participation of mast cells in various pathological processes and of human mast cells and basophilic leucocytes in some allergic reactions must also now be re-examined as differences in response related to differences in the mast cells themselves, perhaps in their surface receptors.

We may now return to the question of the difference in released mast-cell heparin and administered commercial heparin, even though they appear to be linked through the common denominator of intracellular metachromasia. Damage to the mast cell by trauma or by a chemical histamine liberator leads to the release of metachromatic material in the form of granules. Concomitant release of histamine favours the ingestion of such natural granules by phagocyte-macrophages and fibroblasts. Commercial heparin, on the other hand, is dealt with as are other electronegative colloids: it is taken up mainly by the cells of the R.E.S. and is stored there. It is not the presence of heparin that determines its fate, but rather its mode of presentation to the phagocyte. In other words, the metachromatic mast-cell granule carries with it the means for its own digestion—an event occurring in the phagocyte without noticeable effect on the clotting-time of the circulating blood. Lagunoff and Benditt demonstrated that, in addition to a high content of metachromatic material and amine, the mast-cell granule is rich in enzymes. While inactive in the mast cell, these may be active in the phagocyte.

NON-MAST-CELL HEPARIN?

Heparin and related s.m.p.s. may also have important physiological functions outside the mast cells (non-mast-cell heparin). The increasing recognition of non-mast-cell histamine suggests that non-mast-cell heparin should also be looked for. The demonstration that exogenous heparin may be located in tissues and in cells other than mast cells without being in granules (at the level of light microscopy) suggests that the new techniques may reveal endogenous non-mast-cell heparin when suitably applied. Such techniques have already been used by Blaschke et al. to demonstrate the presence and probable role of mucopoly saccharides in adrenocortical vesicles. Certainly, the circumstantial evidence for associating heparin exclusively with mast cells does not provide quantitative data to decide how much of the heparin extracted from a tissue (other than a tumour or mass of mast cells) is derived from mast-cell granules. Presumably non-mast-cell heparin will be treated by the macrophage in the same way as commercial heparin.

Since it is now becoming evident that mast cells show considerable variation in biochemical constituents, the different roles and responses of these cells may well represent different functions associated with different types of mast cells in different tissues and in different species. It is now a century since Ehrlich first drew attention to these remarkable cells and to their unknown function. The view presented here envisages a wider prospect for the functions of the mast cell.

The work of Dr J. Mahadoo is supported by the Saskatchewan Heart Foundation and Canada Packers Ltd., Toronto.

Requests for reprints should be addressed to L. B. J., Saskatoon.

References at foot of next column

Medical Education

THE PREREGISTRATION YEAR: CHAOS BY CONSENSUS

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J. K. Cruickshank

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Summary A questionnaire was sent to all pre-registration housemen who had graduated from the University of Birmingham in July, 1975. The results showed much dissatisfaction with the workings of the houseyear—specifically, with the long, sleepless hours of work, the almost negligible educational role of the year, the lack of time for human contact with patients, and the tedious, repetitive nature of the work. It is proposed that a shift system, which would seem to be acceptable to most housemen, would solve many of these problems, and result in better educational benefit for both doctors and patients.

PROF. JAQUES AND OTHERS: REFERENCES

INTRODUCTION

After five years at medical school most newly qualified doctors are looking forward enthusiastically to the end of house jobs, to working on the wards with a degree of freedom in treating patients, supervised but finally accepted by other doctors. And yet by the end of this year attitudes have significantly shifted: gone is the initial enthusiasm and dedication, and in its place is a bitter and wry cynicism, often coupled with a gross degree of indifference to the quality of medical practice. What has gone wrong in this year?

LACK OF EVIDENCE

In 1944 the Goodenough Report recommended that all newly qualified doctors should work for one year in recognised house-posts. In 1953 this became a legal necessity in Britain for those intending to continue in medical practice: "Those who do not comply do not receive registration, and without that registration they are unable to earn their livelihood". In view of the compulsory nature of the year's service, a large number of studies of the workings of the system might have been expected. On the contrary, however, research is conspicuously absent. One survey in 1964 "provided evidence that the preregistration year is not fulfilling its intended purpose". The Todd report in 1968 noted that there was "much dissatisfaction with many of the posts ... with the inadequacy of supervision and the time available for study and reflection". In an editorial in the British Journal of Medical Education in 1973, the comment was made that "supervision was often inadequate and that overwork was frequently appalling". The Merri son report, in 1975, based on (unpublished) evidence from the Junior Hospital Doctors' Association, could only state that "A summary of the evidence we received on the preregistration year is that it is in many respects unsatisfactory; there is inadequate definition of the unsits, inadequate understanding of the proper interac tion of service and education, and inadequate organisation of and assessment of the working of the system".

THE SURVEY

July, 1976, we distributed a questionnaire to the

The survey was administered to doctors who had graduated from the University of 134 domiciled Medical School in July, 1975, and who by August 1976 had completed their second housejob. We failed to contact 7 of the doctors, and of the remainder, 64 (50.4%) replied, an adequate sample for statistical pur

<table>
<thead>
<tr>
<th>Objective</th>
<th>Respondents feeling objective is desirable (%)</th>
<th>Too little (%)</th>
<th>Satisfactory (%)</th>
<th>Too much (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunity for critical discussion of diagnosis and patient management</td>
<td>62 (96.8%)</td>
<td>48</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>Time to learn practical procedures</td>
<td>61 (95.3%)</td>
<td>11</td>
<td>87</td>
<td>2</td>
</tr>
<tr>
<td>Opportunity to obtain maximum exposure to patients</td>
<td>60 (95.2%)</td>
<td>7</td>
<td>83</td>
<td>10</td>
</tr>
<tr>
<td>Extended period of clinical teaching by consultants in working situation</td>
<td>58 (90.6%)</td>
<td>65</td>
<td>34</td>
<td>1</td>
</tr>
<tr>
<td>Period for study and consolidation of medical knowledge</td>
<td>52 (81.2%)</td>
<td>66</td>
<td>31</td>
<td>3</td>
</tr>
<tr>
<td>Period for practice of basic skills of history-taking and examination</td>
<td>44 (69.8%)</td>
<td>11</td>
<td>59</td>
<td>30</td>
</tr>
<tr>
<td>Period in which to learn basic administrative skills necessary for running ward</td>
<td>35 (57.4%)</td>
<td>4</td>
<td>59</td>
<td>37</td>
</tr>
<tr>
<td>Period for inculcation of &quot;a sense of profession&quot;</td>
<td>23 (40.3%)</td>
<td>5</td>
<td>74</td>
<td>21</td>
</tr>
</tbody>
</table>

Fig. 1—Doctors' subjective estimates of the hours of sleep they managed to obtain while on duty.

(A) shows the mean for all 128 jobs, (B) shows the mean for the best 10% of jobs, and (C) shows the mean for the worst 10% of jobs.
RESULTS

Hours of Duty

By far the greatest area of discontent concerned the hours of work involved. "The biggest drawback of the houseyear is the almost callous disregard by the senior medical staff, and to a lesser extent by nursing staff, of the need of a houseman for sleep". 51 (80-9%) of the doctors estimated that they needed seven or more hours of sleep per night, and 35 (55-5%) that they needed eight or more hours per night. Fig. 1 shows that the doctors' estimated hours of sleep per night when on duty were very much less than their requirements. There is also a very wide range between the best and the worst jobs. The sleep obtained is not of course continuous, but is punctuated by phone calls, an average of 3·56 per night (range 0-12). "The main problem was the long hours of duty—especially for several consecutive nights". Fig. 2 shows the maximum number of consecutive nights worked by housemen: the actual number is significantly greater than the number to be expected from the rota. Only in 84 (65·6%) jobs did the theoretical maximum number of consecutive nights equal the actual maximum; there was no job in which the actual number was less than the theoretical. "One job had a three-day weekend take which can best be described as horrible."

31 (24-4%) of the jobs included casualty duty (despite statements from the General Medical Council discouraging the use of preregistration doctors for this type of work); 22 (78-6%) of these jobs required overnight casualty cover. On average, 16-29 hours were spent on casualty duty each week (median time—10 hours). "Main problem has been lack of sleep due to night calls, especially when on casualty duty at [the major hospital of the region]".

Although hours on duty were exceptionally long, only 69 (54-3%) jobs allowed a doctor as a rule to have an afternoon off, and of these afternoons off, 36-8% were immediately after a night on duty. "I was adamant that I got all my half days, even though I left things undone [on the ward], which was in fact traumatic for me at first but now I just could not give a damn". Only 69% of new contracts (i.e., from February, 1976) allowed doctors an afternoon off.

Much is said of the possible dangers to patients of doctors' lack of sleep, and controlled studies confirm that the deficits in performance are real. 9 "Jobs where the houseman was expected to be on take for 5 days and nights should rapidly be reviewed, as towards the end of that period the houseman was often so tired that he was a positive danger on the wards—often a danger because of sheer apathy". But little mention is made of the effect upon the doctor and his life (with the exception of a single study which showed that interns in American hospitals often suffered from transient psychopathology and perceptual distortions as a result of sleep deprivation). 6 Most of the doctors questioned considered that sleep had adversely affected their relationships with patients and staff and their efficiency of working:

<table>
<thead>
<tr>
<th>Degree affected</th>
<th>Not at all</th>
<th>Occasionally</th>
<th>Commonly</th>
<th>Severely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship with patients</td>
<td>12 (18-7%)</td>
<td>34 (53-12%)</td>
<td>18 (28-12%)</td>
<td></td>
</tr>
<tr>
<td>Relationship with staff</td>
<td>16 (25-0%)</td>
<td>35 (54-6%)</td>
<td>13 (20-3%)</td>
<td></td>
</tr>
<tr>
<td>Efficiency of working</td>
<td>4 (6-2%)</td>
<td>35 (54-6%)</td>
<td>25 (39-1%)</td>
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</tbody>
</table>

Only 14 (21-9%) felt that their own psychological wellbeing had been completely unaffected by lack of sleep, 17 (26-6%) considering that it had been slightly affected, 24 (37-5%) moderately affected, and 9 (14-1%) severely affected. "I became...a tired, bad-tempered, psychological wreck, lying back with relief on hearing at 3 A.M. that a patient had died in the ambulance on the way in".

"One big hate—1-in-2 jobs. Would never do one again under any circumstances and would put people off from doing it. Completely soul-destroying. Very inhibitory effect on any social life and marriage". 45-1% of jobs had a 1-in-2 or worse, and only 5 jobs were better than 1-in-3. On average, doctors were on duty for 41-8% of nights. When asked, most housemen said that the housejobs limited their non-medical activities:

<table>
<thead>
<tr>
<th>Degree affected</th>
<th>Not at all</th>
<th>Occasionally</th>
<th>Commonly</th>
<th>Severely</th>
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</thead>
<tbody>
<tr>
<td>1 (1-5%)</td>
<td>8 (12-5%)</td>
<td>27 (42-2%)</td>
<td>28 (43-7%)</td>
<td></td>
</tr>
<tr>
<td>2 (3-2%)</td>
<td>15 (23-8%)</td>
<td>29 (46-0%)</td>
<td>17 (27-0%)</td>
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</tbody>
</table>

41 (71-9%) said that they resented this kind of limitation. Of the 27 married doctors, 9 (34-6%) felt that the houseyear had affected their marriage slightly, and 6 (23-1%) that their marriage had been affected moderately or severely. "My wife has continually complained about living with a zombie or mental cripple, as my intellect has been totally quashed with no talk other than about patients". "Rewards are few and far between, yet one is expected to give up the majority of one's life to the job".

Lack of Teaching

One must not forget that the houseyear is, in principle at least, to be regarded as part of the doctor's continuing education. "Consultant teaching occasionally present—but for s.h.o. benefit. Work-load precluded my attendance. This was worst aspect of the job". "Dislike lack of time to do background reading". "Due to the pressures of work my successor in the surgery job has been unable to attend theatre" (this incidentally was in a Forces hospital). In only 79 (63-7%) jobs were housemen encouraged to take part in postgraduate education. In 67 (46-8%) posts housemen rarely or never used a
medical library, even though in most posts (100; 78-1%) these were less than one mile distant. Whilst 46 (80-7%) housemen thought that one aim of the houseyear should be to encourage independent and critical thinking, 15 (24-2%) occasionally and 5 (8-1%) often found that they were inhibited from commenting on a consultant's decision by their later need of a reference from that consultant. "The 'reference weapon' hangs over junior staff, but there's nothing for the consultant". I felt more constrained about commenting on the decisions of consultants for fear of affecting my husband's career in hospital practice."

Unrewarding Work
A lack of teaching would be acceptable if the work itself were satisfactory. "Surgery... endless clerking of patients already seen by numerous other people for list cases; therefore no stimulation and very little interest... endless v. and r.s, chools, and hernias". "Housejobs require one to use very little of the knowledge one has acquired during the medical course; it is generally an intellectually undemanding job... On the whole consists of dealing with endless trivia, filling in endless forms, etc., and really acting as a kind of perambulatory rubber stamp for the administrative convenience of the hospital". "Much of the work... seems to be part of the job simply because no one else would do such things for so little reward at such unsocial hours". In 53 (41-7%) jobs the doctors felt they had insufficient time to talk to patients.

A Shift System?
Given the clear problem of long hours of sleepless working, can these hours still be justified by their necessity? Only 18 (29-5%) of the housemen felt that it was essential for housemen to be on duty for 24-hour periods. "24-hour duty is not essential for learning medicine... skill is gained on a law of diminishing returns and would hardly be affected by reducing hours worked at night". An obvious solution to the working hours of housemen is possible but seems not to receive serious consideration by senior medical staff. In answer to the question "Would you like to work a rota system (including some night shifts) akin to that of nursing staff, whereby a doctor was never on duty for more than 12 successive hours?", 18 (28-1%) doctors said "definitely yes", 33 (51-6%) said "possibly", and only 13 (20-3%) said "definitely no". Such a system requires serious consideration.

Reaction
The long-term effects of the houseyear are difficult to assess, but some idea may be gained of the way that these doctors are viewing their profession. "I am disillusioned with medicine. I find it a boring job, soul-destroying and completely enervating. Unfortunately I am one [a doctor]—I wish I wasn't but I am too overwhelmed to do anything yet". Only 14 (17-2%) doctors had definitely made up their minds about a future career, and 9 (14-3%) had not yet arranged a further job. "My personal solution is going to be to abandon medicine temporarily for a period of self-adjustment". One married couple had had troubles finding s.h.o. jobs in the same hospital: "The possibility of having to work in different [hospital] areas is quite high". This is definitely putting us off hospital medicine in this country and making emigration more likely."
33 (51-6%) doctors were possibly or probably emigrating, and, more disturbingly, 28 (62-2%) felt that the experiences of the houseyear had made them more likely to emigrate.

Minor Complaints
Inevitably a paper like this must select out the data it presents. There were however a whole host of minor complaints and dissatisfaction: on living conditions—"For a compulsory resident job the accommodation is below standard and so are services such as laundry and cleaning"; on the bleep system—"I think about 90% of my calls are unnecessary—either telling me something I know, don't want to know, or will soon find out anyway"; on hospital administration, particularly with regard to finding locums for holidays—"the personnel officer was hopeless and therefore I could not take holidays in full despite 8 weeks' notice". In 29 (23-2%) jobs doctors were not able to take all of the holiday to which they were entitled. For holiday cover many doctors were expected to "double up for colleagues (even when already working a 1-in-2 rota)". A number of complaints concerned weekends: "I am not unique in having worked every Saturday morning for 1 year"; in 16 (12-5%) jobs the doctor was expected to come in every Saturday morning; "Another annoying feature is the requirement to be present on Sundays to clerk up to 10 patients when not officially on duty". The attitudes of senior colleagues often left much to be desired: "After 5 years of study, ward-rounds, etc., cutting sarcasm instead of guidance from senior registrars and registrars is not welcome". In 19 (14-9%) jobs adequate and willing senior cover was not available at night, and in 46 (36-0%) jobs s.h.o.s and registrars were unwilling to assist housemen in clerkig admissions even when the unit was very busy.

UNFULFILLED AIMS
While the data of this paper are small and obtained from only one medical school, they probably give a useful guide to the attitudes of doctors all over the country. It is clear that there is gross dissatisfaction with what happens in the houseyear. Housemen know what the aims of the year should be—and express them in terms which are remarkably similar to those of the Good-enough report; but, as the table shows, the evidence is that these aims are simply not being fulfilled. The impression gained is one of a complete lack of organisation of the houseyear, with almost no control over standards, and with wide variation between one job and another. Standards are determined more by local consensus than by any rational or national process. The statement of the Merriton report, that "this is as important a phase as any in the making of a doctor, requiring the same thought and supervision as the undergraduate years", receives scant consideration by those actually employing the housemen.

We would hope that the Royal Commission will seriously consider the morale of those at the lowest levels of the Health Services pyramid, for it is they who will later on be running that very same service. We would also hope that a larger, preferably national, survey of housejobs and housemen will be instituted to obtain a better assessment of the problems. If this be the case we would emphasise that surveys should be of housemen who are actually doing their housejobs, not those who have finished, perhaps many months or years before. Cognitive dissonance theory predicts that when one has been through an unpleasant experience which is voluntary the very unpleasantness of it makes one more likely, retrospectively, to justify that experience and advocate it for others; certainly older members of the profession frequently comment on how much they have benefited from long hours of unpaid work. If one asks the actual housemen themselves one obtains very different answers, particularly if the questions are anonymous and devoid of any possibility of later recrimination. The houseyear is, at best, very unpleasant for a large number of doctors, and needs serious reconsideration.

We thank the many doctors who completed our questionnaire, and the University of Birmingham Medical Society for a grant to cover postal and administrative expenses.

This paper has been submitted as evidence to the Royal Commission on the National Health Service.

Requests for reprints should be addressed to D. N. J. L., from whom full details of the statistical results are also available.

References at foot of next column
National Health Service

DISMEMBERING A DINOSAUR
FROM A CORRESPONDENT

Since real growth in the National Health Service is unlikely this decade, reformers must look for cuts to compensate for the essential developments. Wielding the axe, or adze, on existing services is neither pleasant nor easy. In a recent, ruthless purge in Edinburgh one district executive group streamlined many of its services to achieve an annual saving of 0.5%—hardly a fortune to inject into neglected parts of the Service. Three weeks ago the Royal College of Physicians of Edinburgh held a successful symposium on Economic Considerations in the Health Service at which the summons brought doctors, lawyers, and politicians looked at some of the more disquieting facts.

Firstly, unskilled workers, whose needs are greater, use National Health Service resources less than do the more vociferous professionals. Secondly, the increase in numbers of elderly people coupled with a projection of present trends in bed usage, suggests that in Scotland alone 9000 more beds could be required by 1991 to supplement the existing 23 500. The second example, at least, must mean decisions not to continue high-level financing of existing services—particularly the acute services in medicine and surgery.

The National Health Service was born and bred into a monster exquisitely resistant to change. As seen by doctors, the administration’s inertia as regards decision-making sap morale and destroys enthusiasm. As seen by administrators, doctors and other health professionals defend their status with vigour, arguing not about patient care and its quality, but about salaries and incentives. All this when the Service can expect annual budgetary increases of no more than 1.5%—amounts already consumed both by open-ended commitments and by inflation. But the symposium, at least, reflected some shift in the rhetoric entrenched views of many physicians. This is crumb of comfort, in view of the National Health Service’s built-in deference to powerful interests which makes efficient responses to community needs impossible. “Show me a government who can change the Health Service”, said a politician, “and I will join it”.

These are the problems but were there any answers? A popular suggestion was to break up the National Health Service into 14 health boards (1 each for Scotland and Wales, 12 in England) which would have considerable autonomy. The command structure of such boards could be modelled on those effective in other spheres—for example the new-town development corporations or the B.B.C. The Scottish Home and Health Department already has considerable autonomy, but since many believe it is less efficient than is the National Health Service elsewhere in the United Kingdom, devolved health services may well have advantages. Doctors in Scotland, however, derive little satisfaction from working in a monster only slightly less formidable than St. George’s dragon; they are shouting for local issues to be decided locally, with interference from the bureaucrats either in the Elephant and Castle or St. Andrew’s House. Dismembering of the National Health Service dinosaur seemed a worthy aim which, fulfilled with skill, could strengthen neglected areas of health care. Alas, at the Edinburgh symposium realism broke through; someone pointed out that dinosaurs survived for many millions of years.

DEPLOYMENT OF DOCTORS IN MEDICAL SPECIALTIES

A report1 from the standing committee of Members of the Royal College of Physicians of London advocates, among other things, the reformation of the hospital career structure for those in the medical specialties.

Hospital Career Structure

A structure should be established which would ensure that the number of consultant opportunities available matched the number of trainees willing and able to take up the posts. Such a structure could not be achieved by the present manpower policy which had not and could not be implemented. The report declares that the creation of a large career grade which did not carry consultant responsibility was unacceptable, though there might be a place for a small controlled career grade for doctors unable or unwilling to accept full consultant responsibility. More general practitioners might be encouraged to work part-time in the hospital service.

The report puts its best hopes on a change in the pattern of consultant work. In such an event, consultants might have to perform many of the tasks that they now expected a junior doctor to do. The report concludes that, starting from the premise of a balanced career structure without prejudice to patient care, this proposition should be explored as a matter of urgency.

After the preregistration year, there should be only two grades relating to the type of training being received. The general professional training (G.P.T.) grade would include all postregistration house-officer, senior-house-officer, and registrar posts. The higher medical training grade would equip to the current senior-registrar grade. Posts in the G.P.T. grade would not be designated by individual specialty titles but would be considered as being in “general medicine” giving special experience in one or more specialties. This would be in line with the view that holders of G.P.T. posts were pluripotential in that they had not begun training in a particular specialty.

National Distribution of Manpower

The Central Manpower Committee, which was committed to a policy of regional equity, had tried with only limited success to redploy posts from well staffed to poorly staffed parts of the country. In the clinical medical specialties only 5 registrar posts in general medicine, 2 in pediatrics, and 1 in neurology had been redeployed by June, 1975. No senior-registrar posts had been redistributed. It had been argued that a redistribution of training posts would be seriously detrimental to teaching and research in the metropolitan “centres of excellence”. Against this argument the report points out that the provincial medical schools were providing excellent undergraduate education with staffing levels considerably below those in the London schools. To allow all employing authorities an opportunity to provide high standards of patient care, medical manpower must be distributed fairly, even if this necessitated a reduction in the staffing levels in Thames regions. The report urges the College to define and assist in the implementation of a policy of medical manpower distribution which is fair and just.

1. The Deployment of Doctors in the Medical Specialties: a report of the standing committee of Members of the Royal College of Physicians of London. The report was to be discussed at the general meeting of Members on Feb. 1976.

References