increased. His blood was examined and showed merely a fall in the red cells with slight hyperleucocytosis. No enlargement of the lymphatic glands could be found, and the spleen was not palpable.

At the beginning of the eighth week, when he was about to be allowed up, a purpuric patch, 4 in. square, suddenly appeared on the outer side of the right ankle. It was dark purple, painless, but rather tender. There was no evidence of trauma. In the evening the temperature rose to 100° F., and by the following day the patch was slightly larger. Towards night similar areas developed on the extensor surfaces of both elbows. The boy moved his arms easily although not willingly. During this night and throughout the following day the blotches on the arms spread rapidly, and a fresh one was found over the inner malleolus of the left foot. The boy now became restless, but did not complain of pain except when the affected parts were touched. He refused to move himself, but often asked the nurse to change his position.

On the morning following the next day the left ear was affected. It was deep purple in colour, and very swollen and tense. From the ear the lesion extended within twenty-four hours over the whole of the left side of the face, scalp, and neck. This, the largest area, was sharply margined. During the same period a patch was noticed on the outer side of the left thigh, and in twelve hours had a diameter of 6 in.

On the morning of death the following was the patient's condition: He was markedly anaemic but mentally clear. There was great disfigurement of the face, more particularly in the region of the orbit and mouth, the lesion being here still unilateral. Small black blebs had formed on the ear, the face, and one extremity. The contained fluid proved sterile under ordinary cultural tests. In continuity with the lips the left buccal surface was discoloured. An area about three inches in diameter was present on the extensor surface of the right elbow. Another covered the whole posterior surface of the right hand. The palm of the hand was unaffected except for a purple tingeing of the flexor lines. A fading greenish patch occupied the back of the left elbow. Another was present on the dorsal surface of the hand and first two fingers. An area on the outer side of the right ankle presented the greenish and yellowish tints of a fading bruise. This was the earliest lesion. There was a purpuric spot near the nail of the great toe. A large circular patch, 6 in. in diameter and with a very definite margin, covered the middle of the thigh on its outer side. Over the front and inside of the left foot there was an irregular reddish-purple patch with a few dark vesicles on it; a similar patch was over the patella. The skin on the trunk and abdomen was unaffected.

During the three days before death the temperature varied irregularly between 100° and 103° F., and the pulse steadily weakened. A blood count taken on the day of death gave 3,600,000 red cells and 50,000 leucocytes. A differential count yielded the following percentages: Polymorphonuclears 88 per cent., small lymphocytes 4 per cent., large lymphocytes 6 per cent., eosinophiles 2 per cent. No nucleated red cells or myelocytes were found in the films. At no time during the illness was there haemorrhage from the mucous surfaces. Unfortunately an autopsy could not be obtained.

UNDER the will of the late Miss Hannah Elizabeth Gartside, of Holmfirth, Yorkshire, King Edward's Hospital Fund for London, the Brompton Hospital for Consumption, St. Thomas's Hospital, and Guy's Hospital each receives a sum of £1,000.

WE learn from the *Journal of the American Medical Association* that in a recent case the eighth circuit of the United States Circuit Court of Appeal affirmed the conviction of one Ackley who had sent a letter through the mails recommending a lady's syringe and sanitary powder for the purpose of preventing conception. The statute declares unlawful every article or thing . . . described in manner calculated to lead another to use it for preventing conception. The article might be of legitimate use and might not prevent conception, but would nevertheless be unlawful if calculated to lead another to use it for such purpose. British law is, we believe, silent on this subject.

ACUTE FACIAL DERMATITIS PRODUCED BY A HAIR DYE.

BY

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THE use of dyes for the hair is admittedly common, but there are so few records in medical literature of accidents resulting from their application that the publication of the following illustrative case may serve a useful purpose, both as a guide to diagnosis and possibly as drawing attention to the dangerous nature of the most commonly employed chemical substances in this connexion.

A married lady, aged 48, engaged in a profession in which public platform appearances play an occasional part, came for the treatment of an acute blotchy erythema limited to the face and scalp, and associated with very acute subjective sensations of burning and itching, severe enough to interfere with sleep and prevent completely the carrying on of her daily routine. These symptoms had been present for forty-eight hours, and had gradually increased in severity. There was considerable mental excitement. The severity of the inflammation had produced oedema of the eyelids, but no vesicles or papules were evident. Although she complained of attacks of shivering and felt thoroughly ill, the temperature and pulse were both normal and the tongue only slightly furred. There was a history of three such attacks (each lasting four to five days) in the preceding eighteen months; she had never previously had any skin trouble. Her scalp, however, had been irritable for two years, and the various lotions prescribed for this and for the acute attacks appear to have relieved without permanently curing the condition. She was quite convinced that every attack had had its origin in the scalp. An examination of this revealed only hyperaemia and a few scales, which on microscopic investigation with methylene blue proved to be sterile. The idea of a seborrhoeic basis for her complaint was therefore abandoned. The colour of the hair, a sort of matt gold, known to ladies as *blond cendré*, had not excited the suspicion of artificial tinting at first, but on the following day a cautious inquiry elicited the important admission that a "harmless" vegetable preparation had been in frequent use for the past three years. Two solutions were employed to obtain the desired tint—the first of an opaque dark brown colour, the other clear and smelling strongly of sulphuretted hydrogen. The former, on analysis, was proved to contain small quantities of a silver salt and traces of pyrogalllic acid as pyrogallate; the second was a weak solution of sodium sulphate.

It is not my present purpose to discuss the nature or *rationale* of the chemical staining powers of these substances or of their interaction; but it cannot be too strongly emphasized that pyrogalllic acid is an irritant to the skin of susceptible individuals. It may also produce a toxic nephritis by absorption, and its local caustic action in strong solution is often made use of for the destruction of nodules in ulcerating lupus. In weaker solutions it may initiate an irritation akin to that produced by chrysarobin, for which it was originally introduced as a substitute. The effects are most commonly seen on the hands of photographers, many of whom employ it or one of its derivatives (hydroquinone, metol, etc.) in the development of negatives. In these patients also the complaint usually is that they have been using the substance for years without any ill effects, and that they cannot understand why the dermatitis should have appeared only recently. The explanation of this fact is not clear, but may depend on the gradual production in the patient by repeated small doses of the noxious drug of the anaphylactic state, in which the very smallest quantities of it, if rubbed into a small area of the patient's skin, will produce in a few hours (twelve to twenty-four) a very marked reaction (Judassohn's test). Hair dyes may, for purposes of classification, be divided into those which produce their effects by simple staining—for example, walnut juice—and those which depend on a chemical action. To the latter and more dangerous class most of the advertised preparations belong, partly because the

general effect obtained is more striking, and partly because it is cleaner and more permanent, requiring renewal about once every three months only, as the hair grows. A member of this class is paraphenylenediamin, which produces a reddish tint and is very poisonous. Many other preparations are in vogue, the compositions of which are trade secrets, and emanate mainly from France. The great majority are chemical combinations of silver, lead, or mercury with pyrogallol and nitric acids. Potassium permanganate and hydrogen peroxide are also used, but are apparently less often the cause of acute inflammation. Their main effect is to bleach the hair.

The treatment of a "hair-dye" dermatitis is usually a simple matter, and a dilute solution of lead or aluminium acetate in water (1 in 100), frequently applied on a mask of lint with the patient reclining, is all that is required in the early stages. Zinc creams with a trace of ichthyol (m x ad 3 x) will be found soothing for the face after two or three days, when exfoliation will have begun, but they are usually not tolerated at first.

Alcohol and stimulants of all kinds are, of course, contraindicated. Aspirin is very useful. It is needless to emphasize the importance of warning the patient never to use the offending substance again, for each succeeding attack is more severe and less amenable to treatment than the last.

ON THE GENESIS OF CANCER.

BY

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Preliminary Communication.

Why does a piece of tissue transform into a fungoid mass? Such is the problem that has hitherto baffled investigation.

The only fact of any real importance established is that there exists a relation between strain on the one hand and cancer on the other. To give five examples:

Antecedent Factor.	Tissue.	Result.
1. Friction of tooth or pipe...	Tongue or lip	"Epithelioma."
2. Strain of blow	Breast	"Carcinoma."
3. Strain of blow	Bone	"Sarcoma."
4. X rays irritation	Skin	"Epithelioma."
5. Strain	Right horns of certain Indian cattle	"Epithelioma."*

* Mentioned by Dr. Bashford at the International Medical Congress, August 8th, 1913. In Cashmere the native wagons are dragged by oxen with the rope attached to the right horn, and it is usually in the right horn that cancer develops.

This simple relation is the only one definitely established up to date, namely:

Irritation or chronic mechanical strain = Cancer.

Or, to give a definite illustration, take the case of a tooth rubbing on the tongue:

Antecedent factor (chronic irritation of tooth) → Internal strain in tissue → Internal change in tissue → Cancer.

Now, in approaching this problem, there are clearly two lines of attack:

1. From the cancer side, the one usually attempted.
2. From the side of strain.

It was decided in the present research to proceed from the standpoint of strain and to investigate the effects of strain upon the normal tissues.

To effect this inquiry three things were necessary:

1. A reliable and impersonal method of estimating strain.
2. A tissue of the body that can be measured and upon which strain falls specially heavy and in excess.
3. A sufficient number of normal tissues to measure.

These three points were met as follows:

1. *The Internal Variability of Tissue.*—This can be measured by the usual variability figures. These depend

in principle upon the extent of spread of a series of measurements to opposite sides of a mean or average value. Thus if the mean figure of 100 units reaching from 10 to 100 be 55, then obviously the spread of this series of units falling under the measurements thus:

10 : 20 : 30 : 40 : 50 : 60 : 70 : 80 : 90 : 100
10 10 10 10 10 10 10 10 10 10

would be greater than the spread of this series:

40 : 50 : 60 : 70
25 25 25 25

The variability figure can be calculated out for each of these series on the principle of finding (1) the average of a series, and (2) the deviation of a series, and dividing the one by the other:

Variability figure = $\frac{\text{Total deviation of series.}}{\text{Average of series.}}$

2. *The only tissues that can be accurately measured are the bones*, for they are fixed with calcium, and are thus measurable with great exactitude. The only bone where strain falls in excess is the thigh bone, for the neck of that bone has to bear not merely the vertical weight of the body, but also the oblique strain as well (see diagram). Every medical man is aware that the neck of the femur is subjected to an excess of strain; for, first, there are special internal strengthening buttresses of bone with special names, and, secondly, the bone yields and breaks readily at the neck in old age.

3. A sufficiency of normal tissues was secured through the kindness of Professor Macalister, in the ancient Egyptian bones lying at Cambridge.

Measurements.—Four measurements were done on each bone: (1) Total length; (2) narrowest at neck (where strain falls heaviest); (3) narrowest at mid-shaft (middle of bone); (4) narrowest antero-posterior measurement at lower end. The measurements were made by Miss Scrymgeour of North Berwick; the calculations were carried out by Mr. John Dougall, mathematician, Glasgow.

Results.

The variability figures worked out as follows:

	Length.	Neck.	Mid-shaft.	Lower End.
First 100	5.9	10.1	8.7	9.0
Second 100	3.5	11.3	7.5	7.9
Third 100	4.2	9.3	7.3	8.3
Fourth 100	5.4	9.6	8.2	8.0
Fifth 100	5.1	11.0	7.7	7.6
Sixth 100	7.8	10.2	9.7	8.9
Seventh 100	10.9	13.3	11.8	11.2
Eighth 100	6.6	10.8	9.5	8.6
Ninth 100	5.4	10.2	7.8	8.2
Tenth 100	7.5	12.9	9.7	10.0
Eleventh 100 (85)	5.6	9.0	7.2	8.2
<i>Broken Femora.</i>				
First 100	—	9.3	7.5	—
Second 100	—	10.2	7.7	—
Third 100	—	9.6	7.1	—
Fourth 100	—	10.4	8.1	—
Fifth 100 (80)	—	9.8	7.8	—

* A detailed report on the research will be published in the *Glasgow Medical Journal*.