

HELMET CRESTS.

The helmet crests are very curious birds, and are at once known by the singular pointed plume which crowns the top of the head, and the long beard-like appendage to the chin. They all live at a very considerable elevation, inhabiting localities of such extreme inclemency that few persons would think of looking for a humming bird in such frozen regions. There are several species of helmet crest, and their habits are well described by Mr. Linden, the discoverer of Linden's helmet crest, in a letter written to Mr. Gould, and published in his monograph of the humming birds.

"I met with this species for the first time in August, 1842, while ascending the Sierra Nevada de Merida, the crests of which are the most elevated of the eastern part of the Cordilleras of Colombia. It inhabits the regions immediately beneath the line of perpetual congelation, at an elevation of from 12,000 to 13,000 feet above the level of the sea. Messrs. Funck and Schlim found it equally abundant in the Paramos, near the Sierra Nevada, at the comparatively low elevation of 9,000 feet. It appears to be confined to the regions between the eighth and ninth degrees of north latitude.

"It occasionally feeds upon the thinly-scattered shrubs of this icy region, such as the hypericum, myrtus, daphne, arborescent espeletias, and towards the lower limit on bejarias, but most frequently upon the projecting ledges of rocks near to the snow. Its flight is swift, but very short; when it leaves the spot upon which it has been perched, it launches itself obliquely downward, uttering at the same time a plaintive whistling sound, which is also occasionally uttered while perched, as well as I can recollect. I have never heard it produce the humming sound made by several other members of the same group, nor does it partake of their joyous spirit or perpetual activity. Neither myself nor Messrs. Funck and Schlim were able to discover its nest, although we all made a most diligent search.

"Its food appears principally to consist of minute insects, all the specimens we procured having their stomachs filled with small flies."

The head and neck of the adult male are black, a line of white running along the center. The long plumes of the throat are white. Round the neck and the back of the head runs a broad white band. The upper surface of the body and the two central tail feathers are bronze-green, and the other feathers are a warm reddish bronze, having the basal half of their shafts white. The under surface is a dim brownish bronze. The length of the male bird is about five and a quarter inches. The female is coppery brown upon the head and upper surface of the body, and there is no helmet-like plume on the head nor beard-like tuft on the chin. The throat is coppery brown, covered with white mottlings, and the flanks are coppery brown washed with green. The length of the female is about one inch less than that of her mate. — *Wood's Natural History.*

Novel Employment of Elephants.

Recently, at Bridgeport, Conn., a switch locomotive having run off the track, two of Barnum's largest elephants were brought out and made to push the locomotive with their heads. They succeeded in righting the machine after one or two attempts, but their exposure to the winter air gave the animals bad colds, and to cure them it was necessary to give them several gallons of whisky.

White Negroes.

At a recent clinical lecture at the College of Physicians and Surgeons, Professor George Fox introduced the "African leopard boy" now on exhibition in this city. According to Dr. Fox the boy is eleven years old and of pure negro parentage, and at birth was entirely black. White patches began to appear on his body when he was three years old, until now a large part of his arms, chest, abdomen, and legs, in irregular blotches is white, and the skin around the blotches is a *café au lait* color. There is also a white spot on his forehead, extending several inches back on his head, and the hair on the white spot is also white, although as kinky as a colored boy's hair should be. Except as to color, the skin is entirely normal. The face, neck, hands, feet, and back are entirely black. The white area is increasing an-

nually, and Dr. Fox predicted that some day the boy would become an entirely white negro. His diagnosis of the disease was leucodermis, and he said it was not rare, as half a dozen entirely or nearly white negroes, he presumed, could be found in this city. The disease was one, like albinism, to which all races and many animals are subject. But most cases of white crows, blackbirds, rats, mice, and elephants are cases of albinism. Albinism differs from leucodermis in that it is congenital, and patches do not increase or decrease. Children of an albino negress and a black negro are always either entirely white or entirely black.

The Mastodon.

Prof. G. C. Brodhead contributes to the *Kansas City Review* an interesting paper, in which he enumerates all the discoveries that have been made of mastodon remains in the United States. This huge animal appears to have had a wide range in this country in past ages. The earliest record that we have of the finding of the bones of the mastodon is contained in a letter from Cotton or Increase Mather to the

in his district. Three other Boston companies have entered the field, one having contracted for ten wells, the other two for three wells each, so that in the course of the year it is expected that twenty-eight wells will go down. The Cape Breton oil is a heavy lubricating oil.

Improved Caustic.

It sometimes becomes necessary to remove certain morbid growths in the throat and elsewhere, and for this purpose a stick of fused nitrate of silver secured in a quill is generally employed. Unfortunately it not unfrequently happens that the caustic breaks off and slips down the throat. To prevent this a Russian surgeon melts together 5 parts nitrate of silver and 1 part nitrate of lead. This composition does not break easily, and can be sharpened like a lead pencil. It should be fastened in a quill made of metallic aluminum, which is not corroded by the caustic as metallic silver is.

Joseph Smith's Tree Root Museum.

Mr. George Jacob Holyoke describes, in the *Manchester Co-operative News*, a remarkable museum of oddities carved out of laurel roots by Joseph Smith, Wessahickon, Pa., the most original thing he saw in America. Mr. Holyoke expected, from his early acquaintance with the man, to find the museum commonplace and pretentious. Instead he found a number of rooms bearing the appearance of a forest of ingenuity, which a day's study would not exhaust. There was nothing tricky about it. Its objects were as unexpected as the scenes in the Garden of Eden must have been to Adam. Noah's ark never contained such creatures. Doré never produced a wandering Jew so weird as the laurel Hebrew who strode through these mimic woods. Scenes from the Old Testament, groups of American orators, statesmen, and railway directors started up in the strange underwood, or held forth in the branches of trees. Dr. Darwin would require a new theory of evolution to account for the wonderful creatures—beasts, birds, and insects—which confront you everywhere. An American Dante, if there be such a one, might find ample material for a new poem in this wooden inferno. The mind of man never conceived such grotesque creatures before; yet this was the work of an old agitator, executed between his seventieth and eightieth year, with no material but roots of trees, with no instrument but his pocketknife and a pot of paint, and no resources but his marvelous imagination. There were snakes that would fill you with terror; stump orators that would convulse you with laughter. His Satanic Majesty strode on horseback; Mrs. Beelzebub is the quaintest old lady conceivable. The foreign devils all had a special individuality. There was the Mohammedan devil, the Indian devil practicing the Grecian bend, the Russian devil eating a broiled Turk, the Irish devil bound for Donnybrook Fair, the French devil practicing polka, the Dutch devil calling for some beer, the Chinese devil delivering a Fourth of July oration. Mr. Holyoke saw no American devil, and hoped we were without one. Mr. Smith's description of his creations endowed every creature with living attributes. He illustrated his favorite doctrine of man being the creature of circumstances, by saying it was coming to live in Schuylkill County which first developed in him the latent slumbering organ of rootology.

Dust and Fog.—Beneficial Effects of Smoke.

Mr. John Aitken recently read a paper before the Royal Society of Edinburgh on the origin of fogs, mists, and clouds. From a great number of experiments with moist air at different temperatures, to determine the conditions which produce condensation of water vapor, he concludes that whenever water vapor condenses in the atmosphere, it always does so on some solid nucleus; that dust particles in the air form the nuclei on which the vapor condenses; that if there were no dust there would be no fogs, no clouds, no mists, and probably no rain; and that the supersaturated air would convert every object on the surface of the earth into a condenser on which it would deposit as dew; lastly, that our breath, when it becomes visible on a frosty morning, and every puff of steam, as it escapes into the air from an engine, show the impure and dusty state of the atmosphere.



LINDEN'S HELMET CREST OR BLACK WARRIOR.—(*Oxyrhopus Lindeni*.)

Royal Society of London, between 1650 and 1700, describing the portions of the skeleton of one of these animals discovered near Albany, N. Y. Since that period skeletons nearly entire, detached bones, teeth, etc., of the mastodon, have been found in nearly every State in the Union, including those of the Pacific slope. The evidence thus far obtained goes to show that the mastodon first appeared in America in Miocene times, was abundant in the Pliocene, and lingered until the close of the Glacial period, and disappeared in the early Loess. We also find that he roamed at will from Canada to South America, being found as far north as 66° N. latitude on our Western Coast.

Cape Breton Oil Wells.

The oil belt at Lake Ainslie, Cape Breton, is being prospected with considerable promise. The Cape Breton Oil and Mining Company are now sinking a well half a mile from the western shore of the lake, and have reached a depth of 1,000 feet. The prospects are said to be good, the oil being of a quality exceptionally valuable. The local manager of the company intends, he says, to sink twelve wells

These results have been verified at temperatures as low as 14° Fah., at which, however, there was little cloudiness produced, owing to the small amount of vapor in air so cold. The sources of this dust are many and various; for instance, finely ground stone from the surface of the earth, the ash of exploded meteorites, and living germs. Mr. Aitken showed experimentally that, by simply heating any substance, such as a piece of glass, iron, or wood, a fume of solid particles was given off, which, when carried along with pure air into a receiver, gave rise to a dense fog mixed with steam. So delicate is this test, that the hundredth of a grain of iron wire will, when heated, produce a distinct haziness in the receiver. By far the most active source of these fog-producing particles is, however, the smoke and sulphur given off by our coal fires; and as even gas grates will not prevent the emission of these particles, Mr. Aitken thinks it is hopeless to expect that London, and other large cities wherein such fuel is used, can ever be free from fogs. However, inasmuch as more perfect combustion will prevent the discharge of soot flakes, these fogs may be rendered whiter, purer, and therefore more wholesome, by the use of gas grates, such as that recommended by Dr. Siemens. Mr. Aitken also drew attention to the deodorizing and antiseptic powers of smoke and sulphur, which, he thinks, probably operate beneficially in killing the deadly germs and disinfecting the foul smells which cling about the stagnant air of fogs, and suggests caution lest, by suppressing smoke, we substitute a greater evil for a lesser one.

THE NAVIES OF EUROPE.—TEN YEARS' PROGRESS IN SHIPS OF WAR.

In recent issues of this paper considerable space has been given to the consideration of our coastwise and maritime defenselessness, and to the pressing need of attention to our naval weakness.

The past decade has been a period of remarkable activity and creative progress in all the navy yards of the world save ours. During this time the great powers of Europe have substantially reconstructed their navies on a scale previously undreamed of; and even the third and fourth rate powers of the world have so increased their war fleets as to place us in a decidedly precarious position navally should a controversy with either or any of them suddenly arise. There is happily no present indication of foreign war, but a war is always possible; and it becomes the richest nation in the world to be doing nothing for the protection of the exposed wealth of its seaports, or for putting itself in position to command respect—the surest guarantee of peace.

According to the recent report of the Navy Department the strength (more correctly, weakness) of the United States Navy is summed up as follows:

In Commission—Steamers, 29, sailing ships, 4; monitors, 8; torpedo boats, 2; total, 43. In Ordinary—Steamers, 18; sailing vessels, 8; monitors, 7; steamers, 3; sailing ships, 3; monitors, 1; steamer, 1; sailing ships, 3. On Stocks—Steamers, 5, sailing ship, 1; monitors, 4; ironclad, 3. Repairing—Steamers, 9. At Naval Academy—Sailing ships, 3; monitors, 1. Public Marine School—Sailing ship, 1. Tugs of all kinds at yards and stations, 25. Total number of vessels, 139.

Of these vessels, constituting the general service fleet, six are double-turreted armor belted monitors, only one of which is finished or near completion—the rest are rotting on the stocks; fifteen are single turreted monitors built from fifteen to eighteen years ago, and now practically worthless; five are unarmored screw steamers (frigates), the youngest, the flag ship Tennessee, being fifteen years old; twelve second-rate and twenty third-rate corvettes, all but one second-rate (the Trenton) and half a dozen third-rates being ancient and of small value; four paddle steamers, all ancient; two torpedo vessels, and a dozen small gunboats, only two of which are yet armed. Some of these vessels carry small rifled guns (altered from smoothbores), and all are slow, very few exceeding ten knots.

The navy of Great Britain presents a remarkable contrast. It now comprises, according to the careful summary of Mr. King ("War Ships and Navies of the World," by Chief Engineer J. W. King, U. S. N. Boston: A. Williams & Co. 1880), nearly four hundred vessels of all kinds, excluding those laid up or employed in permanent harbor service. These vessels are divided into three classes: ships for great naval battles, ships for coast defense, and unarmored cruising vessels. Of the first class of heavily armored sea going fighting ships, armed with powerful guns, there are now twenty-eight, carrying 254 guns, weighing in all 4,493 tons. Eleven of the ironclads are sea-going turret ships—nine mastless and two rigged—and seventeen are broadside ships, of which three are armor-belted cruisers. The coast defenders number fifteen, and the iron broadside ships of the original type number ten. In addition, two iron-plated wooden ships remain serviceable. These are all large ships; nearly all are of recent construction, the average expenditure on new armored ships, according to Mr. King, being about fifteen million dollars a year, while nearly four millions are spent on other new vessels. The first-class turret ships range between 270 and 330 feet in length; 6,200 to 11,400 tons displacement; carry guns of from 25 to 80 tons; and can steam from 12½ to 15 knots an hour. The first-class broadside ships are from 230 to 325 feet in length, and, with one exception, exceed 6,000 tons displacement, rising as high as 9,500 tons. They carry guns of from 12 to 25 tons, and all make better time than the fastest American corvettes, or between 12 and 15 knots. The armor belted ships are but

slightly smaller and less powerful. The coast defenders are improvements on our monitors in size, speed, and armament. Most of the old-type iron broadside ships are larger than our Tennessee; are armored, carry guns from 6½ to 12 tons, and can steam from 12 to 15 knots.

The lately built unarmored ships of the British Navy include three iron frigates, six iron corvettes, two steel dispatch vessels, nine steel and iron corvettes, six composite corvettes, fourteen first-class composite sloops, and six second-class, with a hundred composite gun vessels and gun boats. The frigates steam from 15 to 16 knots; the first class corvettes from 13 to 15 knots; the second class 11 knots; the dispatch boats, both as large or larger than the Trenton, have exceeded 18 knots.

The old-type steam cruisers of wood and iron in the general service fleet are by no means of small importance, though they do not properly fall within the scope of this article. This fleet comprises fifteen ships of the line, twelve frigates, twenty corvettes, ten sloops, thirteen troop ships, supply ships, dispatch steamers, yachts, surveying vessels, etc.

The new fighting fleet of France practically dates from 1872, when a programme was drawn up for the construction of 217 vessels of various types, costing in all upward of \$121,000,000. The finished armored vessels comprise eight sea going ships of the first class, iron or iron and steel rams, from 311 to 322 feet in length, from 8,133 to 10,332 tons displacement, and of speeds ranging from 13 to 14½ knots; seven or eight sea-going ships of the second class, about 250 feet in length, from 4,000 to 6,000 tons displacement, and speeds of from 13 to 14 knots; fifteen coast defenders, from 216 to 241 feet in length; sixteen first-class wood and iron ships of old types, and eight of second-class, the former from 212 to 284 feet in length, the latter 230 feet. All of these ships are armed with breech-loading rifled guns. When Mr. King's table was made two first-class sea-going ships were building, each to carry three 100-ton guns. All the French sea-going armored ships are rigged; the mastless vessels for coast defense include six turreted vessels; all the rest are on the broadside principle, or have the broadside and turret principles combined. The heaviest guns are mounted *en barbette*. Both the armored and unarmored modern ships have the ram bow.

Of the latter type of vessels the programme of 1872 contemplated eight first-class, eight second-class, and eighteen third-class cruisers, eighteen dispatch vessels, thirty-two gun boats, and thirty-five transports. A large portion of these are already afloat. By 1885 it is expected that the entire fleet will consist of new vessels of the most approved modern types armed with the best modern guns, all in perfect condition for service.

The list of the old-type steam cruisers, mostly of wood, given by Lieutenant Very ("Navies of the World," by Lieut. Edward W. Very, U. S. N. New York: John Wiley & Sons. 1880), includes nine ships of the line, six frigates, ten corvettes, twenty one sloops, eleven dispatch vessels, and forty-two transports.

The fleets of Germany and Italy are almost entirely the work of the past decade or so. It is only since 1860 that Germany has had any navy at all, to speak of, and since 1873 that any attempt has been made to acquire a navy commensurate with the importance of the empire on land. The armored ships afloat or building comprise six casemate ships, 213 to 280 feet in length, 7,135 to 7,560 tons displacement, speed of 14 knots, and armed with Krupp guns of from 18 to 36 tons; two armor-belted turret ships, with casemate around turret, 298 and 308 feet in length, about 6,500 tons displacement, 14 knots speed, and armed with Krupp guns, the largest being of 18 tons; three large broadside ships; one corvette, and eight or ten coast defenders, of 1,030 tons displacement and slow speed. The latter carry each a 36-ton Krupp gun, in a movable turret protected by an armor parapet. None of these will be able to match the larger ironclads of England, or the Italian Duilio or Dandolo; but will have a strength sufficient, perhaps, to meet the French under any conditions proffered.

The modern unarmored ships of Germany include seven fast iron corvettes, 2,460 to 3,833 tons displacement, carrying from 12 to 16 guns each, having covered gun decks; and six open deck corvettes of 2,169 tons displacement; three fast dispatch vessels (16 knots), and five gun boats.

The modern war fleet of Italy dates from 1877, and comprises the most powerful and heavily armed vessels ever built. The Italian ships are specially remarkable for the heavy guns they carry and their great speed. The broadside ships Italia and Lepanto, now building, are 400½ feet long, 13,480 tons displacement, are expected to steam 16 knots, and will each carry four 100-ton Armstrong guns, mounted in pairs *en barbette*, and 18 smaller guns. The mastless turret ship Duilio lacks an inch of 341 feet; its displacement is 10,401 tons; it carries four 100-ton guns, and makes 15 knots. The unfinished Dandolo is in every respect its counterpart. The four line of battle cruisers already afloat are from 250 to 265 feet long, and though lightly armored are heavily armed, two of them carrying one 23-ton and six 18-ton guns, the other two carrying six 18-ton guns and two 12-ton guns. There are besides one monitor ram, four floating batteries, and six broadside frigates, for coast defense and station service. The unarmored fleet numbers ten fast cruisers, of which three are second-class corvettes, four gun boats, and three torpedo vessels. By the decree of 1877 it was determined to have completed by 1888 sixteen ships of war of the first class; ten of second class for local defense, for cruising, and for foreign stations; and twenty

vessels of third class; twelve transports, and twelve small ships for local service, a programme which is rapidly being carried out, as already shown.

Two years ago the Russian Navy included thirty-one armored ships and a couple of hundred other vessels. The armored ships were: frigates, 6; battery ships, 3; turret ships, 5; Popoffkas, 2; double turret monitors, 3; single turret monitors, 12. The more powerful of the Russian war ships have been launched since 1874. The double turret ship, Peter the Great, is 330 feet long, is of 9,510 tons displacement, carries four 40-ton guns, and has made 13 knots. The Knatz Minin is another powerful ship, 389 feet long, 5,800 tons displacement, and carries four 28 ton guns, mounted in pairs *en barbette*. The two Popoffkas are floating citadels of circular form, designed for service in shallow water. The latest novelty is the turbot-shaped Livadia, ostensibly a yacht for the Czar, but doubtless intended, in case of need, to be heavily armored and armed for naval uses. During the past five or six years Russia has also been expending large sums on unarmored fast cruising ships, this arm of the navy having already become formidable.

The armored fleet of Austria contains but three or four vessels older than 1870. It comprises three redoubt frigates, 276 to 302 feet in length, 5,940 to 7,390 tons displacement, armed with 10 and 11 inch Krupp guns (18 to 28 tons), and able to make from 13 to 14 knots; five casemate frigates, 222 to 275 feet in length; three broadside frigates, of 197 and 233 feet length; two monitors, and one citadel ship. The smaller frigates are armed with 7 and 8 inch guns, and make from 11 to 13 knots. The last mentioned vessel carries two 17 inch Armstrong guns. The unarmored fleet contains a considerable number of recent cruisers of fair speed and efficiency.

The navy of Holland is chiefly strong for defensive purposes, and comprises but two sea-going armored ships. The armored ships of Spain are few and of small importance compared with those of other European powers. The list includes 133 vessels of all kinds, but there are no modern sea-going armor-clads and no cruisers of the rapid type. Denmark has launched two iron-clads since 1873, the frigate Odin, carrying four 18-ton guns; and the broadside, casemated, central battery ship Helgoland, launched in 1873. The half dozen other armored vessels are old. The Swedish navy is designed chiefly for coast defense. This arm comprises four armored monitors, ten armored gunboats, and about a hundred other vessels of all sorts. The navy proper comprises 38 unarmored vessels. Portugal has one armored ship, ten screw corvettes, nine gunboats, and half a dozen sailing vessels, transports, etc. Norway has four monitors, one frigate, four corvettes, and about a hundred gunboats and other small vessels. Greece has fifteen vessels, including two ironclads. Turkey has vessels enough to rank among the naval powers, but lacks money and officers to make them effective. Fifteen of her ships are large and fairly armed.

The chief lesson taught by the costly naval experiments of European powers during the past decade—a lesson which the United States can profit by—seems to be the inexpediency of building huge floating fortresses at enormous cost. The power of guns can be increased more rapidly than the ability of ships to withstand them; and the greater the target the greater the chance of being hit, and the greater the loss of life and property when a crushing blow has been struck.

For defense against the largest class of ironclads we need properly placed stationary coast defenders, the armor of which can be increased as the power of the guns to be resisted is increased. The superior accuracy of fire possible in a land battery will make one heavy gun, so placed and guarded, more formidable than many guns of equal weight on shipboard. For naval purposes a large number of small vessels of great speed, each carrying one heavy gun, will be more efficient than a few large armor clads of equal aggregate cost.

The Scientific American.

While the newspaper press of the day is, for the most part, inculcating more of error than of truth in the public mind in regard to medical topics, cultivating the vulgar superstitions by circulating every sensational story about madstones and blood stones and the like, and gloating over every report of the desecration of graves for anatomical purposes, it is refreshing to turn to the pages of the periodical above named, and to observe that whenever medical topics are introduced, it is with the design of imparting the truth and inculcating correct ideas. Many years of growth have raised the SCIENTIFIC AMERICAN to the front rank, so that there is not in any country a publication superior to it in its sphere. —Pacific Medical and Surgical Journal.

Photographic Emulsions.

BY H. W. VOGEL, BERLIN.

The essence of the invention consists in combining gelatine and bromide of silver with pyroxiline by the use of a new solvent, which insures the homogeneous mixture of the two. The solvent may be one of the inferior members of the fatty acids, such as formic, acetic, propionic acid, etc., or mixtures of the same alone or with alcohol, etc. Four various methods of producing the combination are described, of which the first is as follows: Ordinary gelatine is dried and dissolved warm in one of the above-mentioned acids, and one per cent of pyroxiline dissolved in a similar acid is added.