the Kwakiutl. The tribes of the interior, on the other hand, live in underground houses, and are hunters as well as fishermen. The hero of the Salish myths seems to be the Sun, and legends are found referring to the murder of the old sun and the origin of a new one. I am not equally sure that the legend of the Great Transformer originated among the Salish. On the coast he is undoubtedly considered the deity, but he is of far less importance among the Ntlakapamuq of Thompson River. I do not know whether the legend is known to the Salish of the interior of Washington Territory, but we know that it is known to the Chinook of Columbia River. It is also the foundation of the Nutka mythology.

Patriarchate prevails among the Salish. The division into gentes, however, is not very clear. There exist prerogatives of certain groups of families, particularly regarding the winter dances and the use of masks. The latter is undoubtedly derived from the north, as masks are few, and as it seems that they are not used by the inland tribes.

The study of the use of masks calls our attention to another interesting fact. The masks of the most northern one of these peoples, the Tlingit, have certain remarkable ornaments, representing figures of animals, which are attached to the faces. Beside this, they are not as conventional as those of the southern tribes. The masks of the Eskimo of southern Alaska have the same peculiarities, and this leads us to conclude that a mutual influence existed here. A careful study of the religious ideas of these tribes reveals another fact that strengthens the foregoing conclusion. The Tlingit as well as the Eskimo believe that there are two regions to which the souls go after death: those dying a violent death go to heaven; those dying of sickness go to a lower world, which the Eskimo believe to be under ground, while the Tlingit say that it is outside the world, on the same level with the earth's surface.

I have attempted in the preceding remarks to elucidate a few points regarding the history of North-West American culture. I have shown that it is not uniform, and that it is derived from various sources. Those facts seem to be the most convincing which prove that various tribes belonging to the same linguistic stock have not the same social organization and customs. Unfortunately the available material is not sufficient to complete our inquiry. A knowledge of the tribes of Gardner Channel and of the Salish of the interior, as well as of their southern neighbors, is indispensable in tracing the origin of the legend of the Great Wanderer.

One of the results of our inquiry is the discovery of the deep influence wrought by the Kwakiutl upon the development of their neighbors. It may be that this influence is still more important than it seems at present. The foundation of the mythology of the Kwakiutl tribes is obscure, as they themselves are much influenced by another great group of tribes, — the Tlingit and Haida.

These two tribes will form one of the most interesting objects of further researches. Their languages are very much alike in structure, while their vocabularies show great differences. Their customs and traditions are alike; but the Haida are influenced by their southern neighbors, through their frequent intercourse with the Tsimshian. The fact that the arts of the Tlingit and Haida are not of the same character is important, as it seems to prove that the arts are of foreign origin, but attained their highest stage of development here.

The legends of the Tsimshian favor the theory that they reached the coast much later than the other tribes. The Nutka, finally, are so much influenced by the Kwakiutl, that a study of their customs does not reveal any facts as to their origin. F. BOAS.

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THE increase of population of France is steadily growing less. In the past year the number of births was 899,333; of deaths, 842,797; or 23.5 and 22 per thousand respectively. The excess of births over deaths has decreased since 1881 from 108,229 to 56,536, or 48 per cent. The *Revue Scientifique*, from which we take these figures, comments in a very interesting editorial on the connection of these facts with the question of retrenching immigration into France, which is at present favored by the government and by the people, and shows that the only remedy is to open France to an unrestricted immigration from neighboring countries.

## SCIENTIFIC NEWS IN WASHINGTON.

Photographs made on Surfaces Feebly Sensitive to Light: Making Pictures on Printing-Paper and Wood without Previous Preparation of the Surface. — A Town in Florida where they deserve to have Yellow-Fever: Dr. Posey's Report on the Sanitary Condition of Macclenny. — Do we carry an Electric Battery within us? — Floating Wrecks a Source of Great Danger to Ocean Navigation: The International Marine Conference to discuss the Subject. — The "King Devil." — How to see Insects and Plant-Roots under Ground.

### Surfaces Feebly Sensitive to Light.

SOME interesting experiments have recently been made by Mr. J. W. Osborn of Washington, on the sensitiveness of different surfaces to light, the results of which he has described in a paper, of which the following is an abstract: —

"In thinking and speaking of substances sensitve to light," says Mr. Osborn, "photographers and others are apt to remember only the haloid salts of silver; chromic acid, under restraint, acting on organic matter; asphaltum, and a few salts of iron and platinum; which short catalogue does, in fact, include all the sensitive bodies used in practical photography." But, as every one knows, this list may be indefinitely extended (if the degree of sensitiveness be disregarded), and Mr. Osborn has prepared a number of specimens to show such extension in certain directions. Broadly, he says, the results should not be regarded as new, though in the manner of their preparation and presentation some novelty may be claimed for them.

Three specimens were prepared to show colored commercial paper which had been bleached by light, and which give, therefore, a negative when exposed under a negative. On other sheets exposed, papers colored for the purpose with eocine and methyl violet are shown, and they establish the fact that these colors, under the luminous influence, give rise to colorless compounds.

"The duration of the exposures required to produce these photographic effects," says Mr. Osborn, "is very considerable when the change is carried to its maximum; varying from twenty to thirty-five or forty hours in direct sunlight, which is the only kind of exposure employed in the experiments. Indications of photochemical action are, however, visible in much less time. A piece of eocine paper exposed under two strips of black lace showed a faint positive after half an hour; also a piece of methyl violet paper, similarly exposed, showed gradually increasing strength of the positive after one, two, and three hours.

"The fact that printing and writing papers become brown by age is familiar to most persons; but that this change is essentially photographic is not a common belief. Pieces of newspaper were taken from the New York *Tribune*, Baltimore *Sun*, and Washington *Evening Star*, and photographic images were impressed upon them by simple exposure under a dense negative. These papers were subjected to no preparatory treatment, establishing the fact that the newspapers we read daily are printed on papers sensitive to light, and adapted for the production of positive pictures.

"Pieces of white pine wood of different qualities were prepared, upon which photographs were produced by exposures under stencil negatives made by cutting openings in tinfoil and pressing it into close contact with the surface of the wood by means of a plate of glass properly clamped thereto. The exposure required to produce these photographic images varies from thirty to fifty or sixty hours. On a piece of poplar the picture was produced in twenty hours; for it seems probable, that, of all the woods in common use, poplar is the most sensitive, and gives the darkest color when fully exposed. It seems probable that the darkening of wood, which is very commonly though rather vaguely attributed to the action of the air, is related to the photographic effect obtainable on printing-papers. These are now hardly to be had without an admixture of wood-pulp; and the present inquiry, inasmuch as it proves the phenomena to be strictly photographic, may have a practical bearing if it points to means which will keep printing-papers white indefinitely."

The bleaching action of light upon a dried leaf is shown by one specimen; and by another, the fact that a piece of parchment, though substantially white, becomes a little whiter where the light has acted. As far as it goes, this would tend to show that the "yellowing of parchments by age" is not a photo-chemical process. The parchment had a very long exposure.

"As connected with this general subject," continues Mr. Osborn, "I would call to mind the investigations of Mr. Thomas Gaffield of Boston, who established conclusively, more than twenty years ago, the slow effect of light on colorless glass in gradually giving it color, sometimes pinkish and sometimes yellow, the former being apparently due to a re-oxidation of the reduced manganese employed to counteract the iron. These changes often require years for their completion.

"Experiments only just completed tend to show that pure cellulose in the form of the finest filtering-paper is not sensitive to light; at least, a constant exposure in a horizontal position to diffused and direct sunlight failed in two weeks to produce any perceptible change in color. On the other hand, the same filtering-paper colored with picric acid, and similarly exposed for the same time (about one hundred and forty hours of diffused and direct sunlight), gave a coloration as before, when sized and calendered paper of the best quality was treated with the acid.

"Simultaneously with the above exposures, another was made of the same duration and in the same way. This was the presentation of a thin stratum of commercial picric acid on glass to the same illumination as that already mentioned, under a stencil tinfoil negative and a plate of glass covering the same. The picric acid was darkened, as before, very decidedly, though it would be difficult to exhibit the results in a satisfactory way by means of a specimen."

### Yellow-Fever and Bad Sanitation.

Surgeon-General Hamilton has just published the reports of several of the government inspectors who were detailed to visit the cities and towns of Florida, and ascertain their sanitary condition and whether yellow-fever prevailed in them or not. Among these reports is that of Dr. J. L. Posey upon his visit to Macclenny, a small town, of about six hundred inhabitants, in Baker County, in which the fever was epidemic. Here is what he says about the sanitary condition of the place: —

"The general appearance of the town, which consists of perhaps a hundred stores and dwellings scattered over a rather large area, indicated a very wretched sanitary condition. The streets along the railroad-track, as well as others, were covered with heaps of decaying sawdust, and garbage of every description spread over them, drains obstructed, and open lots overgrown with weeds and rank vegetation. The floors and platforms of the depot-buildings, passenger and telegraph offices, and their vicinity, were covered with lime, which had recently been thrown broadcast. A further stroll through the town revealed a similar deplorable sanitary state, — the steps and front galleries, and porches and premises, of residences, lavishly sprinkled with lime, and the yards filled with accumulated garbage. No organized measures had been adopted by the local health authorities to even ameliorate, much less correct, this unsanitary state of their town.

"The site of the town is a low, flat, sandy plateau, without sufficient elevation to give effective drainage; the surrounding pine-forests being interspersed with a series of marshes and alluvial basins. No attention had been given to the removal of excreta or their proper disinfection. The water-supply is generally obtained from wells at a depth of fifteen or twenty feet, and is of a quality which I consider very unwholesome, having experienced personally its disagreeable effects. The atmospheric condition resulting from such foul surroundings was fully prepared to propagate the infectious material, which had been already introduced into the town, and had been gradually developing since the 1st of August.

"I went from house to house, and found the sick and dying huddled together in small rooms, with windows and doors closed, the floors sprinkled with chloride of lime, carbolic acid, and a variety of other disinfectants. The oppressive odor of disinfectants mingling with the close atmosphere of the sick-rooms, laden with the emanations from the excreta and ejecta of the patients, together with the dreadful visages of the dying, was shocking to every sense, and the scene well calculated to appall the stoutest hearts. I have seldom witnessed a more pitiable and melancholy sight than that presented to my view in my house-to-house inspection through this desolate scourge-swept town. As I returned to the hotel in the evening, I met many whose pale, wan features, languid air, and step marked them as convalescents from the disease, and others who, with anxious look, approached me, and in whispered tones asked to know my opinion of the prevailing fever. I told them that they must escape with the rising sun, or, remaining, fall victims to yellow-fever.

"A late report shows that there have been 189 cases out of an actual population remaining of 195, the deaths being 21 whites. Of the above number, 160 were whites and 29 colored. There are now sick 11 white and 8 colored."

Dr. Posey himself contracted the yellow-fever at Macclenny, but has since recovered.

Comment upon such a report as this is unnecessary. Yellow-fever is a disease that seeks filth and bad sanitary conditions, and, wherever it finds these and an unacclimated population, it is certain to become epidemic. Its whole history in this country proves this; and especially was this illustrated in the terrible experiences of Galveston about twenty years ago, of Shreveport a few years later, and, more recently, of Memphis. Yellow-fever never became epidemic where the sanitary conditions were good, although the germs of the disease have frequently been introduced into them. It is probable that the sanitation of Jacksonville is much better than that of the cities named was at the time the scourge swept over them; and this, it is believed, accounts for the mild form of the fever there, and the low rate of mortality.

### The Human Heart an Electrical Battery.

The discovery announced in the following brief notice has greatly interested the scientific men of Washington, who are looking for fuller reports in the British scientific journals. This brief article appeared in the *Pall Mall Budget* of Oct. 4.

"The most important of the inaugural addresses at the hospitals was Dr. Waller's at St. Mary's, on his discovery of electrical currents caused by the pulsation of the human heart. The researches which Dr. Waller described have occupied him during the last four years; and the record was interesting, he thought, as an actual example of what goes on in physiological laboratories, and correction of 'that most unfortunate and mischievous error that they are chambers of horrors.' But more interesting still are the results of the researches themselves; for if in each human heart there be indeed an electrical battery, then developments in the art of electricity may in time become possible, beside which Mr. Edison's wonderland will seem commonplace."

### Derelicts on the Ocean.

One of the most interesting subjects to be discussed by the International Marine Conference in Washington next spring will be "the destruction, or at least the frequent reporting, of dangerous derelicts." The fullest and most valuable information in regard to drifting wrecks, their courses and location, now furnished anywhere, is given on the monthly Pilot Chart issued by the United States Hydrographic Office. Numerous reports are received daily from the captains of vessels; and when the latest facts are plotted, and represented graphically upon the chart, captains of vessels leaving port are able to see at a glance just about where on their voyages they may expect to encounter these dangerous obstructions.

When one of these derelicts drifts into the path followed by many vessels, the danger is greatly increased, and remains until the wreck breaks up or drifts into unfrequented parts of the ocean. The Pilot Chart for October shows the very interesting history of the derelict schooner, 'W. L. White.' She was wrecked off the Delaware capes in the great March blizzard, first drifted south and then north-east, and by the last of March was found in the track of the transatlantic steamers, where she remained six months, drifting slowly north as the summer months went on, and as the steamers changed their tracks to the north. From March 13 to Sept. 19 she was reported thirty-eight times. In twenty-three instances the reporting vessel passed near enough to read her name. On May 30, three vessels 'fell in' with her; June 17, two; and Aug. 7, two. Of the thirty-eight vessels which reported passing her, twenty-eight were transatlantic steamers, and were, no doubt, travelling at high rates of speed when they passed her, and did not see her until she was close by. The awful results of a collision on any one of these occasions can better be imagined than described.

Icebergs frequently give notice of their near approach by the

falling temperature of the air, but a drifting wreck gives no such timely warning of its dangerous neighborhood. This danger is especially great in the night, in foggy or thick weather, and when the derelict is bottom-up or deeply submerged. An instance of narrow escape was the experience of the steamship 'Louisiana,' Sept. 19. While steaming at fourteen knots an hour in the Gulf of Mexico, she passed within fifty feet of a vessel two hundred feet long, bottom-up.

It is hoped that the conference will devise some plan to rid the ocean of these obstructions, or, at least, of the most dangerous of them.

### The "King Devil."

In August, 1879, Prof. Lester F. Ward, while returning from a hunting-excursion in the North Woods, discovered near Carthage, N.Y., a new variety of *Hieracium* (house-leek), of which he obtained two specimens. The next day, after a long search, he found on a farm at Evans Mills — a small village about ten miles from Watertown — large colonies of the same plant. The individuals were many of them smaller and slenderer than, but there was no doubt that they were of the same species as, the specimens secured the day before. He secured a great number of the specimens, and remarked to his companion, that, unless the farmers of that region adopted some measures to destroy that weed, it would give them much trouble in the future.

On his return to Washington, Professor Ward identified his specimens as belonging to the species *Hieracium præaltum*, a variety of house-leek very common, and a great pest to farmers in many parts of Europe, but little known in America.

Last summer Professor Ward visited St. Lawrence County again, and one of the first things he was informed of was the appearance, six or eight years ago, and the rapid spread since, of a weed they called the "king devil." Professor Ward at once identified it as the novel variety of house-leek he had discovered during his former visit in that neighborhood, and, of course, recalled to mind the warning he then uttered. When the king devil once gets into a field, it completely covers the ground with its continuous green leaves, preventing the growth of any other plant or weed. It took such complete possession of one field of thirty acres, that there was absolutely nothing else on it — there could be nothing else.

Inquiry as to the local origin of the king devil traced it to the farm where Professor Ward had found the colony in 1879; and here, therefore, was the nest in which was hatched one of the worst pests the farmers of the United States have ever had to encounter, and from which it has spread over the country. In the region where it first appeared it has already extended over a belt of country fifteen miles wide, the length of which Professor Ward did not ascertain. It has been reported thirty miles west of Kingston, Canada, and in other places.

Various methods of eradicating the king devil have been suggested, but none of them have proved effective except the thorough salting of the land. This, of course, is expensive, and destroys all other vegetation as well as the noxious weed against which it is directed; but the field can be restored, and, while the king devil has possession of it, it is of no use whatever to its owner.

### An Apparatus for studying Insects under Ground.

Prof. H. J. Comstock of Ithaca has, by a very simple invention, greatly extended the field of investigation for entomologists. He has made it possible for them to see insects under ground, and study their subterranean habits. The apparatus consists of a narrow frame made of wood, the two broad sides enclosed with glass. A sheet-iron shutter or screen is fitted to slide before the glass on each side, and, at ordinary times, exclude the light. Two sides and the bottom of the box thus formed are therefore narrow, and composed of wood, while the other two sides are broad pieces of glass. The top is open.

This box is filled with earth, and any plant that may be selected is set out in it. The insect living under ground that is an enemy of this plant, and whose habits it is desired to study, is also placed in the earth. The sides of the box are then closed with the screens, so as to secure the same conditions in the soil in the box as under ground in nature. From time to time, as it is desired to investigate, the screen on one side is temporarily removed, and through the glass the movements of the insects may be observed, changes in their development noted, and important discoveries may be made.

The apparatus is made of all sizes and various shapes, so as to adapt it to any special investigation that may be undertaken. Professor Comstock has one at Ithaca so large that he keeps it in a hole in the ground, and raises and lowers it by means of a rope attached to a pole. It is admirably adapted to the study of the roots of growing plants, and may be so modified as to expose to view the underground habits of small animals that burrow.

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## COMMERCIAL GEOGRAPHY.

### Bokhara and the Transcaspian Railroad.

THE rapid changes brought about by the construction of the Transcaspian Railroad in Bokhara and Samarkand form the subject of an interesting paper by Dr. O. Heyfelder, which was published in the October number of *Unsere Zeit*. On Jan. 18, 1888, the great bridge across the Amu Darya at Chardjui was completed, and on May 27, Samarkand was reached. The railroad runs in a north-easterly direction from Merv to Chardjui, and, a short distance south of the latter place, enters the territory of Bokhara. Near Karakul it reaches the Sarafshan, which it ascends. Samarkand became a Russian province in 1868, but until recently it was almost isolated, large deserts being situated north-west and south-west of it. A road connects the city with Tashkent, from which place it took twenty-one days to reach St. Petersburg. The telegraph from Samarkand to St. Petersburg followed the same road. Since the opening of the railroad the state of affairs in the whole valley of the Sarafshan has greatly changed. The people of Bokhara were at first opposed to the enterprise, as it brought the country still more under Russian and Christian influence. For these reasons they insisted upon the road passing the city of Bokhara at a distance of several miles; but it seems that after the road was once opened they quickly acquiesced in the new state of affairs, and the country is now open to European, or rather Russian, influence. Lady physicians, who practise in Samarkand and Tashkent, have had a great influence upon the population, and the medical staff of the railroad is doing good work in Bokhara. Heyfelder believes that their influence will be sufficient to improve the hygienic conditions of the filthy cities of that country. European manufactures are introduced by branch offices of Russian houses, and particularly through their establishment European influence is gaining greater strength. The first of these branch offices was founded in Bokhara in 1874, after the ratification of the treaty of commerce; but the greater number were established after the completion of the railroad to Merv, and after its continuation to Samarkand had been decided. At present they are not confined to the capital, but Russian merchants are found in every city of the country. The extent of its trade will be understood from the fact that merchants from Bokhara visit annually the great fair of Nischnii-Novgorod to sell the produce of the khanate. Silk manufactures from Samarkand are sold in St. Petersburg, Moscow, and Kharkow. Sheep are purchased in Karakul, and transported by rail to the Dnieper; lamb-hides are sold to Moscow, lumber to Asia Minor; and carpets from Bokhara are valued all over the Orient. While, according to the treaty, the importation of European manufactures is favored, a wise article prohibits the sale of alcohol in the khanate. Gambling and the use of liquors have been introduced by the Russians into Samarkand, not to the advantage of the natives. It is doubtful whether the influence of the Europeans will have a wholesome effect upon the trades of the people. At present they are skilful potters, turners, embroiderers, and leather-manufacturers. It is, however, a frequent experience that trades of this kind are unable to compete with the cheap products of European machines, and that the introduction of improved methods is accompanied by a decline in native art. Samarkand and Bokhara are dependent upon the Sarafshan, cultivation being possible only by means of irrigation. There exists an admirable and complicated network of canals all along the river; but, of course, no scientific methods of irrigating are used, and consequently a great portion of the available water is wasted. Russian influence will undoubtedly tend to improve the methods applied, and thus the extent of arable land and the value of its produce will