expectantly for a few days, as the Germans have recommended for brain wounds of this age (Tönnis, 1941), but with the addition of local and parenteral sodium penicillin.

The other case was that of a man with an 8-day-old right frontal wound infected with *Staph. aureus* whose pus became Gram-negative under penicillin treatment (in addition to calcium penicillin, applied locally to the brain wound, he had sodium penicillin, 485,000 units intramuscularly, because of a compound fracture of the femur). This man became drowsy and died on the tenth day after operation; at necropsy an abscess was found in the right frontal lobe which had been incompletely tapped during the last days of his illness. This case is a failure of surgical technique, and it shows the importance of maintaining drainage during penicillin treatment.

Wound healing in the 20 survivors, observed for not less than three weeks in all but 5 cases, was by first intention in 6 cases. In 13 there was a slight gape or sinus in the wound, usually at the site of greatest tension, but most of the wounds healed by first intention. These gapes were usually not serious, for only in one case did a small fungus appear during healing.

These results compare favourably with other series of wounds of similar age (Table II), especially when we consider that more than half of the wounds were purulent and would not hitherto have been sewn up. But the series is small and has not yet been followed up for more than 62 days. Brain abscess might still appear in some.

During the Battle of Sicily the opportunity also presented of treating 17 cases of non-penetrating wounds, 1½ to 16 days old, locally with penicillin, usually as a solution, sometimes in powder form. The older cases were heavily infected, with fractures of the skull and bare bone lying at the bottom of a suppurating granulating wound. These wounds and the underlying skull were excised and sutured, and all except two healed satisfactorily, though certain technical mistakes were made at first and temporary sinus formation was not uncommon. In these cases the bacteriological results were not so satisfactory as in the penetrating wounds: in a number the purulent discharge from the sinus continued to show Gram-positive organisms, and these were with one exception cases in which the skull had been fractured. Penicillin is so certain in its effects on Gram-positive cocci, apart from the occasional penicillin-resistant strain, that it is reasonably certain that the solution did not reach all the infected parts. The assumption may be made that there were small foci of osteomyelitis beyond the margin of excised bone. In gunshot wounds exposing and perhaps breaking the skull it is unlikely, when surgical treatment is not immediately available, that good healing will be obtained unless the exposed (and probably infected) bone is very widely excised.

Of penicillin treatment all that we are entitled to say at this stage is that the results are not unpromising. Though penicillin is in great demand and short supply, little is required in the treatment of head cases, and further developments in the technique of its use will be made.

Summary

The treatment of gunshot wounds of the head by neurosurgical units of the British Army in the Middle East and in North Africa is reported.

Three units treated 459 non-penetrating head injuries (wounds of the scalp and skull with dura intact), with 3 deaths.

There were 506 penetrating brain injuries, with 83 deaths. The variation of mortality in the different series depended largely on the level on the lines of communication at which each unit was working.

In penetrating brain wounds, when the initial débridement was incomplete, about 25% of those who survived the immediate effects of brain injury subsequently developed brain abscess. The onset of intracranial infection occurred later than in the case of the 1914-18 war, and a considerable proportion recovered with further treatment.

At the C.C.S. level 28% of head wounds were complicated by wounds in other parts of the body. Non-penetrating head wounds were twice as common as brain wounds. The mortality for brain wounds was about 25%. In "fresh" cases operated on by neurosurgeons the incidence of post-operative intracranial infection was minimal (3.7%).

Of 36 head wounds 3 to 12 days old all but one were found to contain bacteria. The predominating infecting organism was

Staph. aureus (23 cases). Evidence was obtained that in the majority of brain wounds infection develops in the superficial layers of the wound and spreads thence to the deeper layers.

Penicillin was applied locally to a series of 23 brain wounds 72 hours old, or older, with encouraging results.

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BURNS AND SCALDS IN CHILDREN

AN INVESTIGATION OF THEIR CAUSE AND FIRST-AID TREATMENT

BY

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In spite of a significant reduction in the gross numbers of deaths from burns and scalds under modern methods of treatment, the mortality rate in young children remains relatively high, even when efficient treatment is provided at an early stage. During the past three and a half years there has been an increase in the incidence of burns and scalds in the Edinburgh district, which has aggravated the coincident reduction in the number of available hospital beds. It has long been recognized that burns and scalds as they affect children are largely domestic accidents, and the most hopeful means of securing a further reduction in the number of deaths is by avoiding those conditions which are known to favour the occurrence of thermal injuries. During the period June 1, 1938, to July 31, 1942, 366 children suffering from burns and scalds were admitted to the Royal Hospital for Sick Children, Edinburgh. This report is based on the information obtained regarding the injuries sustained by these children, and is presented in the hope that interest will thereby be stimulated in the social aspects of the problem of burns and scalds, and that suitable preventive measures will be taken.

Causal Agent

Table I gives a list of the agents causing the injury, and indicates that these accidents are almost entirely of a domestic nature. The commonest cause was the upsetting of a cup of tea. The average age in this group was 18 months, and usually the child was being nursed on the lap within easy reach of the tea-cup; sometimes the adult was holding both child and cup when the accident occurred. The injury thus produced is characteristic, usually involving 5 to 10% of the body surface, the commonest sites being parts of one side of the face, neck and chest, one shoulder and arm. Similar but more extensive injuries resulted from the upsetting of kettles (59) or teapots (43): most of these were due to nursing children in close proximity to the table, but a number resulted from the child upsetting a teapot or kettle on a stove, a hob, or a gas-ring on the floor. Saucepans (63) were often on the floor or, when on a fire or stove, the projecting handle was grasped by the child. A child, 2 years of age, fell and sat in a frying-pan placed on the floor. Some of the children who fell into wash-tubs or baths were just at the toddling stage and lacked proper supervision when in wash-houses and outhouses, and as a rule such injuries were extensive.

The burns fell into 3 groups. The most serious as regard extent and prognosis were those in which the child's clothe

were ignited; 6 out of 30 such patients died. This type was most common in girls, often being due to the hem of a nightgown or skirt becoming ignited as the child reached for the mantelpiece or stood too close to an unguarded fire. Some were the result of the child, or other children, playing with matches. Burns due to contact with fire-bars or hot grates were usually small in extent but deep in degree, and some occurred in spite of a fire-guard; one child, aged 16 months, climbed the fire-guard while unattended

TABLE I

Agents causing Burns and Scalds	Number of Patients	Died
Cup of tea (includes 3 coffee, 3 cocoa)	91	1
Teapot	43	1
Kettle	59	3
Saucepans and other cooking utensils	63	—
Plates of hot food	9	1
Fall into pail of hot water, hot bath, wash-tub, boiler, etc.	20	2
Fireplaces, etc.	25	—
Clothing set on fire	30	6
Lighted paper, celluloid combs, etc.	9	1
Burst rubber hot-water bottle	5	—
Burst boiler	2	1
Poultices	3	1
Stood in quicklime	1	—
Sunburn	1	—
Car accident	1	—
Baby born into pail of hot water	1	1
Feet bathed with boiling water	1	—
Placed on "chamber" containing boiling water	1	—
Cause unknown—"came home burned"	1	—
Burns	68 (18.6%)	7 (10.3%)
Scalds	298 (81.4%)	11 (3.7%)
Totals	366	18 (4.9%)

and fell against the bars of the grate, and another, aged 2 years, was burned while playing with a gas-oven. In the third group, the burn, usually of small extent, was due to the ignition of celluloid combs or similar articles when the child, tiring of them as playthings, poked them into an easily accessible fire; these were serious in that the hands were often the parts most badly affected. The miscellaneous causes call for little comment; 3 out of 17 such patients died.

In the case of patients living within the boundaries of the city of Edinburgh an attempt was made to relate the circumstances of the accident to the home conditions and the geographical situation of the house. This has shown that the incidence is high in certain areas of the city where population is dense. The cases are concentrated in parts of the Old Town and in some parts of the newer municipal housing estates built on the outskirts of the city. This latter observation is important, as it appears to indicate that bad accommodation is not so prominent a factor as the domestic habits of the family. In some families more than one child had been scalded or burned on various occasions, and a few children had been injured more than once. The lives of the parents of these children are hard; families are often large, and it is all too common for the younger children, aged up to 5 years, to be left in the charge of other children only a few years older. This aspect of the problem has become increasingly important with the present difficulties in shopping, part- or whole-time war work, etc.; and is not always relieved by such measures as have been introduced for the partial care of children, since many parents are unwilling to depute the care of their children.

Time Incidence

In 132 cases of the present series there was a record of the time of day at which the injury occurred (see Chart). The peak

Chart showing time incidence of injury (132 cases)

was reached in the early evening between 5 and 7.30 p.m., which is not unexpected. There were surprisingly few during the morning, but an unduly large number between 9 and 11 p.m. The occurrence of scalds in young children at midnight and 1 a.m. is noteworthy.

Burns and scalds are common during the winter months, but in examining a large series of over 800 cases it was found that admissions might reach an unusually high level in a particular month without relation to the season and for no evident cause. Table II is of interest in showing that the incidence in the last two months of 1939 and the first two months of 1940, when compared with that in the same four months in the previous five years, was found to be nearly twice as great. These numbers have since declined, but are still 40% above the pre-war level.

TABLE II.—Number of Children suffering from Burns and Scalds seen at Surgical Out-patient Department per Month (1934-42)

	1934-5	1935-6	1936-7	1937-8	1938-9	1939-40	1940-1	1941-2
Nov.	12	16	10	12	9	22	14	13
Dec.	11	15	12	12	20	24	14	22
Jan.	12	9	16	12	11	29	28	20
Feb.	16	5	16	15	11	22	15	15
Totals	51	45	54	51	51	97	71	70

This increase appears to be associated with the abnormal social conditions existing during these months of 1939-40, such as the closing of schools, cinemas, and other places of entertainment and the lack of recreational facilities, the "black-out," and a reduction in amount and quality of parental supervision of children, due to mental unrest, preoccupation of various kinds, and additional war work.

Age Incidence

In Table III the number of patients and deaths, and the mortality rate at certain ages, are shown. Most injuries occurred in the second year of life: 70% of the patients were less than 3 years and 88% less than 5 years of age. The mortality rate was high in the first, fourth, and fifth years; in the first year fatal injuries were often of small or moderate extent (5, 5, 5, 10, 20% of body surface), while in the fourth and fifth years they were usually extensive (10, 25, 45, 50, 50, 60, 65% of body surface). In the first year all were scalds; in the fourth and fifth years only two were scalds.

TABLE III

Age Group (Years)	Total Patients	Total Died	Burns		Scalds	
			Total	Died	Total	Died
0-1	45	5 (11.1%)	7	0	38	5
1-2	147	4 (2.7%)	24	1	123	3
2-3	65	1 (1.5%)	9	0	56	1
3-4	38	4 (10.5%)	8	3	30	1
4-5	26	3 (11.6%)	7	2	19	1
5-12	45	1 (2.2%)	13	1	32	0
0-12	366	18 (4.9%)	68	7	298	11

Further evidence on age incidence in children has been obtained from the Reports of the Registrar-General for Scotland, which show that in the years 1931-8, inclusive, 493 deaths, or 40.9% of deaths at all ages from burns, occurred in children of 5 years or under; of the 18 children of the present series who died 17 were aged 5 or less. The only significant difference in incidence between the two sexes was between the ages of 1 and 3 years, when males predominated (136 males, 76 females); the totals for all ages (up to 12 years) were 211 males, 155 females.

Extent of Injury

Thermal injuries may be classified according to their extent, site, and depth. In children the most important of these criteria is extent, since the ratio of surface area to body weight is highest at birth and decreases approximately as weight increases, and the systemic disturbances are usually related fairly closely to the extent of the injury. The danger of certain complications is greater in deep than in superficial burns and in burns affecting the flexures and the neighbourhood of orifices, and these factors were taken into consideration in deciding whether or not to admit patients. Comparison with previous series in regard to extent of injury is difficult, but it is the opinion of surgeons who have treated such patients for many years that more injuries of small extent are now treated in the in-patient department than was formerly the case.

From Table IV it will be seen that in 303 of 366 patients admitted the injury involved 15% or less of the body surface; most

patients with lesions of less than 5% were admitted because of the dangers of complications due to site or depth of the lesion, and none of this group of patients died. Of 244 patients with injuries of 5 to 15% of body surface, 6 died (1 of shock, 5 at later stages); of the remaining 63 patients 12 died (8 of shock, 4 at later stages). As the extent of injury increased so did the mortality rate, but the number of patients diminished. The importance of shock as a lethal factor is closely related to the extent of injury.

TABLE IV.—Extent of Injury in Relation to Mortality

Area (%)	Number of Patients	Deaths (All Causes)	Shock	Mortality Rate (%)	
				All Causes	Shock
Less than 5	59	—	—	—	—
5–15	244	6	1	2.46	0.4
15–45	54	7	5	13.0	9.0
50–65	9	5	3	55.5	33.3

First-aid Measures

Information was obtained in 265 cases regarding the first-aid treatment given by parents, relatives, neighbours, passers-by, or medical practitioners. In some cases more than one method had been used. One patient had been treated with four different medicaments—namely, cod-liver oil, flour, and baby powder to the raw surface, and castor oil internally; another had been dressed with carron oil, white of egg, and tannic acid jelly. The 316 substances used on 242 patients are listed below; no first-aid treatment was given to 23 patients.

Substances used as First-aid Treatment on 242 Patients

	Patients
Olive oil	79
Various tannic acid jellies	51
Picric acid	45
Dry dressings, cloths, etc.	23
Flour	18
Carron oil	16
Ointments	16
Castor oil by mouth	14
Flavine emulsion, etc.	8
Baking soda	6
Vaseline	5
White of egg	5
Butter	4
Syrup of figs by mouth	3
Cloth soaked in tea	3
Talcum powder	15
Starch	4
Cod-liver oil	2
Eucalyptus	2
Cold water	2
Soap	1
Glycerin	1
Milk	1
Vinegar	1
Calamine lotion	1
T.C.P.	1
Boric powder	1
Total applications	316
No first aid	23

The popularity of olive oil is an important factor, since, if a coagulant or other agent in a watery solution or base is subsequently to be used in the treatment of the raw surface, all the oil must be removed from the burn and adjacent skin, involving prolongation of local treatment and increased trauma to the raw surface. Oily and greasy substances do not appear to reduce the loss of plasma from the raw surface to an appreciable extent, and in some cases their application caused more pain than the initial injury. A variety of tannic acid jellies were used, but in no case was such treatment properly carried out. The commonest faults were the use of hopelessly inadequate amounts of jelly, resulting in the treatment of only part of the affected area, and the failure to cleanse the affected area before applying the jelly. For example, scalds due to the spilling of a cup of tea commonly extend on to the scalp and are always more extensive than they at first appear; before such injuries can be cleansed the hair must be shaved, and in the absence of this precaution infection is invariable. Picric acid is still frequently employed, in spite of the danger of liver damage which is known to be associated with its use. Twenty-three patients did not receive first-aid treatment; most of these were brought to hospital within a short time of injury, and no adverse effects were noticed in these cases. The use of baking soda is based on the common belief that it is soothing; flour and oils are thought to exclude the air. It is widely believed, among the older members of many of the families from which these children came, that a dose of castor oil helps to

“put away” shock following a variety of injuries, including burns and scalds. The dose varied, but as a rule the oil was vomited and purging seldom resulted; syrup of figs was also used for this purpose if castor oil was not available. Most of the remaining heterogeneous collection of substances represented all that was obtainable in the circumstances, applied without respect to action or value. Patients whose injuries had been covered only with a dry cloth or dressing were in a better state on admission than those with comparable injuries which had been treated with the wealth of the domestic pharmacopoeia.

Discussion

De Quincey, writing in Edinburgh about a hundred years ago, stated that “three thousand children per annum—that is, three hundred thousand per century; that is (omitting Sundays), about ten every day, pass to heaven through flames in this very island of Great Britain.” In a footnote he adds: “Their deaths are chiefly through the carelessness of parents.” In spite of considerable advances there is still room for improvement. Donald (1930) reported a steady decrease in the number of children admitted and in the mortality rate at the London Hospital between 1899 and 1920. On the other hand, Wilson (1932) stated that in the Royal Hospital for Sick Children, Edinburgh, the incidence and mortality rate remained fairly steady during the period 1899–1920, but since 1920 the number of admissions had risen steadily, though the mortality rate had fallen. A possible explanation of this increase may be the rehousing of families from the Old Town in the new municipal housing estates at the periphery of the city, which began in 1922. This has resulted in a reduction in the number of patients treated at the dispensaries (Table V). It will be noticed that burns and scalds in children represent 5.6% of all new patients treated, and that this figure has remained remarkably constant in spite of the fall in attendances, indicating that the incidence of these injuries remains much the same in those areas of the city (chiefly the Old Town) served by this dispensary.

TABLE V.—Out-patient Attendances at a Dispensary

September to August	Total Out-patients	Burns and Scalds in Children
1936–7	2,034	112 (5.5%)
1937–8	2,104	106 (5.04%)
1938–9	1,357	90 (6.6%)
1939–40	1,299	69 (5.2%)
1940–1	1,708	102 (6%)
1941–2	944	60 (6.35%)
1942–3	793	37 (4.66%)
Totals	10,239	576 (5.6%)

In the present series of children up to 12 years of age the burn–scald ratio is 1:4, as compared with Mitchiner's (1933) figures of 1:7 in 1933 and 3:2 in 1899. It is questionable whether the steady fall in the number of burns since 1899 which Donald reported has been contributed to by the Children's Act, 1908, to such a large degree as he believes. It seems equally probable that changes in environment in respect of fewer gas-lights, oil lamps, and open fires, greater provision for recreation and entertainment outside the home, and improvement in housing conditions have been the important factors. Of deaths at all ages from burns and scalds, 40% occur in children under 5 years of age. In this series 88% of 366 children under 12 years of age were less than 5 years old, and Donald's figures show that 86% of the 1899–1903 group and 88% of the 1924–8 group of children under 12 years of age were less than 6 years old. While the total number of burns and scalds at all ages may have declined, the proportion in children under 5 years of age remains the same. In the present series nearly all the injuries were due to domestic accidents arising out of a combination of the inquisitive and acquisitive instincts, lack of painful experience, carelessness and thoughtlessness of young children, together with inadequate supervision and failure to take preventive measures on the part of parents or responsible elders: actual neglect was extremely rare. These injuries were most common under cramped conditions in the poorer districts, but occurred also in small families living in uncrowded homes.

The limit of the degree to which the gross mortality rate in children can be markedly reduced by therapeutic measures is now being approached. From the evidence which has been cited

there is no doubt that nearly all these injuries can and should be prevented. To this end the following suggestions are made:

1. Intensive propaganda by posters exhibited in public conveyances, hospital and clinic waiting-rooms, schools, and cinemas. Such propaganda should give information as to the number of burns and scalds per year, with mortality rates; and a description, with diagrams, of the ways in which the accidents occur, how they may be prevented, what first-aid treatment should be applied, and where further treatment may be obtained.

2. Closer co-operation between hospital staffs and the social services. All such accidents involving children should be notified to a statutory or voluntary organization dealing with the welfare of children, or to the hospital almoners. The house concerned should be visited within 48 hours by a trained social service worker—preferably a woman—who would inquire into the circumstances of the accident, give advice regarding the prevention of a recurrence, and make a confidential report to the hospital or organization.

There are few, if any, circumstances more distressing than those attending the burning or scalding of an infant or young child. At once all is confusion and concern. While recognizing the difficulties and stress under which home treatment is carried out, the methods that had been employed in this series call for comment. The state of the injuries to which various types of coagulant jellies had been applied was creditable neither to the person who applied the treatment nor to the jelly concerned. When used properly on a suitable case such jellies may be valuable and efficient agents, but their employment by those not conversant with the indications for their use and with their inherent dangers is to be discouraged. A recommendation that the patient be removed to hospital without any form of local first-aid application may be thought callous, but it cannot be too strongly stressed that first-aid treatment of the kinds commonly found in this series is unnecessary, meddlesome, and almost invariably harmful. The guiding principles are two: the treatment of shock already present, and the prevention, so far as is possible, of further shock; the latter implies protection of the raw surface, but not its over-medication. Both principles can be followed by interfering as little as possible with the patient and the lesion. The details of first-aid treatment have been fully stated in E.M.S. Memorandum No. 7, Department of Health for Scotland, 1941.

Summary

A review has been made of 366 children up to 12 years of age, suffering from burns and scalds, who were admitted to the Royal Hospital for Sick Children, Edinburgh, from June 1, 1938, to July 31, 1942, with special regard to the social aspect of the injuries.

The circumstances of the accident, including the time of day, causal agent, age of patient, and the extent of the injury, have been analysed. The results of these analyses, combined with the geographical and social distribution within the area served by the hospital, show that the problem of burns and scalds is primarily a social one, which, it is believed, can best be solved by suitable educative propaganda directed to that part of the community most affected.

The first-aid treatment given to these patients was also examined; in the great majority of cases it had been badly done or was of an undesirable nature.

The mortality rate in this series of 366 burns and scalds was 4.9%.

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Standard rates of pay for all nurses in mental hospitals and institutions in Scotland are recommended by the Scottish subcommittee on nurses' salaries, and the general effect is to increase salaries by 4s. or 5s. a week, thus bringing pay and also conditions of service generally into line with those in England. The starting salary of male nurses will be £2 18s. a week, rising to £4 11s. 6d. as charge nurses; the rates for women are 11s. less. There is to be an additional 4s. a week for nurses on night duty, and a standard working week of 48 hours is suggested, except in the Royal Asylums, where, in accordance with practice, the standard week varies between 48 and 54 hours. Nurses in mental institutions will receive a cash payment of £2 10s. on passing the preliminary examination and £5 on passing the final. Annual leave is to be 21 days. It is hoped that the new scales will result in increased recruitment of nurses for mental hospitals, where training is given not only for the State Register examination but also for the certificate of the Royal Medico-Psychological Association.

HEAT IN THE TREATMENT OF SHOCK

BY

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The application of heat has become fully established as a cardinal principle in the treatment of traumatic shock. It has been believed to exert a favourable influence, mainly by relieving the cutaneous vasoconstriction and thus augmenting the venous return. The possibility that the cutaneous vasoconstriction is a compensatory mechanism and that heat may be harmful has only recently been entertained.

To assess the value of heat in clinical cases of traumatic shock is difficult, for the level of shock is influenced by many variables which cannot be controlled. It seemed useful, therefore, to investigate the effects of heat, as usually applied in the treatment of shock, upon normal subjects. This report relates to such an investigation carried out upon healthy adults exposed to heat under a "heat cradle." While the results cannot properly be regarded as applicable to shock, they do at least suggest that the value of heat in shock deserves further critical assessment.

Experimental Method

Subjects used in this investigation were young adult males who were either convalescent from minor surgical procedures or were awaiting such operations as herniorrhaphy or excision of haemorrhoids. Observations made were: (1) arterial blood pressure; (2) venous blood pressure; (3) pulse rate; (4) oral temperature; and (5) the patient's clinical condition.

The venous-pressure apparatus employed consisted of a No. 19 intravenous needle fitted to a three-way stopcock. This stopcock is connected at one inlet to a reservoir of normal saline and at its other inlet to a manometer of 4 mm. calibre. Venous blood pressure is therefore recorded in millimetres of saline solution. Zero was arbitrarily set at the level of the manubrium sterni. When the apparatus is in use repeated observations can be made, and between these readings a continual drip of saline prevents clotting within the needle. By this method the normal range was found to be 60 mm. to 80 mm. of saline solution and the average resting venous pressure in 40 young adults was 69.5 mm. At least five minutes must elapse after venepuncture before readings can be accepted as being reliable.

Heat was applied by means of the hot-air cradle for one hour, the temperature varying between 38° and 40° C. Observations were made before the application of heat, at ten-minute intervals during its application, and for 40 minutes thereafter. To bring the experiment into line with the treatment of shock, normal saline was administered intravenously to 10 subjects in amounts ranging between 200 and 1,200 c.cm. In 5 other cases plasma was administered intravenously in amounts ranging from 250 to 700 c.cm.

Experimental Findings

The record of Case 5 is given in detail (see Table), with a graphical record (Chart I). The combined records of all cases are shown in Charts II and III. Mean curves are used in place of tables, and it is to be noted that the curves of individual cases approximate closely to the mean.

Certain constant changes were observed: (1) a progressive fall in arterial blood pressure; (2) a rise in venous blood pressure; (3) a rising pulse rate; and (4) a rise in oral temperature. In addition to these findings, however, the most striking observation was the effect of the hour's exposure to heat on the patient's general condition. Three experiments had to be abandoned owing to the severity of symptoms and the resulting anxiety expressed by the patient. In these cases headache, nausea, and exhaustion were prominent symptoms. *Flushing* was evident before the termination of the period of exposure to heat in every case. *Frontal headache* was common, and frequently lasted from 12 to 24 hours after the end of the experiment. In 9 cases symptoms of *dehydration* were present in varying degree—viz., dry tongue, weakness, and thirst. In all cases general perspiration was noted. In 6 cases *nausea* was present, and vomiting occurred in two of these. Other symptoms were abdominal discomfort, muscular