great reputation of its builder, Schichau, of Elbing, as a builder of fast ships makes very probable.

In its general appearance and internal construction and arrangements, the Kaiser Wilhelm resembles the Lucania more than any other ship. Her greater length is emphasized by the four great funnels, and the greater sheer which she possesses adds greatly to her appearance. A novel feature is the addition of bilge keels to prevent rolling, and these, with the high freeboard forward, render her a remarkably steady and dry boat in rough weather, as was shown in the stormy weather of one or two days of the passage.

The hull is constructed on the well known cellular principle. There are 16 transverse bulkheads extending to the upper deck and one longitudinal bulkhead in the engine room. The boilers are placed in four separate watertight compartments. Twenty-four large lifeboats are carried on the awning deck. The ship has been built in accordance with the requirements of the Imperial German Navy Department, and in time of war she can enter the service as a cruiser.

We present an illustration showing the propellers and the construction of the stern, which is quite a departure from the type common to most ships of this class. It will be seen that the plating just below the water line and above the rudder is swelled out into a cigar-shaped form. This is done to accommodate the connections of the hydraulic steering gear, the arms of which work within the space thus provided. The steering gear was constructed by Brown Brothers, of Edinburgh. The tail shafts are entirely inclosed by bringing the plating of the ship out and around them.

The engines are built on the Schlick system, and run in remarkably even balance, the vibration common to most large ships being noticeably absent. There are four cylinders to each twin engine, as follows: One 52 inch high pressure, one 89¾ inch intermediate, and two 96½ low pressure. The three-bladed bronze propellers are 22 feet 3¾ inches diameter and 32 feet 10 inches pitch and weigh 26 tons each. The crank and the screw shafts are of nickel steel, the shafting being 198 feet long. The two condensers have 35,522 square feet of cooling surface, and the 11,060 tubes, if placed end to end, would measure 25 miles in length. There are 68 auxiliary engines, comprising 124 steam cylinders. For ridding the ship of water there are pumps available whose combined capacity is 3,600 tons per hour.

The steerage passengers are placed forward, the second class aft and the first class amidships. A novelty which will be appreciated is the placing of the first cabin staterooms on the upper and promenade decks, above the level of the bulkheads. This gives free access from one part of the vessel to the other, without having to climb stairways. Moreover, the rooms being high above the water, the portholes can be kept open in comparatively rough weather. The large dining room, capable of seating 350 guests, is on the main deck, between the two sets of smokestacks. On either side are three] alcoves and overhead is a large skylight. This magnificent room is 66 feet wide and extends entirely across the ship. The open well in the center is really an alcoved gallery upon the deck overhead, from which a view may be obtained of the room below. The decorations are in white and gold, in the early Italian Renaissance style. At the four corners of the dining room are four smaller dining rooms for the use of parties of 20 or 30. They are named after the mother, the wife, the great statesman and the famous soldier of King William "the Great," as his grandson has ambitiously named him. They are respectively named the Queen Luise, Empress Augusta, the Bismarck and Moltke rooms, and each is decorated with mural paintings illustrating scenes in the lives of these persons. The drawing room above the gallery or vestibule just mentioned is noted for its full length oil painting of William I, by Prof. Koner. The emperor is shown in the imperial ermine with the sword, crown, and scepter. Notable features are the smoking room, with its decorations in light colored oak, and its cozy alcoves and easy chairs upholstered in raised light brown leather. Perhaps the most exquisite room is the library, which is situated forward of the drawing room. It is decorated in rococo, with Gobelin tapestry and unpolished walnut.

There are in all 200 staterooms, accommodating 350 first class passengers. Many of these are arranged for family use, and include sitting room, bedroom and bathroom. The second class staterooms, 100 in number, can berth about 370 persons. Most of these rooms are on the upper deck. The second class dining room extends the full width of the ship and is fully equal to the first class dining room on some of the other ships.

To adequately describe the many features of interest in this vast ship would take more space than is at our disposal. Perhaps as impressive a fact as any is the large number of people which is necessary to run the Kaiser Wilhelm. Including the waiters, stokers, engineers, sailors and officers, the total is 450. If these be added to the 800 steerage, 370 second class and 350 first class passengers, we have a total of 1,970 souls who are housed, fed and safely carried at railway speed over the boisterous Atlantic.

### Development of Fruit Flavors.

Some very interesting and suggestive results have been obtained by Jacquemin, who finds that, by the addition of the leaves of fruit trees which in themselves have no marked flavor, to saccharine solutions undergoing alcoholic fermentation, a very marked bouquet of the fruit is developed. Thus, by immersing pear or apple tree leaves in a 10 or 15 per cent solution of sugar, and adding a pure yeast, which by itself gave rise to no marked flavor, after fermentation a liquid was obtained which had a strong odor of pear or apple respectively and an excellent flavor, and on distillation gave an alcoholic distillate in which this aroma was still more marked. Vine leaves act in a similar manner, and the author suggests that it may be possible to improve the bouquet of a poor vintage by the addition of some leaves during fermentation. It is noteworthy that the results are far more marked when the leaves employed are from trees in which the fruit is approaching maturity. The author infers that the flavors of fruits are due to a body elaborated in the leaves, possibly of a glucosidal nature, which is not transferred to the fruits until the latter approach maturity, and is then acted upon by the special ferments contained in the fruit juices and develops distinctive flavors. The matter would appear to be of considerable practical importance.—Comptes Rendus, cxxv, 114.

### A PRACTICAL ELECTRIC DARK ROOM LAMP.

Photographers who are traveling around the country often have great difficulty in doing their work well from the trouble experienced in getting a good dark room lamp. The smoke and smell, and danger from fire, in using an ordinary lamp in an extemporized dark room, where the facilities for working are often of the crudest form, are among the principal obstacles to doing good work. To obviate this trouble the Lecoll Storage Battery Company, of 76 Jackson Boulevard, Chicago, have brought out the efficient storage battery

A PORTABLE DARK ROOM LAMP.

lamp shown in the accompanying illustration. This portable lamp will give the operator from eight to ten hours' continuous light with one charging, and the charging is readily effected by connecting the lamp with any direct current electrical system. It will be seen that the lamp proper is in a case in the front of which is a ruby glass. Thus the best possible light is rendered available, there being no chemicals to handle, and nothing whatever objectionable to the user. It is to be remembered that only a direct current system, and not the alternating current, is to be used in charging, as the latter would ruin the battery. The same company also make a combination bicycle and dark room lamp. This suggests itself as a most admirable device for amateurs.

### Printing in Clouds.

The amateur when he first launches into photography and has reached that stage in which he feels confident in being able to produce a good printable negative, finds that there are many things to learn before he is able to produce a class of work that will pass off as a carefully finished picture. A landscape without clouds is, after all, but half the picture, and the lazy method of sunning down—for lazy it is—is no more or less than a good excuse for the want of a little trouble to print a cloud carefully into the picture.

The present time of the year is a good one to procure a few cloud negatives, and if one or two are taken now and again when out picture hunting, a valuable stock will very soon accumulate. If taken on films, you can call it at once two negatives, from the fact of their being reversible.

Some workers advocate one method of procedure and some another; but all of them attain the same effect in the end, and it would be exceedingly difficult to cry aloud any one particular method as being better than another, but one that is easy of manipulation demands some attention.

The picture being printed, and the cloud negative having been chosen for the subject, the masking of the picture while printing in the cloud is the one main point that has to be overcome. The joining up of the horizon lines is very often badly done, and if by chance the picture line is slightly intricate, it is here that generally a weak point exists.

Provide yourself with a dozen or so sheets of good white thin tracing paper, cut to the size of the plate you are working, and when you have finished printing your landscape take it out of your frame, place it upon a small board, and place a piece of tracing paper over it, and retire to the other side of the room. You will then be able to draw with a fine pen over the most important objects in the picture a line from one side to the other, following, of course, the details. It is a matter of time that should be given to this part of the work, for without it you cannot succeed. When you have finished this outline, all that is necessary is to fill in the view half with Indian ink—artist's black or vermilion will do, if it does not irritate the eyes—the whole of the lower half of the paper, and let it get thoroughly dry, which will be but a few moments.

The cloud negative is now inserted in the printing frame, and the print, with the mask in register, is also placed in position in the frame, and the cloud printed in to the proper depth.

If you possess a retouching desk, these marks may be made at night from the negative. With a few pieces of stamp paper attach the edges from front of paper to glass side of the negative to prevent its slipping; afterward it can be detached and then blackened out.

The hard lines are softened to a nicety by printing through the tracing paper, and perhaps a little longer time is required to print.

In the event of a negative that has fortunately got clouds developed up, it very often happens, unless the picture is thin, that to print the clouds out properly the view has to be much overdone before the clouds have received enough to define them properly, unless masked in some way. The tracing paper mask comes in handy here. In printing upon paper that gives no visible image, such as carbon, platinotype, bromide, etc., it must be noted that the paper negative and mask should be placed well into one corner of the frame, and a note made of it on the back of the print, so as to provide against any chance of mistakes; for nothing is more annoying than to find, after all your pains, that you have manipulated your sky upside down upon the view when you come to develop the picture. It should be noted that a good white tracing paper gives no grain that will harm a print for the purpose that it is used, and care should be taken that it is not crumpled. It deteriorates with age, going yellow, which makes a long printing job, but the paper is cheap enough for one to make a fresh mask when required.—"Erudio," in Photographic News.

### Scientific Expedition to Christmas Island.

When the world is fast becoming all mapped and labeled and described, and geologized and botanized, it is refreshing to learn that there are still a few miles of little known ground. Christmas Island, about 200 miles south of the western end of Java, the nearest land, from which it is separated by an ocean about four miles deep, is one of the few isolated spots on the earth that has remained practically uninhabited by man. It has now a small population numbering 22 persons, consisting of Mr. Andrew Ross, who is the only European, his family, and about a dozen laborers from Keeling-Cocos Islands, says the London Times. Mr. Ross, however, has only once penetrated to the further side of the island, the journey taking three days (the island is about twelve miles long and seven miles broad). Now, however, the island is to be used by the Christmas Island Phosphate Company, and a working party is now on its way there. Hence it is of peculiar importance that a scientific exploration should be undertaken to obtain an accurate account of the native fauna and flora before they are displaced by introduced forms of life.

Dr. John Murray, of Edinburgh, has offered to the trustees of the British Museum to defray the expenses of sending out a naturalist to collect everything indigenous to the island, and to present the specimens to the Museum, if the trustees will allow one of their officers to go out. The trustees have accordingly dispatched Mr. C. W. Andrews, of the department of geology in the Natural History Museum, to make an exhaustive survey and exploration of the island. The area is about 100 square miles, the highest point being about 1,200 feet, so that a considerable variety of temperature and other conditions occur. The fauna as far as known is remarkable for the very large proportions of species peculiar to the island. Thus three of the five known mammals, all the land birds, and four out of five land reptiles are endemic. Of insects, out of some thirty-five species that have been determined, twenty-three were new. In one respect the island is fortunate—there are no wild animals, snakes, or other creatures inimical to man. Most of the island is covered by thick forest growth, in which orchids and other epiphytes are very common, while it is probable that not one-third of the flora is yet known.

### Plants That Give Light by Night.

The following account of the phosphorescence of plants, which is much more common than most persons imagine, though few have observed it, is contributed to La Nature by M. Chas. Marsillon. "The phosphorescent gleam that certain plants and flowers give out in darkness constitutes one of the strangest phenomena of the vegetable kingdom. The illustrious Linnæus was the first to call the attention of the scientific world to this singular phenomenon, which before his time had been unobserved or unknown. While walking in his father's garden on a calm, warm, and fine summer night, he was surprised to see a bunch of Tropæolum majus, the common nasturtium, or capucine, that seemed to have flowers that shone with iridescent colors in the midst of the gloom.

"Captivated by the novelty of the spectacle, the future scientist repeated his nocturnal walk many times, and each time he saw the fantastic gleams of the capucine flowers. An electrician of the period, Wilcke, to whom the young Linnæus related his interesting observations, attributed the display to some electric phenomenon, an opinion that was shared by a number of writers who mentioned the curious property.

"Nevertheless, all did not agree on this point. Some were of the opinion that this phosphorescence was merely apparent, and was an optical illusion. . . .

"Numerous other flowers possess the strange property observed in the nasturtium. Among them, the marsh lily, that grows abundantly in the marshes of South Africa, presents the same peculiarities. Erasmus Darwin, who studied this flower closely, regarded it as the most perfect type of phosphorescent vegetables. The assertions of a great number of scientific observers leave no doubt of the fact that certain plants have this singular property of becoming luminous at night.

"A Swedish naturalist, Haggren, carried his love for this new kind of investigation so far as to employ a special watchman to walk about his garden for whole nights and notify him at once of luminous plants and flowers. The scientist was thus able to prove that the phosphorescence was noticed especially after a very sunny day, while it was invisible in rainy weather. The light increased in intensity during July and August. It appeared about half an hour after sunset and vanished at dawn.

"Haggren carried his investigations farther still. He subjected these singular flowers to a microscopic examination to find out whether the phenomenon did not depend on the presence of insects or other organisms. Repeated experiment showed the improbability of this; he found nothing, and concluded that, according to the opinion of Wilcke, the phenomenon had probably an electric origin. He thought, besides, that the pollen of the flower probably played an important part in the production of the light. His opinion seemed to be confirmed by the fact that the flower of the nasturtium, on which he experimented, shone with a brighter light at the time of full florescence.

"Dowden and three other botanists observed the same phenomenon at different times. They reported their observations in the London Botanical Journal about 1842. More recently, during the past ten years, Canon Russel has reported the same phenomena. His scientific papers prove that the phosphorescence extends to the leaves of certain plants, those of the nasturtium in particular. This scientist thus proved that the light persists even after the leaves have been detached from the parent stem.

"In September, 1891, he wrote to Science Gossip as follows: 'During the evening of June 19, 1889, I was walking in my garden, when, in passing near a marigold, the Calendula officinalis, I was struck with the intense light given out by its flowers. I waited several seconds and observed to my great surprise that the scintillating light seemed to play around the petals. I thought that I was the victim of an ocular illusion; so, to check my own observations, I called several persons and asked them if they saw anything extraordinary.

"'Several exclaimed that they saw little flames dancing around the flowers; others could scarcely distinguish them, and only at rare intervals; others still, in spite of sustained attention, could see nothing remarkable. This is, without doubt, due to the fact that the power of vision varies greatly with observers, the optic nerves being more sensitive with some than with others. The phenomenon, which began to be visible about half-past eight in the evening, lasted a whole hour, with remarkable alternations of great and of decreasing intensity. At certain moments the entire plant became phosphorescent.'

"The fraxinella, or Dictamnus fraxinella, of which there are three varieties in our gardens, the white, the red, and the purple, seems to excel all other phosphorescent flowers or plants in luminous intensity. This plant secretes in abundance an essential oil that in times of great heat spreads in a thin layer over the surface of the flower and then volatilizes, impregnating the surrounding atmosphere with its vapor. This vapor has the property of becoming luminous in darkness, so that the flowers appear to take fire by contact with the surrounding atmosphere.

'A variety of euphorbia, the Euphorbia phosphorea, has also, in a very marked degree, the power of becoming phosphorescent during the night, in the heart of the vast Brazilian forests. In this same country, a sort of grass, which the natives call khuskhus, shines, at certain hours of the night, with a bright light. If we are to believe the tales of trustworthy travelers, in some cases horses and other animals browsing on this grass have stopped in surprise to see it suddenly give out light and surround them with flames that envelop their trembling limbs in all directions. . . .

"But if flowers have this strange property in a remarkable degree, other plants among the lichens, mosses and fungi shine with an equally bright light in the same conditions. In the environs of Dresden, especially, there are several coal mines where grows a small species of agaric along the shafts and galleries. It presents to the visitor the appearance of innumerable luminous festoons of changing colors. . . .

"The eminent naturalist Joseph Hooker thinks that the source of this phosphorescence is a slow combustion, without heat, that takes place in the mycelium of the fungi during a continual oxidation of its substance. In northern India, among the agarics that flourish there, there is a cryptogam similar to that of the Dresden mines and equally luminous.

"The Agaricus olearius, a common mushroom of the south of France, grows, as its name indicates, on the bark of the olive, even in its smallest crevices. It makes its appearance as a parasite of this tree, in the month of November, and transforms the trunk of the olive tree into a phosphorescent mass, producing one of the most original effects that can be met with. . .

"Quite as remarkable as the preceding is the Agaricus Gardneri, the parasite of a Brazilian palm. Its light, a brilliant yellowish white, may be compared, for intensity and beauty, to that given by the tropical fireflies. Another cryptogam, a native of Borneo, growing like the preceding on various kinds of trees, gives out a light with greenish tints like that of the electric spark. When the natives see this singular light shining in the black night, they flee in terror, believing that they have seen the Evil One. . . .

"We will close by noting the interesting experiments made by Dr. Tulasne on vegetable phosphorescence. He has proved that the light emitted by mushrooms disappears completely in a vacuum or when they are plunged into a vessel that contains only irrespirable gases. He infers from this that, as Hooker asserted, there is a combination between the oxygen of the surrounding atmosphere and a substance peculiar to this plant. Such is the most probable explanation, and the one generally held by scientists, of the singular phenomenon presented by phosphorescent plants."—Translated for the Literary Digest.

### Electric Railways of Europe.

L'Industrie Electrique has just published a complete list with details of the electric railways now operating on the continent of Europe and in Great Britain. The summary, which we print herewith, shows that Germany is far ahead of any other European country in both the number of electric railways and in the length of mileage, etc. It is interesting to note also that Germany has four roads using storage batteries and France five such roads. Switzerland also makes a very good comparative showing. Considering the number and density of the population of Europe, that continent ought to be a veritable paradise for manufacturers of electric railway apparatus:

| | Total Length of Lines in Kms. | Total Power on K. W. | Number of Motor Cars. | Lines with Acc. Contd. | Lines with Underegt. Cond. | Lines with Centr. Rail. | Lines with Accum. | Total No. of Lines. |
|---|---|---|---|---|---|---|---|---|
| Germany | 642·69 | 18,963 | 1,631 | 45 | 2 | .. | 4 | 51 |
| England | 109·42 | 4,870 | 168 | 10 | 1 | 6 | 1 | 18 |
| Austria-Hungary | 83·89 | 2,589 | 194 | 7 | 2 | .. | 1 | 10 |
| Belgium | 34·90 | 1,220 | 73 | 4 | 1 | .. | .. | 5 |
| Bosnia | 5·60 | 75 | 6 | 1 | .. | .. | .. | 1 |
| Spain | 47·00 | 600 | 40 | 3 | .. | .. | .. | 3 |
| France | 279·36 | 8,756 | 432 | 19 | 1 | 1 | 5 | 26 |
| Holland | 3·20 | 320 | 14 | .. | .. | .. | 1 | 1 |
| Ireland | 18·00 | 486 | 32 | 1 | .. | 1 | .. | 2 |
| Italy | 115·67 | 5,970 | 289 | 9 | .. | .. | .. | 9 |
| Sweden-Norway | 7·50 | 225 | 15 | 1 | .. | .. | .. | 1 |
| Portugal | 2·80 | 1,0 | 3 | 1 | .. | .. | .. | 1 |
| Roumania | 5·50 | 140 | 15 | 1 | .. | .. | .. | 1 |
| Russia | 14·75 | 870 | 48 | 2 | 1 | .. | .. | 3 |
| Servia | 10·00 | 200 | 11 | 1 | .. | .. | .. | 1 |
| Switzerland | 78·75 | 2,622 | 129 | 17 | .. | .. | .. | 17 |
| Totals, | 1,459·03 | 47,596 | 3,100 | 122 | 8 | 8 | 12 | 159 |

DUPUOY demonstrates the oxidizing power of animal charcoal by the addition of a few grains of that substance to a few c. c. of fresh tincture of guaiacum. An immediate intense blue coloration is produced in the cold. Wood charcoal does not give this reaction. It is thought that probably to this oxidizing power is due the beneficial effect of animal charcoal on ulcerations and granular wounds.—Bull. de la Soc. de Pharm. de Bordeaux, xxxvii, 171.

### Science Notes.

Experiments with the synchronograph, recently conducted in England by the inventors of the system, Messrs. Squires and Crehore, are reported as very successful. In a test made August 22 over a line from London to Aberdeen and return by underground cables messages were sent at the rate of 4,300 words per minute. In another test a submarine cable 120 knots long was employed. Messages were transmitted in this case at the rate of 1,300 words per minute.

A curious landslip occurred a few days ago in the village of Sattel, in Canton Schwyz. An inn situated by the side of a road which runs across the slope of a hill was carried, without sustaining any injury, thirty-five feet down the hillside, stopping just short of being precipitated into the river Steinen. The road in front of the house, the garden, and all the immediate surroundings of the inn are intact. By the house were two large elms, and even these have in no way suffered.

On August 8 last, at Frankfort-on-Main, a statue of the Frankfort physician, Samuel Thomas von Soemmering, was unveiled. Dr. Von Soemmering's name is well known in connection with the early history of telegraphy, says The Electrical Engineer. The statue, which has been executed by Petry, is a life-sized figure of Soemmering, and next to him is represented an electric battery connected to his electro-chemical receiver. The granite pedestal of the statue bears the words: "S. Th. v. Soemmering, Erfinder d. elektr. Telegraphen."

The risks that the modern student of bacteriology runs in the pursuit of his investigations are exemplified by the fact that Surgeon-Major Ronald Ross, of the English army, who has been employing three months' leave in investigating the malarial mosquito theory (recently set forth in these columns), has contracted the infection upon which he was endeavoring to throw light. Says The British Medical Journal: "Deeming himself feverproof, he had gone to a highly malarious district . . . in order to have abundant material for work. We are glad to hear of his recovery, and also to learn that, notwithstanding his recent illness, he has made some important and hopeful observations in connection with the theory for which he has done so much. We trust that the devotion which he has shown in the cause of medical science and humanity will have a better reward than a dose of jungle fever, and that every facility will be granted to enable him to bring his disinterested and arduous labors to a satisfactory conclusion, and with as little danger to his health and life as possible."

A most phenomenal island is that of Bornhohn, in the Baltic, belonging to the kingdom of Denmark. It is famous for its geological peculiarities, consisting as it does almost entirely of magnetite, and its magnetic influence is not only very well known to the navigators of those waters, but also much feared by them, on account of its influence on the magnetic needles, which makes the steering of a ship correctly a matter of much difficulty. In fact, this influence is felt even at a distance of miles, and so palpably that, on the island being sighted by mariners on the Baltic, they at once discontinue steering their course by the needle, and turn, instead, to the well-known lighthouses and other holds to direct their craft. Between Bornhohn and the mainland there is also a bank of rock under water, which is very dangerous to navigation, and because of its being constantly submerged, vessels have been frequently wrecked at that point. The peculiar fact in this case is that the magnetic influence of this ore bank is so powerful that a magnetic needle suspended freely in a boat over the bank will point down, and, if not disturbed, will remain in a perfectly perpendicular line.

More than seven thousand members attended the twelfth International Medical Congress held at Moscow on August 19-26. From a report in the Lancet, we learn, says Nature, that the Grand Duke Sergé Alexandrovitch officially opened the congress on August 19, in the presence of a brilliant assembly; Count Delianof then delivered a short address of welcome in the Latin tongue. Prof. Skilfosovski, president of the organizing committee, also delivered an address. Prof. Roth, the general secretary, then gave an account of the preliminary labors of the organizing and executive committees. The recent congress was larger than any of its predecessors, the number of members exceeding 7,300, more than half of whom came from abroad. Prince Galitzin, the mayor of Moscow, welcomed the members of the congress in the name of the city of Moscow, and added that, to commemorate the event, the municipality had decided to offer a triennial prize for the best work on some selected medical subject. After brief addresses by the delegates of the different countries represented at the congress, Prof. Virchow gave an address upon "The Continuity of Life as the Basis of Biological Science." The second address was by Prof. Lannelongue, who had for his subject "The Surgical Treatment of Tuberculosis." Dr. Lauder Brunton then read an address on "The Relations between Physiology, Pharmacology, Pathology and Practical Medicine."