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## ARSENICAL PAPER-HANGINGS.<sup>1</sup>

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DURING the past year I have had occasion to give advice in a number of cases involving grave symptoms, of long and persistent continuance, and of a nature so masked as to puzzle, for a time, both friends and physicians; but which, from the history and the symptoms, joined with the surroundings which I found in each case, I believe to have been due to arsenical poisoning from wall-papers on living or sleeping rooms, which the patients had occupied for a longer or shorter time.

It will be remembered that the pigments used by manufacturers of arsenical wall-papers are composed very largely of arsenite of copper and of aceto-arsenite of copper or Schweinfurth green, the former containing fifty per cent. and the latter fifty-eight per cent. of arsenious acid, which dangerous elements are applied to the paper by size, giving but a feeble cohesion when exposed to the air or to the danger of attrition from various causes. Even the flock papers, which have been looked on as innocuous, often have a layer of arsenical pigment, which in time becomes equally dangerous.

The subject of arsenic-bearing wall-papers has been freely discussed in both home and foreign journals for the past twenty years; nowhere more fully or satisfactorily than in our own State Board of Health Report for 1872. Cases and series of cases have been given, some by physicians who have experienced the ill effects in their own persons, and all bearing a striking resemblance to those I have had under notice.

The symptoms in these cases have been of a composite character, affecting the system generally, with more marked evidences of disturbance in the digestive and respiratory systems, and with a strong tendency to neuralgic and mental disorder.

In connection with these cases I shall show specimens of paper from rooms which the patients have occupied, and a considerable number of others which have been offered for sale by manufacturers, and intended

<sup>1</sup> Read before the Boston Society for Medical Observation.

for domestic use. The former specimens offer the strongest evidence for the opinion I formed of the disturbing element.

The series of symptoms is very well described in their usual sequence by a non-professional writer in the *British Medical Journal* for July 22, 1871. Referring to a number of cases which occurred in his own family, he says, "First appeared irritation of the mucous membrane, causing diarrhoea and vomiting, with various other symptoms of severe gastric derangement, resulting in permanent indigestion; also incessant severe cold in the head, which in one instance lasted for several years without being touched by any remedy; ulcerated throats, with acute inflammation, resembling diphtheria and quinsy; severe spasmodic cough, spasmodic asthma, bronchitis, and congestion of the lungs; soreness of the mouth, lips, and tongue, which appeared as if scalded in patches; inflammation of the eyes and eyelids (the conjunctivæ being invariably bright red), in one case threatening absolute loss of sight; congestion and torpidity of the liver, with the various symptoms resulting therefrom; and severe bilious and feverish attacks. There was, in short, irritation of every organ. In many cases, if not in all, the action of the heart was weakened, and in some palpitation frequently occurred. There were pains in various parts of the body, especially across the shoulders, down the spine and limbs, also in the joints, which were often stiff and swollen; scaling of the skin, and irritating eruptions, which no remedy ever relieved except Turkish baths. The effects upon the nervous system were most remarkable, producing a thoroughly shattered condition; great irritability, depression, and tendency to tears, with unusual prostration of strength. . . . The list also includes giddiness, headache, acute earache, and neuralgia; bleeding at the nose; frightful dreams; hysterical attacks; faintness; cramps, rigor, and numbness of the limbs; rigid spasms and convulsions. The last symptoms developed in the worst cases were loss of memory and threatenings of paralysis, also spasms, with twitchings of the body and limbs."

CASE I. Mrs. A., a lady fifty-six years of age, in easy circumstances in life, of a peculiarly active and nervous organization, of regular habits of life, was exposed in her bed-chamber, for a number of years, to the influence of arsenic paper. She had been previously entirely healthy, never having had any illness other than temporary troubles of small moment. Menstruation ceased to occur within five years without any abnormal symptom, the critical period being only marked by the cessation of the monthly flow.

Twelve years ago she married and came to live in a home near an inland city. Her chamber was on the ground floor of a large house, and had been newly hung with a paper of a light green hue. The room was occupied only at night, most of the time during the day being

spent in other parts of the house, and, in the summer months, in the open air. To this circumstance, of course, is due her freedom from trouble for a considerable period.

Three or four years after occupying the room, or perhaps a little earlier, she began to have a feeling of general malaise. The first thing she recalls is a sensation of exhaustion, which she then thought due to one or two severe falls, but which is now more satisfactorily explained. Being a person of strong will, she made every endeavor to throw off or resist this sensation ; but it would as constantly return. It was especially difficult for her to rise in the morning, although awake at a very early hour. The debility increased as the illness went on. She would feel quite well and strong for a time, and would at once experience the sense of prostration on making any attempt at movement, and, at times, on any unusual mental exertion, making the duties of a housekeeper particularly onerous. She speedily increased considerably in weight, from about one hundred and twenty-five to one hundred and sixty pounds ; this condition lasted for some months, and then gave place to emaciation.

At certain intervals afterward the various symptoms of the digestive, nervous, and circulatory systems, which I shall mention, appeared and increased in severity up to the time I saw her, in June, 1875. The precise date of the access of each symptom is unknown, but each had shown itself, either continuously or at intervals, for a number of years before.

I found her in bed, perfectly prostrated, hardly able to move hand or foot ; with skin very dry and rough ; hands and feet cold or cool to myself and to the patient. I do not recall either the pulse or the temperature, though both were duly noticed at the time. Emaciation was marked ; a countenance naturally rosy had become sallow ; tongue inflamed, dry, cracked, with brownish coat in centre ; gums also dry and angry. The sensation of dryness was apparent to herself, with a feeling as if the mouth were lined with flannel. No sensation of dryness or pain in the throat or œsophagus. Nausea, often about ten P. M., and nearly always when she wakened, but not during the night, unless she happened to be up and about for any purpose. At times a pressure in the stomach ; frequent thirst of an evening, seldom during the day ; capricious appetite.

During her early years, at her home in Philadelphia, she had often had diarrhoea, but she had been free from it for some years. Two or three years ago it came on at intervals, its presence being ascribed to diet and the usual causes ; of late it had been more marked, the discharges watery and painful. She had never noticed blood. No oppression in breathing ; no catarrhal trouble, cough, or other noticeable pulmonary complication. Her eyes had for some time shown signs of

weakness and congestion. They had previously been very strong. At last she could not open the lids at night without lifting them with her fingers. At the time I saw her there was marked conjunctivitis, as if from some external irritation. No headache, but an "aching, tired sensation" in base of the brain, which ran down the spine to the lumbar region. At times, during the past few years and never before, a tenderness in the neighborhood of the liver, which would pass away after a slight diarrhœa. Her temper was never irritable or much depressed, but her household duties seemed to weigh on her, and were more than ever a responsibility. A carbuncle or perhaps a large boil on the back was reported as having occurred three or four years before, otherwise no eruptions, carbuncles, or furunculi. The sleep was more easily disturbed than when in health, and she had often awakened chilly or feverish. The feet and legs, to the knees, were frequently cramped, and had been relieved by warm applications and friction.

The symptoms detailed had always been, to a certain extent, relieved during absence from home; but in about ten days after her return the exhaustion and other evidences of disease would recur, and soon be as bad as ever. The symptoms had been most speedily relieved on coming to the salt water at New York or Boston, and under such circumstances almost entirely disappeared. The air of Philadelphia was less beneficial, but no permanent relief was experienced as long as exposure to poison was renewed on her return home.

The marked symptoms in this case seemed to be of the mucous membranes and the nervous system, to be increasing in severity, alleviated by absence, but returning on fresh residence; and so apparently due to a local cause. There was no malarial influence in the neighborhood; the air, though somewhat damp, was pure and healthy; no imperfect drainage. On examining the paper of the room I found it heavily loaded with arsenic. The patient now recalls the fact that no room in the house was so difficult to clean as her bed-chamber, and servants had made similar remarks. She herself found it almost impossible, for some reason unknown to her, to remain in her room, from the sensation of extreme exhaustion.

CASE II. The husband of this lady had occupied the same room, but his frequent absence from home on business and his out-of-door life had given him less exposure. Previously healthy, he had, soon after his occupancy of the room, begun to have tonsillitis, with dry tongue and mouth, and finally these symptoms continued throughout nearly the entire winter. He increased very markedly in weight, became dyspeptic, and had a foul breath, with a general sensation of malaise. He at last occupied another room at night, and was at once relieved and has had no sore throat to this day.

CASE III. Mrs. B., an amateur artist, had in like manner a bright

green paper on her studio. After spending some time in her room, in which she was occupied several hours each day, she would come out thoroughly exhausted; was very "logy," became bloated, and was generally running down. For some time she had had an ulcer on the face, which had not yielded to medical treatment. The library was hung with a green paper of a dangerous hue, and the bed-chamber with still another. A flock paper was also employed in some part of the house — where I do not know. The papers on the studio and chamber, as determined by analysis, are heavy with arsenic; that on the library contains a smaller amount, and a considerable quantity was found in the flock paper. The patient went to New York for some weeks, and remained while the paper was being removed and her house repaired. She speedily improved in health, the ulcer on the face took on a healthy action and was quickly cured, and the sensation of exhaustion disappeared.

CASE IV. Mr. B., the husband of this lady, being less exposed, suffered less, but he was for a considerable time the victim of conjunctivitis, which disappeared on removing the paper from the walls.

CASE V. The case of Mr. C. was very similar to that of the lady first mentioned. His case, however, was marked by more violent febrile manifestations and delirium, and he was for some time in danger of his life. One eye was lost by the sequelæ of conjunctivitis, and the other permanently injured. He was for a long time unable to sleep. A light-green paper was on his chamber and sitting-room. His removal from the house put an end to the reception of the poison. He is now much better, is recovering strength, flesh, and appetite, and his ability to sleep is now restored.

CASE VI. Mrs. C., the wife of the above, for the three years they had inhabited the arsenic-rooms, had had more or less sore throat, for which she was unable to account. During the first six months after leaving the rooms she was much better, and at the end of a year was entirely well and now has no trouble.

CASE VII. Mrs. D. had a green paper on her library and another on the dining-room. I tested both, and found much arsenic in the former and a less amount in the latter. The next day these papers were removed from the walls, and a tendency to dysenteric diarrhœa, which had caused much trouble, at once diminished, and the attacks have been much lighter. Two canaries had died in the library without known cause, except that they showed signs of poison.

CASE VIII. Mr. E. (not my patient), who had slept in a room with a bright-green paper for some years, was seriously ill with symptoms referred to the nervous system and digestive organs. I never saw the patient, but am led to believe the symptoms were of such character as to be due to arsenic. He went to Europe for a change, and another

gentleman, who took the house furnished, desired me to examine the paper. I did so, and found it loaded with arsenic.

The paper in the case first mentioned was not removed from the wall until after the marked convalescence of the patient in another room, to which she had been carried. Three or four persons were occupied in the work. One man got a sore mouth, having been previously well, and knowing no reason to account for it; another had every symptom of a cold, and felt a general stiffness of his limbs; a woman was in the room for half an hour, and her throat, previously entirely well, became rough and remained so for some days. A paper-hanger in the same neighborhood remarked that his mouth was always sore when he put on green paper, and his men often spoke of their eyes becoming inflamed and their hands ulcerated.

I do not feel called on, in relating these cases, to enter upon the discussion of various points which naturally suggest themselves. The method of dissemination of the poison, the susceptibility of some persons to its influence and the immunity of others, and other points, have been often considered, and an opinion has been formed in the matter in the mind of every practitioner of medicine. One point, however, seems worthy of our attention, and cannot be too strongly urged: the necessity of sanitary measures to avert the evils arising from the use of arsenic in wall-papers and other articles of domestic and personal use; the duty of the physician to his patients and the community in warning them against the use of such articles, and the obligation incumbent on the state to enact and enforce laws for the protection of the people from dangers which we know to be insidious, but powerful for great peril to all those exposed to their influence.

It may be true in our land, where "liberty runs mad," that the view expressed by Dr. Draper, "that the rights of individuals and of industrial pursuits are deemed too sacred to allow of excessive restriction, and a prohibitory law to affect the manufacture or use of arsenical pigment would be of questionable force," a view in which, so far as this particular subject goes, I am inclined to disagree with him. Legislation with the object in view of preventing the use of arsenical papers has been employed in some of the more despotic nations of Europe, where the care of the citizen is considered of the utmost importance to the state. The case of the gentleman who returned to his house to find it in the possession of the sanitary police, engaged in removing a beautiful arsenical paper which he had just applied to his walls, is in point. The laws relating to slaughtering cattle and preparing meat for the market met with vigorous opposition a few years ago, but they are now looked on, even by the butchers themselves, as highly salutary, and no hindrance to private rights or emoluments.

The fact that the most beautiful, the most delicate, and the most

easily manufactured green color is produced from arsenic will always offer a strong incentive to manufacturers of wall-paper, to painters, makers of cloth fabrics, confectionery, card-stock, and other materials in the arts.

As an adjuvant to legislation, or to take its place, if such a course be impossible, it seems incumbent on physicians to act as instructors to the community. I fully agree with Dr. Draper, to quote once more from his report, that "if there be awakened in the community some appreciation of the dangers which belong to the indiscriminate use of emerald green colors, there will be no need to invent methods of repression in behalf of the public health; for reasonable people, informed concerning the risks, will not be likely to test their own tolerance of arsenic or to subject their children to it. The demand ceasing, the supply will cease, and a correct taste in color will find its gratification in agents which possess no poisonous character." It is safer, however, to consider that a certain proportion of the community is *not* "reasonable," and that they are at once thoughtless and careless of the safety of themselves and of those around them. To gain the needed information the public requires frequent and often-repeated injunctions from those in whom they have confidence, and I feel it to be a duty of our state and local boards of health not to be neglected, to coöperate with physicians in extending a knowledge of the dangers of arsenic.

Arsenic *green* is a term which, it would seem, is sufficiently well understood by a considerable proportion of the intelligent members of the community. Large quantities of such papers are, however, still sold to go into the country and to those less careful of the hygienic condition of their households. It is less generally known that the presence of arsenic is not confined to green papers alone, and I show you this evening a number of specimens of wall-papers of various hues which may be looked on as very innocent in their outward appearance, but which I have proved by analysis to contain arsenic in considerable amounts. Many of them have a greenish hue, and in such the arsenical pigments have been used to tone down other colors. It is safe to consider that *all* wall-papers which contain arsenic, in any proportion whatever, are dangerous elements, in the light of modern sanitary hygiene.

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## RECENT PROGRESS IN OPHTHALMOLOGY.

BY O. F. WADSWORTH, M. D.

*Neuro-Paralytic Keratitis.* — This subject has been reinvestigated by Senftleben,<sup>1</sup> by cutting the trigeminus in rabbits, and his results agree entirely with the view of Snellen, that the keratitis is due solely

<sup>1</sup> Virchow's Archiv, Bd. 65.