin into a slowly revolving cylinder placed at such an angle that the ore travels forward continuously in it. As it does so it is heated to a dull red by the waste gases from subsequent operations. From this cylinder the ore drops into a second revolving cylinder, where the fine particles are subjected to the action of reducing gases which reduce the magnetic oxide of iron to the metallic form, at the same time permitting the particles to retain their individuality. From this second cylinder the reduced ore drops into a smelting bath at the bottom of the revolving cylinders, and the molten steel or malleable iron, as the case may be, is tapped from this whenever that operation is necessary. It will thus be realized that the process is one of great simplicity and yet of much ingenuity. Not the least interesting part of it is the use of fuel oil for heating purposes. This is employed to secure concentration of heat and direct application in the furnace work. It is found that the fuel oil possesses many advantages over producer gas as used in existing smelting practice. The work done so far has demonstrated that not only is oil a cheap fuel, quite irrespective of the capital outlay that would be required if it was decided to utilize producer gas, but it is so thoroughly under control as to insure the best service.

The temperature at which iron ore melts is given variously at from 1,500 deg. to 2,000 deg. C., according to its purity.

The accurate gaging of temperature in the furnaces plays a very important part in the company's work, and accordingly an installation of thermo-electric thermometers has been made at the company's works. The apparatus consists of a "couple" consisting of a platinum-iridium junction inclosed in a metal tube fully 3 feet long, which is placed in the center of the furnace, and the temperature is then recorded on the dial of a special form of voltmeter, each division on which represents 25 deg. C. This voltmeter reads up to 1,600 deg. and is placed at any convenient distance from the furnaces. The various thermometers are connected with a switchboard, which is again connected with the "couples" or tubes in the furnace. In the installation under notice four "couples" will be used, inserted in different parts of the furnace, and separately connected with the board, so that the reading of any thermometer can be taken and any discrepancy in the heat of different points of the furnace can be quickly remedied. It is interesting to notice that the voltmeter is so extremely sensitive that variations of heat down to 0.5 of a degree were easily noticeable in the trial test. The greatest temperature recorded was 1,300 deg. C., equal to 2,340 deg. F.—John P. Bray, Consul-General.

A direct railway between Shanghai and Canton presented so many difficulties, on account of the mountainous region to be traversed, that some Belgian engineers conceived the idea of making a branch from Shanghai, by Hangeschan and Nantschan, to Tschan-scha, capital of Hunan, where it will join the Canton and Hankow line. The *Frankfurter Zeitung* states that the concession is granted.

The Great Northern Railway has now fitted five sets of Ransomes and Rapier's hydraulic buffers at its King's Cross Station. These buffers, together with five similar sets just installed by the Caledonian Railway at the Central Station, Glasgow, are the largest of their kind yet constructed; their pistons have a stroke of 7 feet. In tests carried out at King's Cross a train, weighing with engine 369 tons, was run into one of these sets of buffers at a speed of 9.4 miles an hour, and by their action was smoothly brought up without serious inconvenience to people seated in the carriages.