BIRDS IN THE ZOOLOGICAL GARDEN AT BERLIN.

When in the late autumn the red and yellow leaves fall and the first night frosts come, there is a peculiar restlessness among the feathered inhabitants of the Zoological Garden. The migratory birds are very much excited by the call of passing birds of their species, and forget that their ability to fly has been taken from them by the injury which their wings have sustained. So they try to rise, only to fall headlong on the grass or in the water. The first cranes gather in groups and answer with deafening cries the call of the wild cranes which form themselves into regular triangles or parallel lines high in the air as they pass southward. The birds with stilt-like legs, from hot countries, such as the flamingoes and many species of storks and cranes, evidently suffer when the temperature sinks at the beginning of winter. With bristling feathers and shivering legs, they stand close together in groups or run up and down flapping their wings, trying to warm themselves. Remarkable groups can often be seen, whose conduct shows plainly that temperature causes them discomfort.

Our cut shows such a group. Here we see a whole deputation of the long-legged fellows who seem to have sought the old philosopher, the marabou, for advice and help in their trying position. He, however, seems not to be in the mood for giving counsel, and apparently feels like venting his anger in some such words as these: "I cannot help you. You must stay here. Go to your stalls, and do not bother me."—*Illustrirte Zeitung.*

BIRDS IN THE ZOOLOGICAL GARDEN AT BERLIN.

How a Blind Man Sees.

Many instances have been related showing that defection in any one or more of the human senses often results in developing the corresponding inner sense. This has been more frequently observed in persons afflicted with loss of sight and hearing. One of the kind is interestingly described in a late issue of the Chicago *Herald*, which can be safely taken as one of the most remarkable on record.

Mr. Henry Hendrickson, born in Norway forty-three years ago, but who has lived in this country forty years, was deprived of sight when six months old. He was educated at the institution for the blind in Janesville, Wis., and is the author of a book entitled "Out of the Darkness," somewhat in explanation of the mediumship with which he is becoming endowed, although unable to account for it in any manner satisfactory to himself or conformable to the known laws of physical science.

The narrative states that he is well educated, a brilliant conversationalist, and, with glasses which hide his completely closed eyes, one would scarcely recognize him as a blind man. For the last twenty years he has seldom used an escort, except when in great haste, and when going on territory entirely strange to him. Many people who have observed the facility with which he moves from place to place doubt that he is totally blind, but he has been put under the severest tests, and those who have made the investigations are convinced that he cannot see.

Describing his habits to the reporter, he said: "When in a train at full speed, I can distinguish and count the telegraph poles easily, and often do it as a pastime, or to determine our speed. Of course I do not see them, but I perceive them. It is perception. Of course my perceptive qualities are not in the least impaired on account of my blindness. I am not able to explain it, but I am never in total darkness. It is the same at midnight as at midday. There is always a bright glow of light surrounding me."

A practical test was made. A thick, heavy cloth was thrown over his head as he sat in his chair. This hung down on all sides to his waist. It was impossible for any one to see through it. Then before him or behind him, it mattered not, an ordinary walking cane was held up in various positions, and in answer to the inquiry, "In what position am I holding it?" he gave prompt and correct answers, without a single mistake, sometimes describing acute or oblique angles.

"I have never," he said, "by the ordinary sense of sight seen an object in my life, not the faintest glimmer of one. My sight or discernment does not come in that way. This will prove the idea to you: Take me into a strange room, one that I have never been into, and never heard about, and no matter how dark it is, I can tell you the dimensions of the room very closely. I do not feel the walls; I will touch nothing; but there is communicated to me by some strange law of perception the size and configuration of the room."

He then related that being in New York in 1871, he walked from Union Square to a friend's house on Forty-first Street, a long distance, with several turns, and did not make a miss. He said: "I knew the house when I came to it. I did not see it, and yet I did. I am studying shorthand, and as my hearing is very good, I expect to become an expert. I had a little trouble with my writing at first, but am now able to write very well."

Another remarkable illustration of his power to see without eyes is this: If one make motions in the air like beating the time for a choir, but describing phonetic characters, he tells the characters, and interprets them. What might be termed a "crucial test" of this was given the *Herald* reporter.

Mr. Hendrickson further said: "I'm a very good skater, and can, when gliding over the ice swiftly, see every particle on the ice, every crack and rough spot, no matter how small and indistinct. The faster I go, the plainer I can see. Well, I don't mean that I can see, but I perceive, or something. It is light to me, and I discern everything."

The Locomotive Cab.

Mr. W. W. Boyington, in an interesting article in the *N. W. Architect* on the "Architecture of the Present Time as compared with that of Fifty Years Ago," gives the following incidental reminiscence:

"We must not forget the very crude construction of railroads. First the wood stringer with iron strap rails, more familiarly known as the 'snake head' rail. On these rails the engines were constructed to run without tenders or covers of any kind to protect the engineer or fireman. They used to stand on the open platform, exposed to the severity of the weather and storms. It was in the year 1830, I think, that I was called upon by the master mechanic and general superintendent of the Boston & Albany Railroad to see if I could not devise some kind of protection at least to partially cover the engineer and fireman, and have it sufficiently open not to obstruct their view. I examined an engine and reported that I could construct a cover. I was at once employed to make the necessary drawings and superintend the construction of the first cab over an engine in this or in any other country. The result was a perfect success, upon which there has not been any material improvement, as it was almost identical with the cab now in use. I need hardly inform you that its use was immediately adopted throughout this country. Had I had forethought enough to have secured a patent for the device, I probably would not have been called upon to prepare this paper. I trust you will forgive me for diverging so far from the subject given me. The mention of these somewhat kindred subjects has been prompted by the incidents in my early life that were fastened so strongly in my mind in connection with my studies and practice in architecture."

Meteorites.

Probably the largest private collection of meteorites is that of Mr. George F. Kunz, the well known mineralogist of this city. The collection contains over one hundred specimens, one-third of which are unbroken.

What is Hydroquinone?

The above question having been put to us by a number of our friends, we thought it would not be uninteresting to give our readers a brief review of the chemistry of this new developing agent and some statement of its general properties.

A few words may not be out of place here in explanation of the method of spelling the word as given above. Some writers in English use the term "hydrokinone;" but in looking into the matter we find this is simply an adoption of the German word without much change; whereas the correct English word used by the best scientific authorities is "hydroquinone." The reason for the latter method of spelling appears to us to be a good one. It is because the body under discussion was formerly obtained from quinic acid, one of the substances associated with quinine in Peruvian bark. We therefore prefer the word hydroquinone rather than hydrokinone, and for like reasons we reject the word hydrochinone, also used by some authorities.

Hydroquinone belongs to a class of organic bodies that the chemist calls diphenols, and hence it is sometimes called quinol; but the former name is that more commonly used. It was first obtained by Caventou and Pelletier, about the year 1820, as a product of the dry distillation of quinic acid, a compound found in Peruvian bark and a by-product in the manufacture of the well known alkaloid quinine. The above chemists did not make a thorough examination of the body, and called it pyroquinic acid, because they obtained it by heating quinic acid. Some time afterward Wohler found that he could obtain the same body by combining hydrogen and quinone (a product of the oxidation of quinic acid with manganese dioxide and sulphuric acid), and gave it the name it now bears, hydroquinone. He further found that hydroquinone could be best prepared by passing sulphurous acid gas through a warm saturated solution of quinone which has some of the undissolved substance suspended in it.

It is very interesting to note how the researches which had for their object the artificial production of the alkaloid quinine have also given us a long list of new chemical compounds that are gradually becoming useful to man as their properties are studied. Hydroquinone is one of these bodies, and although we cannot make quinine from it, yet there appears to be a great field for it in its applications to photography.

After hydroquinone as a product of the dry distillation of quinic acid had been studied, it was found to be obtainable from other sources. The leaves of the bearberry (*Arbutus uva ursi*) contain it combined with glucose, also the leaves of wintergreen (*Pyrola umbellata*). From both these sources it can be obtained by boiling the aqueous extract with dilute acids. But further study showed it to be related to benzol, the product of coal tar, and a process was soon devised to manufacture it from aniline, which is a derivative of benzol and the source of so many interesting organic compounds. The method of procedure is as follows:

One part of aniline is dissolved in eight parts of sulphuric acid and thirty parts of water, and to the cooled solution two and a half parts of potassium bichromate dissolved in water are gradually added. To the brown fluid thus obtained potassium sulphite is added, and the whole mixture is finally shaken with ether. The ether is allowed to rise and the fluid below is drawn off and rejected. By distilling the ether solution a residue is obtained which is dissolved in the smallest quantity of hot water. Sulphurous acid and animal charcoal are then added, and the solution is boiled and filtered. On standing, the hydroquinone separates out in hexagonal rhombohedral prisms.

The substance thus obtained sublimes in monoclinic plates, which, on solution in water, again gives the crystals mentioned above. It has a slightly sweet taste, and melts at 169° Celsius. It is readily soluble in hot water, alcohol, and ether (at 60° F. one part takes seventeen parts of water for solution). It reduces silver nitrate solution, and also alkaline solution of copper sulphate. It forms a compound with sulphurous acid gas, which may account for the fact that it works better in a developer which contains sodium sulphite. It may possibly be still further improved by adding sulphurous acid to this solution of sulphite and hydroquinone. The result of its oxidation is quinone, the product mentioned above, which is also obtainable from aniline by oxidation.

We have given our readers a brief review of the principal chemical properties of this exceedingly interesting developing agent. It is not as energetic as pyrogallol in its reducing power, but the results obtained are softer and the negatives are less liable to be stained. Furthermore, the fact that the reducing action of the developer is less energetic allows of its better preservation, and the same solution can be used for the production of a great many more negatives than a similar solution with pyrogallol as the active agent. At present the price of hydroquinone is considerably higher than pyrogallol, but should there be a demand for this new agent, it will be manufactured cheaply, and the reduction in price will be similar to that which took place when pyrogallol became a popular developer.

We recommend all our readers to try this new developing agent, and even at the present prices the advantages and comfort obtained in its use fully compensate for the extra expense incurred in using it.—*Anthony's Bulletin.*

Leather Board.

According to the *Shoe and Leather Reporter*, the name leather board is something of a misnomer. In the best grades of it no leather is used at all. Essentially, leather board is a paper. It is manufactured by paper processes and on paper machinery. The raw materials are beaten up in a pulp engine, run off on what is known as a wet machine, and pressed between rollers. Then it is dried out of doors in summer, under cover in winter, after which it is calendered until finished. It is marketed in sheets. These are put up in bundles of fifty pounds each. The varying thickness of these sheets is expressed by the number of sheets in a bundle. Leather board so thick that five sheets make a 50 pound bundle is No. 5 board; that so thin that 45 sheets make a 50 pound bundle is No. 45 board. These two numbers are the extremes.

Of leather board there is a wide range of qualities. The poorest sells at about 3 cents, the best at 12 cents per pound. All grades of it are used more or less in most medium and low priced shoes. It is a shoddy, and yet in some of its uses, such as in "filling," where otherwise only small scraps of leather would be worked in, it answers the purpose even better than the latter.

Leather board may be divided, according to its uses, into three kinds: 1. That used for inner soling, shanking, filling, and the like. Materials used in the manufacture of this grade vary more than those in any other. They are all cheap, but must be supplied with a good deal of fiber, for it is a requisite that the product be both tough and solid. Thousands of pairs of shanks are made of this every year. Then, too, steel shanks are covered with it. Backed with cotton duck, inner soles are made of it. Manufacturers use it for filling between the outer and inner sole, not to cheapen, but to save the time of gathering and arranging leather scraps. Board of this quality sells at about 3 cents per pound.

2. For tapping and veneering. This is in truth shoddy. It is made to imitate leather in appearance, and to cut as near like leather as possible. When cut it must present a surface that finishes like leather, and the toughness of the product is in some measure sacrificed to secure these appearances. Scraps of leather are used in its manufacture, but these also are worked in pulp form. Veneered with a thin split of leather, just enough to satisfy the demands of the buffing machine, many outsoles are made of this board, while it is freely used for taps and heel lifts. It sells at 3¼ to 4 cents per pound.

3. Counter board. Leather board and union heel stiffenings are or ought to be made of the best board, and this is manufactured of what is known as hard stock manila, jute, and the like. When up to the highest standard, this product is rich with tough, fibrous material, will stand a great deal of wrinkling before it breaks, and may be made approximately waterproof. Boot and shoe heel stiffenings or counters of all kinds, and box toes, are made of this. When properly treated and manufactured of good stock, the counters are serviceable. When leather board is backed with a leather split and moulded into a stiffening, the product is a union counter. On this kind of board prices range from 5 to 12 cents per pound. One company, which manufactures leather board, makes a chair seat cut from this material.

The American Physique.

Last spring I received a letter from an English gentleman who is interested in anthropology and biology, asking me if there were any facts to sustain the impression abroad that the white man is deteriorating in size, weight, and condition in the United States. I had no positive information of my own to give, and I could only refer my correspondent to the data of the measurement of soldiers and to some other investigations of less importance. It occurred to me, however, that since by far the greater part of the men of this country are clad in ready-made clothing, the experience of the clothiers might be valuable, and that from their figures of the average sizes of the garments prepared by them for men's use very clear deductions could be made as to the average size of the American man. I therefore sent a letter to two clothiers in Boston who have been long in the business, one in Chicago, one in New York, one in Baltimore, one in Detroit, one in Texas, and one in Montreal. The information received in return is to this effect:

In any given thousand garments, the average of all the returns is as follows: Chest measure, 38 inches; waist, 33½ inches; length of leg inside, 32½ inches; average height, ranging from 5 feet 8½ to 5 feet 9 in New England up to 5 feet 10 for the average at the South and West. A few deductions of weight are given, from which one can infer that the average man weighs between 155 and 160 pounds. These measures cover the average of the assorted sizes of garments which are made up by the thousand. There are a few small men who buy "youths' sizes," so called, and a few larger men who buy "extra sizes."

The remarks made in some of these letters are interesting. My correspondent in Chicago states that "so far as relates to the assertion that the race in this country deteriorates, our experience teaches us that the contrary is the case. We are now, and have for several years past been, obliged to adopt a larger scale of sizes and many more extra sizes in width, as well as length, than were required ten years ago. I find that occupation and residence have a great deal to do with the difference in sizes, the average of sizes required for the cities and larger towns being much less than that required for the country. Again, different sections vary very much in those requirements. For instance, an experienced stock clerk will pick out for South and Southwestern trade coats and vests, breast measure 35 to 40, pants always one or two sizes smaller around the belly than the length of the leg inside; for Western and Northern trade, coats and vests, breast measure 37 to 42, pants 33 to 40 around the belly, 30 to 34 length of leg inside."

My correspondent in Texas gives the average 38 inches chest, 33 to 34 inches waist, 32½ leg measure, 5 feet 10 inches height, adding: "We find that the waist measure has increased from an average of 32 to 33 inches during the past five years, and we think our people are becoming stouter built."

My correspondent in Baltimore had previously made the same statement, to wit: "Since the late war we have noticed that the average sized suit for our Southern trade has increased fully one inch around the chest and waist, while there has been no apparent change in the length of pants." I asked this firm if the change could be due to the fact that the colored people had become buyers of ready-made clothing, but have for reply that the fact that the negroes are buying more ready-made clothing now than previous to the war accounts in only a small degree for the increase of the size, but is due almost entirely to the increased physical activity on the part of the whites. The experience of this firm covers thirty-five years.

My correspondent in New York states that "for the last thirty years our clothing, numbering at least 750,000 garments yearly, has been exclusively sold in the Southern States. We find the average man to measure 37 inches around the chest, 32 to 33 around the waist, 33 to 34 inches length of legs inside, average height 5 feet 10 inches. The Southerner measures more in the leg than around the waist—a peculiarity in direct contrast to the Western man, who measures more around the waist than in the leg."

My correspondent in Canada gives the following details; experience covers twenty years, about 300,000 garments a year:

Breast measure	36	37	38	39	40	41	42	44
Waist measure	32	33	34	35	36	37½	39	42
Cut per 1,000 of above sizes	80	160	240	240	140	60	60	20
Average weight for each size	140	150	160	168	175	180	200	225

"The information about the weight I got from a custom tailor of some years' experience, and cannot, of course, vouch for its correctness."

My correspondent in Detroit says: "We notice marked peculiarities in regions where dwell people of one nationality. The Germans need large waists and short legs; the French, small waists and legs; the Yankees, small waists and long legs; the Jews, medium waists and short legs. We have found a decided demand for larger sizes than we formerly used."

This subject is foreign to my customary work. I give these statements as a matter of general interest, and perhaps some of the students who are engaged in this branch of investigation may take a hint from this method and extend it still further. Possibly the average size for a woman could be deduced from the data of the manufacturers of knit goods. From what I know of the business of the clothiers to whom I made application, I should infer that the figures which I have submitted above would cover more than one hundred million garments; and I know of no better method of coming at a rough-and-ready conclusion regarding the size of men than the one which I have adopted. The subject has interested me from the standpoint of better nutrition. It will be observed that the American man is decidedly gaining in size and weight. Cannot some one obtain data for comparison with these sizes from the statistics of military recruits and conscripts in Europe or from the contractors for army clothing?—*Edward Atkinson, in Science.*

Liquid Cement or Gum.

To make one gallon of the gum, about one and a half gallons of water, 3 pounds of glue, 4 ounces of borax, and 2 ounces of carbonate of soda, or an equivalent of any other alkali, are taken. The glue and alkaline salts are dissolved in the water by heat, and the solution is kept at a temperature a few degrees below boiling point for 5 or 6 hours. The continued application of heat renders the gum permanently liquid at the ordinary temperature. After allowing the sediment to settle, the clear liquid is evaporated to the required consistency.