

inclined to attach no significance to this growth in the absence of any other results from smears or cultures, and account for it as a contamination, but relate its appearance because of a possible value it may have in further study of cases.

**Treatment.**—Beginning May 28, an injection of gonorrheal mixed vaccine (Cutter) was given every second day for sixteen days, beginning with 25 million gonococci and increasing to 250 million. During all this time the condition of the patient was grave, and because many who saw the patient regarded the case as possibly one of syphilis, I followed the eight injections of gonorrheal mixed vaccine, in spite of the negative Wassermann, with 0.6 gm. salvarsan, administered intravenously. Following this, while the patient was at his worst, Dr. M. M. Patton made an autogenous vaccine from cultures from the feet (containing *Staphylococcus aureus* and *S. albus*) and administered seven doses altogether.

Local treatments were superfluous, except in so far as mixed infection might be excluded. The isolated nodule seemed to do better if left absolutely alone.

Finally, along the first ten days of August, after the outlook began to appear hopeless, the patient began to improve and made a rather rapid convalescence. I believe that the administration of the gonorrheal mixed vaccine was of benefit; at least the joint involvement improved following its use, though the skin lesions did not seem to improve, possibly because the feet at this time began to show evidence of ordinary pus infection. For this the autogenous vaccine produced by Dr. Patton may have done more good than we were inclined to believe.

Internal medication was symptomatic and unimportant.

At present, Oct. 24, the patient is progressing nicely. The exfoliated nails are returning and the skin is smooth. All joints are normal except that the right middle finger and the big toe of the right foot remain flexed, and the shoulders are a little stiff. The left foot swells after walking, but only slightly. The patient's weight is 102, and during the last twenty days he has gained about 1 pound a day. His usual weight is 125.

The patient relates that in June of 1908 while suffering with acute gonorrhea and gonorrheal rheumatism he had many crusty horny-like nodules on the soles of his feet which disappeared with his convalescence from the gonorrheal trouble. In the absence of any other etiologic factor, I feel that we are justified in considering this peculiar condition a gonorrheal skin disease.

204 Fourteenth Avenue.

## EXOPHTHALMOS IN SCURVY\*

L. R. DEBUYS, M.D.

Assistant Professor of Diseases of Children in the Medical Department of the Tulane University of Louisiana; Junior Pediatricist of the Toussaint Infirmary; Pediatricist at the Presbyterian Hospital; Visiting Physician, Diseases of Children at the Charity Hospital

NEW ORLEANS

A review of the literature on the condition of the protrusion of the eye in connection with scurvy shows that the terms "proptosis" and "exophthalmos," which are synonyms, are used to designate varying degrees of the protrusion. Proptosis is the more commonly used, and specifies the condition when not extreme, whereas exophthalmos is the term always employed to signify the extreme protrusion of the eyeball.

The committee of the American Pediatric Society in its "Collective Investigation of Infantile Scurvy in North America," in 379 cases reported that swelling and

protrusion of the eye was noted in forty instances.<sup>1</sup> Heubner,<sup>2</sup> in his collection of sixty-five cases, states that the orbit was involved four times; and Jacobi,<sup>3</sup> in forty cases, four times. In the foregoing cases it is not stated whether the protrusion of the eye was slight, or whether there was a decided exophthalmos. In view of this fact, and also because cases of exophthalmos in scurvy have been rarely reported, it is reasonable to presume that had these cases been extreme, they would have been published.

Text-books on the diseases of children make unimportant and subordinate mention of proptosis in some instances, and vague mention in other instances; in some text-books there is no mention at all made of the symptom. In text-books and journals on the diseases of the eye, even less is to be found on the subject. In only two instances<sup>4</sup> was it possible to find mention of orbital hemorrhage in scurvy. The references in both instances are practically the same.<sup>5</sup>

The case of Magnus, which he reported in 1878, is probably the first report of exophthalmos in scurvy. Before Barlow's<sup>6</sup> article in 1883, on "Cases Described as Acute Rickets, Which are Probably a Combination of Scurvy and Rickets, the Scurvy being an Essential, and the Rickets a Variable Element," many cases of scurvy were reported as acute rickets. A case appearing under the title of "Acute Rickets" was reported by Möller<sup>7</sup> in 1862, in which there was an exophthalmos. In this case, because of the absence of affection of the limb bones, either during life or at post-mortem, Barlow did not include it as one of scurvy in his analysis. It must be said in this connection that cases have appeared in more recent years in which the diagnosis of scurvy has been made with few symptoms other than exophthalmos.

The number of cases of exophthalmos in scurvy appearing in literature are very few. It has been possible for me to collect reports of only thirteen cases, including my own, which are reported in full. From the study of these cases, (which I have tabulated and appended to this paper,) and the literature on the subject, the following may be said:

Proptosis or exophthalmos in scurvy consists in a protrusion of the eyeball from its orbit. This protrusion may be of variable degree, from slight to extreme. It may occur at any time during an attack of scurvy; it is at times caused by violent fits of crying (Cohn,<sup>8</sup> Jacobi,<sup>9</sup> DeBuys) and appears suddenly, or it may be precipitated by prolonged crying (Jacobi<sup>10</sup>). Extreme exophthalmos is rarely seen, though protrusion of the eyeball may occur in from 6 to 11 per cent. of cases of scurvy. The condition may be caused by ecchymoses, into the loose areolar tissue around the orbit (Railton,<sup>11</sup> Fischer,<sup>12</sup> Carr,<sup>13</sup> Hutchison<sup>14</sup>) or the subperiosteal extravasations of blood which are seen elsewhere may be found also in the bones of the head and face (Miller,<sup>15</sup>

1. Boston Med. and Surg. Jour., 1898, cxxxviii, 605.

2. Heubner: Berl. klin. Wchnschr., 1903, No. 3, p. 280.

3. Jacobi: Diseases of Children, 1909, p. 210.

4. Weill: Ztschr. f. Augenh., 1903, ix, 516. Grounouw: Graefes-Saemisch Handbuch, Ed. 2, ii, 324.

5. Magnus: Deutsch. med. Wchnschr., 1878, No. 28. Kunkow: Vjest. Ophthal., x, 275.

6. Barlow: Tr. Roy. Med. and Chir. Soc. of London, 1883, lxi, 150.

7. Möller: Kronenberger med. Jahrb., 1862, iii, Part 2, p. 135.

8. Cohn: Referred to in article by Schlesinger in München. med. Wchnschr., 1905, No. 43.

9. Jacobi: Diseases of Children, 1909, p. 232.

10. Jacobi: Diseases of Children, 1909, p. 222.

11. Railton: Lancet, London, i, 532.

12. Fischer: Diseases of Infancy and Childhood, p. 337.

13. Carr: Practice of Pediatrics, p. 335.

14. Hutchison: Lectures on Diseases of Children, 1910, p. 174.

15. Miller: Medical Diseases of Children, p. 77.

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\* Because of lack of space this article is abbreviated in THE JOURNAL by the omission of the skilograms and the tabulated details of cases. The complete article appears in the Transactions of the Section and in the author's reprints.

Sheffield,<sup>16</sup> Pfaundler and Schlossman<sup>17</sup>). In the instance of exophthalmos the hemorrhage takes place beneath the periosteum within the orbit, and does not interfere with the motility of the eye. Barlow<sup>18</sup> believes that he has evidence for the conclusion that subperiosteal hemorrhage within the orbital cavity caused the exophthalmos in his cases, while Meyer<sup>19</sup> and Snow<sup>20</sup> were able to demonstrate at autopsy the presence of subperiosteal hemorrhage within the orbit in their respective cases.

The exophthalmos may appear in one or both eyes, beginning in one and involving the other subsequently. It comes on suddenly and causes a displacement of the eye forward, downward and outward. There may be an improvement, the eye returning to its normal position, to be followed by a recurrence (Magnus,<sup>5</sup> DeBuys); or the eye may remain stationary, and at intervals the symptoms increase (Jacobi,<sup>3</sup> DeBuys). If the hemorrhage extends in front of the fascia orbitalis there may be an associated ecchymosis and suggillation, the upper lid becoming discolored and puffy, caused by the infiltration of blood into the loose connective tissue of the lids; or the exophthalmos may exist as the sole evidence of hemorrhage into the loose areolar tissue within the orbit, or of subperiosteal hemorrhage within the orbit, providing the hemorrhage does not extend in front of the fascia orbitalis. This symptom is usually a late manifestation in scurvy, though it has been noted as being among the earlier evidences (Schlesinger<sup>21</sup>); and Barlow<sup>22</sup> has described a case in which the exophthalmos was the only symptom of the disease.

Proptosis or exophthalmos should not be confounded with the conditions more frequently found when there is actually no displacement, but the ecchymoses and suggillations are in the soft tissues in front of the eye, and hemorrhage under the conjunctiva, giving the effect of a displaced eye. In these conditions the tissues may become so much involved as almost to close the eye, whereas in exophthalmos the aperture of the lids is much wider than normal and the eye is seldom completely covered by the lids.

In injury of the eye producing a proptosis or exophthalmos, besides the history of the injury there are wanting the other evidences of scurvy, and the therapeutic test will clear the diagnosis.

In malignancy there is not the sudden swelling; the motility of the eye is impaired in extreme cases; the evidences of scurvy are not present, and antiscorbutic treatment also has no effect.

Gumma of the periosteum within the orbit may produce an exophthalmos, but the onset is very slow and gradual.

Mucocoele, encephalocele and hydrocephalus may give rise to a displacement of the eye, but there are enough other symptoms in these conditions to permit a differential diagnosis.

Barlow<sup>23</sup> states that he is of the opinion that in no disease, even syphilis, is the therapeutic test of more value than in scurvy. In making a therapeutic diagnosis should there be no improvement in four or five days, the diagnosis should be questioned.

Within the past few months it was my good fortune to see the following case of extreme exophthalmos in a case of scurvy:

#### REPORT OF CASE

*History.*—T. G., white female, aged 11 months, only child of healthy parents, appeared at my clinic at the Touro Infirmary, Nov. 23, 1911, because of one eye protruding almost out of its socket, and because of pains in the limbs which were diagnosed as rheumatism by a physician.

The baby was born at full term by a foot presentation after a prolonged labor. She weighed about 4,082 gm. (nearly 9 pounds) at birth. Her eyes became sore shortly after birth, and she had a nasal discharge. The mother nursed her exclusively on the breast for six weeks. She was then given malted milk for two weeks. Then, because of frequent stools, condensed milk was given. She was ill with "cholera infantum" for two weeks, and was put back on malted milk, which was continued thereafter. Her feedings were irregular, as was also the quantity given at each feeding. At 4 months she had two teeth, and at 8 months she was able to sit alone. There had never been any convulsions. Aside from "cholera infantum" at 2 months, the only sickness up to the present illness was a siege of boils which continued throughout the past summer. From this time on it was noticed that the baby perspired very freely, particularly about the head. The present illness began about the middle of August, 1911, when her left leg was knocked on being lifted from her chair. "She screamed as if her leg were broken" and it began to swell. She seemed to be in pain when touched, and was very cross and restless at night. About one week later the parents consulted the family physician who diagnosed the condition as rheumatism. It was found out later that he believed it to be syphilitic, and the baby was treated with mercury by inunction. She was also given drops, presumably iodid in some form.

In the latter part of August one day about five minutes after her bath, the baby cried violently. The mother on going to her to investigate the cause of her crying, noticed that her right eye was protruding, and that the upper and lower lids were discolored and swollen. These symptoms remained the same for three or four days, and then became better gradually for three or four days, at the end of which time the eye was apparently back in its normal place so that it could not be noticed that it had been pushed out. Three weeks after this it again protruded, but the discoloration was not so marked as with the first attack. The discoloration remained for about one week. The exophthalmos continued for about one week, but improved slightly during that time. The protrusion was not so pronounced as on the first occasion, nor was the improvement so marked. It then suddenly protruded again much more than on the other occasions, and remained until it was seen by me three weeks later. The mother stated that there was no discoloration the third time, and that the protrusion was increasing very slowly until I saw it. The patient's eye was not completely closed during sleep. The second and third occasions of protrusion of the eye were at night, the displacement being noticed in the morning.

The baby had four upper incisors and two lower central incisors when her leg was hit. Her gums were red and swollen at the time of the first exophthalmos. Three weeks later they were bluish-red. The baby seemed to be in much pain, cried a great deal and was irritable. At night she was restless. There had been no fever. The appetite was poor, and at times there was vomiting of a greenish substance. The stools were not noticed as being different from her normal stools. The urine was brown since before the first exophthalmos, was plentiful, and stained the napkins. On one occasion after the second exophthalmos, when the baby vomited, blood came from her nose. Other than these there were no hemorrhages noticed.

*Examination.*—The child was poorly developed and poorly nourished, anemic, much emaciated, 65 cm. (25½ inches) long, weighing 5,132 gm. (a little over 11 pounds). She was anemic, and the mucous membranes were pale. The right eye

16. Sheffield: *Modern Diagnosis and Treatment of the Diseases of Children*, 1911, p. 507.

17. Pfaundler and Schlossman: *Diseases of Children*, 1908, II, 180.

18. Barlow: *Keating's Cyclopaedia of the Diseases of Children*, 1880, II, 275.

19. Meyer: *Berl. klin. Wehnschr.*, 1896, p. 85.

20. Snow: *Arch. Pediat.*, 1905, xxII, 576.

21. Schlesinger: *München. med. Wehnschr.*, 1905, No. 43, p. 2073.

22. Barlow: *Centralbl. f. inn. Med.*, 1895, No. 16, p. 532.

23. Barlow: *Keating's Cyclopaedia of the Diseases of Children*, 1880, II, 277.

protruded almost out of its socket, being pushed forward, outward and downward. There was no pulsation. The eyelids were clear, but apparently puffy. The movements of the eye were not impaired, and the sclera and conjunctiva were normal. The baby lay with her legs everted and flexed, and there was apparently no muscular power. There was no inclination to move the arms. The skin was clear with the exception of the right leg, on which there were two ecchymotic spots. Over the thighs and legs, which were very much swollen, the skin was tense and glossy. The thorax was flattened antero-posteriorly, the sternum was depressed and the abdomen distended. On being moved for examination the baby cried as if in much pain. The head was rather square and the anterior fontanel was opened and depressed. The sutures were not closed. There was costal beading and slight kyphosis, but the epiphyses were normal. Examination of the abdomen showed it to be soft, with walls flabby, but liver normal and

days elapsed before the patient was seen again. In the belief that an interesting case was about to be lost sight of a special endeavor was made to complete the examinations, with the result that skiagrams, photographs and examinations of the blood were made. Owing to the inability of the mother to secure the urine, an examination of it was not made, but the mother stated that the urine was no longer brownish, it having cleared entirely two or three days after the first visit. On the occasion of the first visit, the mother was instructed to give the baby a teaspoonful of orange-juice every four hours; proper instruction regarding feeding was also given. When the patient was seen the second time the exophthalmos was much improved, the eye having almost returned to its normal position; the legs were greatly reduced in size, and were not very painful. The ecchymotic spots on the leg had disappeared, the baby was much more quiet and less irritable, and there was hardly any pain on being handled. This interesting improvement was attributed solely to the use of orange-juice, because the mother had not changed the diet as she had been instructed. The photographs (Figs. 1, 2 and 3) before and after twelve days of treatment also show the improvement. In spite of these marked changes, the skiagrams taken twelve days after the treatment was instituted (Figs. 5, 6 and 7) show unmistakable evidence of scurvy.

The result of the blood examination showed: hemoglobin, 65 per cent.; red blood-corpuscles, 3,920,000; white blood-corpuscles, 4,950; neutrophils, 42 per cent.; small lymphocytes, 50 per cent.; large mononuclears, 5 per cent.; eosinophils, 3 per cent. Coagulation time was between five and one-half and six minutes (Wright).

It developed that the reason the patient was not placed on the prescribed diet was for fear of the parents' incurring the displeasure of their society physician, who had continued



Fig. 1.—A photograph taken Nov. 23, 1911 (before treatment was begun), showing the exophthalmos with the forward and outward displacement. The peculiarly flattened chest may be noticed, and the angle or beading of the ribs. The thighs and legs, particularly on the right side, are much swollen. The feet also are swollen. The ecchymotic spots on the right leg can be seen.



Fig. 2.—A photograph taken Dec. 5, 1911 (after treatment was begun), shows improvement in the exophthalmos and in the child's general condition. The expression of pain has disappeared. The state of nourishment is better. This can also be seen by comparing the abdomen with Figure 1. Improvement in the legs can readily be seen; also disappearance of the ecchymotic spots. Swellings of the feet also have disappeared.

spleen not felt. Examination of the heart and lungs was negative. The arms, legs and back apparently lacked muscular power, though no attempt at determining the muscular power was made because movement was accompanied with great pain. The thighs were much swollen, the deeper structures especially so. The shafts of the femora were firm and thickened for almost their entire length. The same condition existed in both legs, the swelling being mostly about the lower ends of the tibiae. The joints were normal. There was pain on moving the arms; in fact, touching the patient almost anywhere seemed to cause pain.

The respirations were normal; pulse, 164; temperature, 38.8 C. (101.8 F.) by rectum. The gums were reddened, spongy and swollen. She was referred for examination of her eyes. Dr. M. Feingold reported that both fundi were normal, and that there was a tumor of some sort pressing within the orbit in the upper half and inner side. The examination of the nose was negative, there being no evidence of acute or chronic inflammation.

*Treatment and Subsequent Course.*—The mother was requested to take the child to the radiologist for skiagrams, but she did not do so, and was lost sight of for a few days, even before the blood and urine could be examined. Twelve

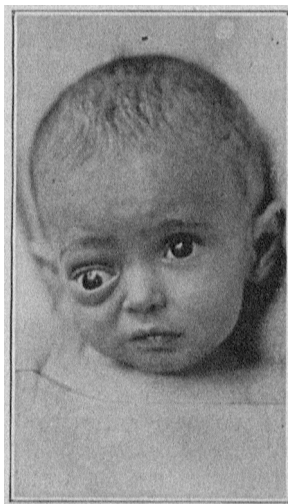


Fig. 3.—A photograph taken Nov. 23, 1911 (before treatment was begun), allows a better study of the exophthalmos. Its displacement downward, outward and forward can be seen. The facial expression also can be studied more closely.

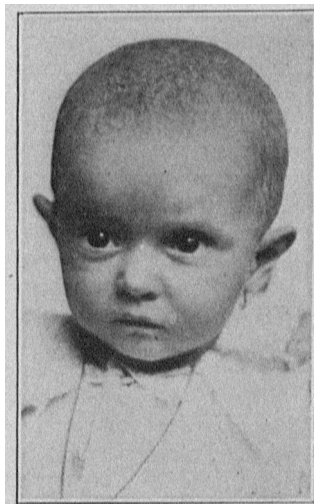


Fig. 4.—A photograph taken April 15, 1912, before the leg had thoroughly assumed its normal position.

the usual diet. The parents consented to allow further observations of the patient to be made in appreciation of the improvement following the antiscorbutic treatment.

The patient was again seen April 9. She was 15 months old, and with her clothes on weighed 6,087 gm. (nearly 16½ pounds). The anterior fontanel was open and measured 5 cm. by 5 cm. (nearly 2 inches). She was pale and sallow, had seven teeth and could sit up, but could not walk. There had been no further trouble with her eye, and no return of any other symptoms of scurvy. The orange-juice had been continuously given, the diet remaining the same. It is interesting to note that after the first marked change following the use of orange-juice, the further improvement had

been very slow, probably because the diet had not also been changed. This was shown by subsequent photographs and skiagrams (Figs. 4 and 8) and also by the examination of the eye, there still remaining a slight exophthalmos. The report of Dr. Feingold was as follows: palpebral opening narrowed, difference of about 1 mm., and probably shorter, with Hertel exophthalmometer: unsatisfactory examination; exophthalmos of about 1.5 mm. on right side; lower half of right cornea more covered than in the left eye; upper lid also covering more of cornea in the right than in the left eye; pupillary reaction and motility perfect.

A series of examinations was made again on this visit resulting in some further improvement. The blood examination showed: hemoglobin, 90 per cent.; red blood-corpuscles, 4,230,000; white blood-corpuscles, 6,250; neutrophils, 44 per cent.; small lymphocytes, 50 per cent.; large mononuclears, 6 per cent. The coagulation time was between three and three and one-half minutes (Wright). Wassermann and von Pirquet reactions were negative.

#### DIAGNOSIS OF CASE AS SCURVY

The clinical picture of the case is typically that of scurvy. Certain conditions, however, must be excluded because they present some of the symptoms found in this case:

Rheumatism was excluded because it is a rare condition at this age, and also because when rheumatism is found before the fourth or fifth year it rarely manifests itself by swelling of the joints, and when rheumatism does involve them there are evidences of inflammation. In this case not the joints but the shafts were involved, and there was no redness or evidence of inflammation.

Osteomyelitis was excluded because it is a condition in which there are high fever, abscess, and usually one bone involved.

Sarcoma was excluded because it does not involve as a rule more than one bone; is progressive in its course; and because antiscorbutic treatment has no effect on it.

Syphilis was excluded because the pseudoparalysis in legs appears at a much earlier age and is one symptom of a condition in which there are many other manifestations. Again, had the condition been syphilis the liver and spleen would have been enlarged and the antisiphilitic medication used should have improved the condition in over two weeks' treatment instead of aggravating it. On the other hand, the improvement under the influence of orange-juice was a therapeutic diagnosis sufficient to remove all doubt. The negative Wassermann may have been produced by a prolonged course of anti-syphilitic treatment, but the history does not warrant the suspicion of syphilis.

In confirmation of the diagnosis against the foregoing conditions, the skiagrams offer positive proof of their non-existence.

Anterior poliomyelitis was excluded because there was a negative history for infantile paralysis, and because of the symptoms of scurvy being characteristic. In doubtful cases an electrical reaction is diagnostic. This was neither advisable nor necessary in this case.

Purpura could not be considered because there is an absence of the history of improper feeding in purpura, and it is not accompanied with swelling of bones from hemorrhage with accompanying pain.

That medication had no influence on the production of the condition is shown in the history, as the disease began before the drugs were given, and the improvement was marked before they were discontinued.

In rickets there are no ecchymoses, no pain, no spongy gums, and also the ends of the long bones are involved. It must be remembered, however, that for a long time the two conditions were considered together until Bar-

low's original article. Moreover, rickets and scurvy are frequently seen together probably because the diet that produces scurvy may be also an etiologic factor in the production of rickets.

The exophthalmos might have necessitated differentiation from malignancy and trauma, but the other evidences of scurvy and the diagnostic significance earlier considered in this paper readily exclude both.

Finally, the therapeutic test of the diagnosis establishes the case as one of scurvy.

I wish to express my thanks to Dr. M. Feingold for the examinations of the eye; Dr. A. D. Henriques for the skiagraphic work; and Dr. C. C. Bass for the laboratory examinations.

1776 State Street.

#### ABSTRACT OF DISCUSSION

DR. H. M. McCLANAHAN, Omaha: I see about four cases of scurvy a year in consultation. In three out of four of my cases the diagnosis had not been made. Out of ten cases of which I have records, in four the first symptom was hematuria. In three of these a diagnosis of scurvy was made on the hematuria as the only symptom.

DR. W. W. BUTTERWORTH, New Orleans: In spite of all our education along certain lines we have not educated the physician to differentiate between so-called rheumatism and scurvy in the young infant. It seems that it is still possible to make this mistake.

DR. L. R. DEBUYS, New Orleans: I believe the English pay more attention to the examination of urine than we do. As I understand it, in some institutions a routine examination is made; consequently they find blood in the urine more frequently, and are thereby better able to recognize those cases of scurvy in which the bloody urine is an early symptom. In scurvy the lower extremities are more commonly involved than the upper. Rheumatism seems to be the condition most often confounded with scurvy, and this mistake in the diagnosis is the one most frequently made.

In one of my radiographs a condition can be seen which I have not been able to find before: the zones of proliferation in the bones. Most radiographs show the early conditions of scurvy which are important for diagnostic purposes, but I have seen no other radiographs which show these changes.

#### OCCUPATIONAL SKIN DISEASES \*

JOHN A. FORDYCE, M.D.

Professor of Dermatology and Syphilology, University and Bellevue Hospital Medical College

NEW YORK

With the exception of certain well-defined types, occupation dermatoses as a class have not, in this country at least, received the attention they merit. While every dermatologic clinic numbers among its applicants each year many patients in whom occupation has a direct or indirect bearing on the causation of their eruption, it is difficult, owing to lack of systematic investigation, to give a definite idea as to the prevalence of skin affections in the various trades. At my own clinic at the University and Bellevue Hospital Medical College about 2 per cent. of the total number of new cases for 1911 constituted occupation dermatoses. The great majority of these were of the type known as trade eczemas, and while many cases yield readily to treatment and proper preventive measures, others constitute a serious inconvenience from

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