

the British battleships "Duncan" and "Formidable," the Japanese battleship "Mikasa," and the German battleships of the "Deutschland" class. In the same class also he places the British cruisers of the "Warrior" type. The compiler of these tables even prefers the "Washington," with its high velocity 10-inch armor-piercing rifle, high speed, and great coal endurance, to our own three "Alabamas," which are placed in a class below it. The high position given to our navy in this table, which has been drawn by the man who in all Great Britain has probably given the greatest amount of attention and thought to this particular phase of the subject, is an indorsement of that traditional policy of the United States navy, dating from its earliest days, which has insisted that our ships must carry the heaviest possible battery of long-range guns.

#### A FRENCH "JUNGLE."

The few Americans to whom European opinion concedes the possession of a sense of shame and a liking for decency, and who are supposed to have been sitting with bowed heads and tightly-clamped nostrils ever since the horrors of Packingtown were exposed, may stiffen their spines a bit—without, however, relaxing the death grip on their noses. They are beginning to learn that "there are others." All sorts of horrible stories have come from England, and now M. Martel (appropriate name!), chief of the animal inspection service of Paris, is hammering French butchers and telling them to go to Germany, regardless of Sedan and the lost provinces, and learn that the Middle Ages no longer exist beyond the French frontier. In an article in a French scientific journal (*La Science au XXme Siècle*) M. Martel, who surely ought to know what he is writing about, describes a state of affairs so primitive and repugnant, that its toleration in the twentieth century in the enlightened city of Paris seems absolutely incredible. For, singularly enough, conditions are even worse in Paris than elsewhere in France.

M. Martel impartially distributes the blame for the rudimentary equipment and exceeding filthiness of the 918 public abattoirs of France among ignorant architects, routine-enraptured butchers, careless municipal authorities, and indifferent consumers. French designers of abattoirs, he says, know nothing of the needs of the business or the importance of sanitary inspection, and are the laughing stock of the designers of foreign establishments. The French idea of a public abattoir has not changed in a century because the powerful butchers' syndicates have always maintained the principle that the butcher is master in his own shop, and may defy the inspectors.

The old provincial establishments, built long before there were any public abattoirs in Paris, are better planned than the newest Parisian abattoirs, for at first the advantage of working together was recognized. But the Parisian butcher would not abandon his private killing room, connected with his shop, except upon condition of finding precisely similar accommodations at the public abattoir. Consequently, the abattoirs have become agglomerations of private slaughter houses, in which everything is done in the most primitive fashion, and sanitary supervision is very difficult.

Many French cities, in order to avoid the expense of erecting public abattoirs, have conceded the privilege of building and managing them to individuals and corporations—most of the contracts being very disadvantageous to the city, and so drawn as to block all progress, for, as in Paris, the butchers use all their influence in favor of the system of many small killing rooms.

In France, as elsewhere, the public has remained indifferent to the cause of reform—especially the poorer classes, which are most exposed to the dangers of unwholesome meat. Last year a deputy, in proposing a law (which did not pass) for the extension of the system of public abattoirs, gave utterance to the following naïve confession of impotence: "We must content ourselves with the hope that small municipalities may recognize their duty, and invite the veterinary to inspect the private slaughter houses at the first suspicion of disease."

The average French abattoir consists of a series of stone-walled killing cells, about fifteen feet wide and thirty feet long, alternating with larger and more open halls or courts, which are used for the reception of cattle and for work of various sorts, including slaughtering when the adjacent cells are filled with carcasses. None of the great abattoirs of Paris possesses the modern appliances which are used in Germany and elsewhere for the slaughtering of animals and the dressing, hoisting, and aerial transport of carcasses. Many of the killing cells are poorly lighted, and in some of them lamps and candles must be used when artificial light is needed on winter mornings! The courts are exceedingly filthy. Here stomachs and intestines are cleaned, and their contents, with miscellaneous offal and embryos in every stage of development, are thrown pell mell on the blood-soaked soil. The drovers' dogs are allowed to feast on this

carion, through which the sanitary inspectors must pick their way to the dimly-lighted killing cells.

This appetizing picture is hardly more astounding than the information that no abattoirs in Paris, and only two in France, possess cooling or cold storage rooms.

On the other hand, the public abattoirs of Germany are, in M. Martel's opinion, models of construction, equipment, operation, and inspection. Twenty-five years ago Germany possessed few public abattoirs, but now there are more than four hundred in Prussia alone. The importance of cold storage was recognized fifteen years ago. Many of the German public abattoirs are controlled by syndicates of butchers, who appreciate the advantages of refrigeration, general killing rooms, and machine hoists and carriers. On these points, however, America has little to learn from Germany. The special merits of the German establishments consist in cleanliness and vigorous sanitary inspection.

A peculiar German institution, which has been introduced into some other countries, appears at first sight anything but attractive to American eyes. The *freibank* is a shop devoted to the public and official sale of condemned meat which has, theoretically, been made wholesome by sterilization. Sometimes the *freibank* is attached to the sanitary department of the abattoir, and is under the control both of the police and of the inspection service of the abattoir; sometimes it is in the city, in which case the supervision of the inspectors is less strict. But in every case the meat is sterilized in the sanitary department of the abattoir by methods which involve as little loss of weight and food value, and as little alteration in appearance and flavor, as possible. For example, meat which contains tapeworm larvæ is submitted to prolonged refrigeration, while tuberculous meat is simply heated to a high temperature in closed vessels.

The prices of meats sold at the *freibank* are fixed by the local authorities, and the quantity sold to a single purchaser is limited—usually to about six pounds. This restriction makes it impossible for keepers of hotels, restaurants, and boarding houses to feed their unsuspecting "paying guests" on this officially "cured" meat.

The *freibank* is rapidly becoming common in Germany, especially in the north. It is compulsory in Prussia and Saxony. In Saxony it has been gravely proposed to establish *freibänke* in the fire-engine houses in small towns. Austria, Belgium, and Switzerland are adopting the *freibank*, and it is making progress in Italy, in the face of violent opposition. In Saxony, in 1902, of each one hundred beeves slaughtered, ninety-three were admitted to unrestricted sale, and five and a half were sold at the *freibank*—the remaining one and a half, presumably, having been condemned beyond redemption. More than three million pounds of meat are sold each year in the *freibänke* of Berlin.

The *freibank* does not exist in France, and M. Martel thinks that the French idea of equality will prevent its establishment there. But he points out that the law of supply and demand creates *freibänke* of a very different sort, in which meat unfit for food is sold to customers who can not afford to buy any other. Probably we free and equal—and free and easy—Americans prefer the same system.

#### TULARE LAKE BASIN AGAIN FILLING UP.

Tulare Lake, once a prominent feature on all old maps of California, and at the time enjoying the distinction of being the largest body of fresh water west of the Mississippi River, is located in the extreme southern part of San Joaquin County, at an altitude of about 200 feet above tidewater. In the forties its superficial area is said to have exceeded 1,200 square miles, but in 1868 its dimensions had shrunk to 760 square miles, and twenty years later to less than 200. Occasional floods have raised the level of the lake, but the general tendency has been toward obliteration.

Originally the lake, by a well-defined outlet, emptied into the San Joaquin River, but sedimentary deposits have gradually built up a dike which obstructed the flow of waters and made of the Tulare basin an independent system of its own. The lake receives the waters of Kings, Tule, White, Waweah, Kern, and other rivers, each draining large sections of country, and in periods of flood carrying immense volumes of water. Though of great superficial dimensions the lake is extremely shallow, the deepest part being only 30 feet in depth, while evaporation exceeds 8 feet annually. Tulare Lake has for ages been the depository of all the sediment brought down from the Sierra Nevada Mountains by the rivers of the basin, which formed a soil of the greatest fertility and, but for a liability to flood, the wide plain constituting the basin would have been the site of extensive agricultural development and great productiveness.

Private enterprise aided by the State has made several ineffective attempts to re-open the barrier which prevents the surplus waters from flowing back through the old channel, and thus draining the whole basin,

but the undertaking involved dredging a channel 30 miles long and, in places, 30 feet in depth, and required an outlay of capital beyond the ability of the district to raise, though it is estimated some three-quarters of a million acres would be reclaimed and made fit for cultivation if the project were carried out.

Within the last ten years Tulare Lake has been visibly growing less in dimensions, and the belief in its permanent disappearance has become settled in the minds of those who were interested in the land once covered by its waters. Several reclamation districts were organized, appropriating 150,000 acres of the old lake bed, and a large area put under cultivation. The fertility of the land was demonstrated and immense crops were raised, the land being protected by levees and carefully drained at an expense of several millions. Faith in the future was stimulated by absence of floods, and the ease with which the surplus waters of the rivers were disposed of through the customary channels, and by the belief in the capacity of the numerous irrigating districts to consume all the waters of all the rivers which normally discharge into the lake; moreover, the rainfall of the region for over ten years had been light, and the change in the seasons seemed to have become permanent.

The present year opened with less than the usual rainfall, and more land was put under cultivation in Tulare basin than ever before. Thousands of acres which no plow had ever touched were planted to grain and fruit, and up to the first of February the outlook of the lake dwellers was most alluring. A vast amount had been laid out in permanent improvements and farming machinery, and appearance flattered the most exalted hopes of abundant crops of every description. These would have been fulfilled had not the early months of 1906 violated all precedent, and proved the most extraordinary in point of rainfall in the history of the State. Conditions were reversed. All the region included in the upper part of San Joaquin Valley was drenched with continuous rains for two months, and every watercourse emptied unprecedented floods and, having no outlet, covered the bed of Tulare Lake to a depth which submerged every acre of cultivated land within its boundaries, swallowing up all crops and improvements and utterly destroying the results of ten years of unremitting work expended by the industrious colonists. Where were once wide-spreading tracts of highly-cultivated farms there is now but a waste of waters, above which rise the ruins of great harvesters and the wrecks of homes. The loss cannot yet be estimated, but is widespread and will run into millions. There is no prospect of the lake resuming its level of the early part of the year, when not over ten square miles of land was submerged, for the rivers are still pouring great floods into the basin, and will continue to do so for the next six months, as the present high stages will be succeeded by the usual summer flood arising from melting snows from the Sierras, and is sure to be of unexampled magnitude. Observers report a depth of snow on the summit of the eastern ranges of 22 to 30 feet, extending to low altitudes, and as this will not begin melting before the month of June, the outlook for Tulare is ominous.

The general belief is that no farther attempt to reclaim the vast basin will again be tried until the old outlet into the San Joaquin River is opened, and a sufficient channel to carry any possible flood dredged.

#### THE CURRENT SUPPLEMENT.

The current SUPPLEMENT, No. 1610, contains an unusual number of valuable technical articles. A Koerting 200-horse-power valveless two-cycle petroleum engine for submarine boats is described and illustrated by the English correspondent of the SCIENTIFIC AMERICAN. The Editor has made arrangements to publish a series of articles on soldiers. The first of these appears in the current number of the SUPPLEMENT. W. B. Gump writes on the properties of the series transformer. Most valuable is Dr. Eugene Haanel's discussion of the electric smelting of Canadian iron ores. The electric railway on which the unfortunate accident at Atlantic City recently occurred is described in full, and its rolling stock illustrated. How hot-air balloons are inflated is told in a clear and well-illustrated article. Dr. Theodor Koller gives some very good suggestions on the utilization of waste materials. The Editor hopes to publish a series of articles on this subject. In the present installment the utilization of wood waste and horn shavings is discussed.

The proposal to transmit electricity generated at the Victoria Falls to Pretoria and Johannesburg is taking shape, and a first issue of capital will, it is said, be announced within the next few weeks. The distance from the Falls to the Rand as the crow flies is 600 miles, but it will be necessary to make deviations that will increase the distance to be covered to nearly 700 miles. The extraordinary pressure of 150,000 volts is proposed. At the outset provision is to be made for 30,000 horse-power, but this may be increased as necessity arises.