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Heather Dacre

JOURNAL

OF THE NEW ZEALAND ASSOCIATION OF BACTERIOLOGISTS

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1. Carlozzi, M.: Antibiotic Med. & Clin. Therapy 5: 146 (Feb.) 1958.

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EDITORIAL

Emerging from the Fourteenth Annual Conference of the N.Z. Association of Bacteriologists held in Wellington is the question of the alteration of the Association's title. It is a question which is going to give rise to considerable controversy and therefore an appeal must be made to all Association members for frank thought to be given it, the pros and cons to be weighed, the costs to be added or subtracted and the final answer to be a fair result of the total.

Firstly consider the term "bacteriologist" which in the dictionary is defined as one who pursues the science of bacteriology. Surely this must be recognised as a misnomer since this term can be applied in its true sense to only a section of the staff associated with the varied work carried out in the hospital laboratory. Further, the Association is called "the N.Z. Association of Bacteriologists", we call ourselves "Hospital Bacteriologists" and our final examination is one in "Hospital Laboratory Practice". This is inconsistent.

Then consider the matter of recognition overseas. Members of kindred associations fall under the title of "medical technologists" which would appear a more accurate one than "bacteriologists". Today there is much need for mutual recognition and reciprocity between all countries, particularly in the field of science and medicine. The recent establishment of the International Congress of Medical Technologists is to be commended and this year representation will be made from our Association. But there should not be the need to explain our title when making contact, as is necessary at present.

Next comes the question of status, and this apparently is dear to every one of our members, and rightly so. Not so many years ago the battle was waged for recognition of professional status, the name technician being considered unworthy of those performing the work in the hospital laboratory. The fear is now expressed that this word might come again into common usage, should the title "medical technologist" be adopted, but while work is maintained at a high standard and is well esteemed throughout, there should be no occasion for reversion to this term. Any change of name will involve a certain amount of expense, but the Association's funds are in a healthy state and this should not cause any undue concern.

Finally comes the question of the new title itself, should agreement be in favour of such a change. This question is likely to prove the most controversial one. The title "medical technologist" is disliked by many, yet it appears nearer the truth than "bacteriologist". Also it is a title used by kindred associations overseas. The suggestion that the Association may be one of "hospital laboratory practitioners" may well receive more favourable hearing.

To summarise, therefore; is the title of the Association to be altered, or is it to remain a misnomer, and is overseas recognition and reciprocity necessary? If the decision be made in favour of alteration, what then is to be the title?

AN INTRODUCTION TO EXFOLIATIVE CYTOLOGY AND ITS APPLICATION TO THE DIAGNOSIS OF MALIGNANCY.

MISS PAMELA CARSON

(*Pathology Department, Wellington Hospital*)

(*Winner, Technical Section, Junior Essay Competition.*)

A detailed survey of the technique of exfoliative cytology would involve specialised and comprehensive data, much of which is beyond the scope of a laboratory worker. I have tried in this essay to give basic principles that appear to me to provide a general introduction to exfoliative cytology. This branch of science, although as yet considered incomplete, is still progressing as observations are accumulating gradually in the field of applied cytology and advances are being made in fundamental concepts of the morphologic and physiologic properties of the cell.

The essential difference between exfoliative and other branches of cytology is that it deals with desquamated cells which because of their separation from the site of origin and their ensuing degenerative changes acquire specific morphological characteristics.

Exfoliative cytology has been used to advantage in chromosomal sex determinations, the diagnosis of: pernicious anaemia, chronic inflammatory conditions, e.g., pneumonia, asthma, and in the past three decades has proved to be of real value in two broad fields: firstly, in the physiology and endocrinology of the female sex organs, and secondly, in the early diagnosis of malignancy.

It is known that there exists a continuous exfoliation of cells from every epithelial surface of the body. Thus the vaginal secretion, the sputum and the urine normally contain cells desquamated from the corresponding epithelial surfaces. There is evidence that tumour cells may desquamate even more rapidly than normal cells and that such malignant cells can be accurately identified. If the presence of tumour cells in any body fluid is correctly established, such cells must have originated from an area of tumour proximate to or in contact with the fluid examined.

HISTORY AND DEVELOPMENT

The study of exfoliated cells dates back to the middle of the nineteenth century, when Walshe noted small tissue fragments which were desquamated from malignant growths of the respiratory tract. In 1847, Pouchet first examined unstained preparations of vaginal fluid in an attempt to analyse the normal sexual cycle.

One of the earliest references on studies of desquamated cells for the purpose of diagnosing cancer is that of Beale, 1860, who reported the finding of malignant cells in the sputum from a case

of cancer of the pharynx. Malignant cells in smears of fresh sputum from cases of carcinoma of the lung were reported by Hampeln in 1876 and in 1887, Menetrier in 1886, Betschardt in 1895 and others.

Cytologic smears of other body fluids were also utilized at a very early date for the diagnosis of malignancy. Thus Sanders in 1864 reported finding fragments of malignant tissue in the urine of a patient with cancer of the bladder. Further observations on cells of the urine were made by Dickinson in 1869. As early as 1892, Ferguson recommended microscopic examination of urine sediment as the best way, exclusive of cystoscopy, of diagnosing tumours of the bladder.

Luecke and Klebs in 1867 found malignant cells in smears of ascitic fluid in cases of malignant tumours of the ovary. Later, Quincke, in 1875 and 1882, used this principle in the examination of transudates and exudates for cancer cells. In this application, however, the use of smears was soon superseded by the sectioning of sedimented cells as described by Bahrenberg in 1895.

In 1917, Stockard and Papanicolaou employed the vaginal smear technique as a means of analysing the sex cycle of the guinea pig. They developed the technique of rapid fixation and staining which made possible for the first time accurate cytologic observation of the vaginal fluid. The value of this technique as a method for determining the morphologic and functional state of the female reproductive organs resulted in its general adoption as a standard method for the study of the sex cycle of female mammals and of problems related to sex physiology and endocrinology.

In 1923 Papanicolaou became impressed by the abnormal features of certain cells observed in the vaginal secretion of women with cancer of the uterus and suggested that the vaginal smear should be useful in the diagnosis of malignant uterine disease. His first publication on this subject appeared in 1928 and a second in 1933. Little interest however was aroused by his early observations. Six years devoted to the study of other aspects of vaginal cytology passed before Papanicolaou again in 1941 stated in "The Diagnostic Value of Vaginal Smears in Carcinoma of the Uterus" —Papanicolaou and Traut—that uterine cancer could be diagnosed accurately by vaginal smear. This publication focused the attention of Meigs, Graham, and Fremont Smith on the problem and they, working as a team at the Vincent Memorial Hospital, Boston, were the first to confirm Papanicolaou's results.

It has been recognised that one of the salient features of the cytologic approach is the possibility which it offers for recognition of cancer in its incipiency. This has been demonstrated by the

large number of preinvasive carcinomas of the cervix detected in recent years by the use of the smear method.

The recently acquired evidence of the existence of distinctive cytologic patterns in the early developmental stages of cervical carcinoma, in contrast to those of the more advanced stages, has provided more sensitive criteria for the diagnosis of early cancer, and possibly a means of prognosis based on the prevailing cytologic pattern.

TECHNIQUE

Much progress has been made in the adaption of the cytologic method to the diagnosis of cancer. The method has been expanded from the study of uterine and vaginal secretions to many other body fluids such as C.S.F.; urine; prostatic secretions; semen; sputum; bronchial, gastric, duodenal, rectal and colonic aspirates and washings; pleural, peritoneal and pericardial exudates; breast secretion; and fluid aspirated from other body cavities and cystic growths. Thus far the method, from the point of view of accuracy of diagnosis, has been applied most successfully to cancer of the uterus, lung, bladder, rectum, stomach and pleural and peritoneal linings. Knowledge of the exfoliative cytology of some of the other organs is less advanced, due primarily to the technical difficulties in obtaining proper material.

The collection of most of the material is not required of the laboratory worker but it is necessary to know the range of tests and the technical methods and principle involved for the different types of specimens. Recent advances involving specialised techniques for the collection and treatment of some specimens have been published but these are beyond the scope of this essay.

PREPARATION OF SMEARS

Sputum: A small amount of sputum is placed on a clean slide. With a second clean slide it is gently crushed, using just enough pressure to soften and spread it into a fairly thin, uniform film but not enough to break down the cells. It is advisable to select for the preparation of smears, any bloody or other suspicious-looking areas in the sputum. Smears are allowed to dry slightly around the edges for proper adherence to the slides and then immediately dropped into a fixative of equal parts 95% alcohol and ether.

Urine, exudates and bronchial, gastric or other aspirates or washings: The specimens are centrifuged for approximately 30 minutes at medium speed. The supernatant fluid is decanted and one drop of albumin or serum is mixed with the sediment. The sediment is removed from the tube with a pipette and spread evenly on a slide. Smears are allowed to dry slightly at the edge and then fixed in alcohol and ether.

Fixation:

Fixation does not require more than a few minutes, but a minimum of 15 minutes is advisable for proper adherence of the smear to the slide.

If necessary, smears may be kept in the alcohol ether solution over a long period of time; however this is not recommended as a general rule, as it may result in an alteration in the staining reaction of the cells. Smears which are to be mailed to a laboratory for staining should be fixed in alcohol ether for at least one hour. If ether is not available, ethyl alcohol (95%) can be used alone. Methyl or even isopropyl alcohol, although less desirable, can be used as substitutes if chemically pure.

For shipping, the following method suggested by Ayre and Dakin may be used. After fixation with alcohol ether, the smear is covered with 2 or 3 drops of glycerine without being allowed to dry. A second clean slide is placed on the smear for protection and the two are fastened with a rubber band, wrapped in wax paper and packed for mailing. Alternatively smears are fixed in a solution of 3 parts alcohol ether and 2 parts diaphane for a minimum of 1 hour and allowed to dry. The film of diaphane which forms over the smear protects it from complete drying for a period of a few days.

Another way of protecting a smear is to fix, dehydrate and mount it, omitting the staining. In this manner it can be preserved for an unlimited period of time.

Staining of Smears:

The staining of smears for the cytologic diagnosis of cancer is directed towards three chief objectives.

1. Definition of nuclear details. Because of the widespread nuclear abnormalities of cancer cells and their diagnostic significance, good staining of the nucleus is of primary importance.
2. Transparency. This is of particular importance because of the varying thickness and the frequent overlapping of the cells.
3. Differentiation of cells. Differences in the staining reaction such as that between acidophilic and basophilic cells help greatly in the identification of certain cell types found in smears.

Variations of staining techniques have been devised for various specimens but the following technique used at the Wellington Public Hospital appears to be satisfactory for all types of smears examined.

1. Fix slide in equal parts of 95% alcohol and ether for at least 15 minutes.

2. Rinse successively in 70% alcohol, 50% alcohol and distilled water.
3. Stain in Harris Haematoxylin for 2 minutes.
4. Rinse well in distilled water.
5. Blue in 97 ml of 70% alcohol plus 3 ml ammonia for 2 minutes.
6. Rinse successively in two lots of 70% alcohol, 80% alcohol and 95% alcohol.
7. Stain 2 minutes in OG6.
8. Rinse 8 times in two lots of 95% alcohol.
9. Stain in EA50 for 2 minutes.
10. Rinse 8 times in 95% alcohol and in two consecutive lots each of absolute alcohol and xylol.
11. Mount in D.P.X.

E.A. 50 represents a multiple polychrome stain.
Active ingredients: Light green S.F. Yellowish.
Bismarck Brown Yellowish.
Eosin Yellowish.
Phosphotungstic acid.
Glacial acetic acid.

O G. 6 is a single Orange G stain
= Orange G.
Phosphotungstic acid.

Harris Haemalum is a sharp nuclear stain
= Haematoxylin
Absolute alcohol
Ammonium or potassium alum
Aq. dest.
Mercuric oxide

Staining Reaction:

1. Nuclei stain dark purple.
2. Basophilic cells stain green or blue green.
3. Acidophilic cells stain from pink to orange.
4. Superficially totally cornified cells stain orange or yellow.
5. Erythrocytes stain orange red.
6. Bacteria and trichomonas stain purple.
7. Spores of fungi (monilia) stain light pink.

If darker or lighter staining is desired the staining time may be varied at the discretion of the operator.

Microscopy:

Every smear is covered systematically field by field under low power 2/3in. 16 mm. objective using a bright light with a blue filter and the condenser of the microscope raised. Any unusual or suspicious cells are examined under high power 1/6in. 4 mm.

objective. A blue ink dot is placed, by the worker screening the smear, to the left and slightly above any positive or doubtful looking cells so that they can be referred to the experienced pathologist for final decision. 8 X eye pieces are used by the worker and the pathologist so that uniformity can be obtained in checking results.

RECOGNITION OF NORMAL CELLS

A thorough knowledge of normal exfoliated cells and the range of their variability is of the utmost importance not only as the logical foundation for an understanding of the abnormal but also as a prerequisite of an adequate diagnostic evaluation.

Female Genital System:

1. Vagina and ectocervix:

The squamous epithelium covering the vagina and ectocervix consists of five zones from which cells can be recognised:

(a) basal.
(b) parabasal.
(c) intermediate or navicular.
(d) intra epithelial.
(e) cornified or squamous.

2. Endocervix:

The endocervix, including its glandular components, is covered by simple cuboidal or columnar epithelium consisting of two types of cells, the secretory or mucoid and the ciliated.

3. Endometrium:

The epithelium lining the endometrium, including its glands, also consists of two cell types—the secretory and the ciliated. The secretory cells are of the mucoid variety. They have a cuboidal or low columnar form with a basally located nucleus. Beneath the surface epithelium and between the glands is the uterine stroma consisting of relatively small cells, which in their undifferentiated state resemble cells of the embryonic mesenchymal type.

The identification of endometrial cells in vaginal and endocervical smears is often difficult as they may be confused with endocervical cells or histiocytes. The endometrial cells are generally smaller than the endocervical cells, and tend to form denser and more compact groups in which the outlines of the cells are not always clearly defined. Clusters of endometrial cells often exhibit characteristic patterns which facilitate their identification.

Histiocytes, often varying in number, form and size, are also found commonly in vaginal, endocervical and endometrial smears.

Urinary and Male Genital Systems:

1. *Cytology of urine aspirated from the ureter and the pelvis of the kidney:*

Most of the cells are derived from the transitional epithelium lining these organs, although cells shed from the tubules of the kidney may also be found in ureteral specimens. The renal origin of cells may be revealed by their relatively smaller size and their frequent arrangement into clusters of cylindrical form.

Cells found in ureteral specimens may appear singly or in clusters in which the lines of demarcation between the individual cells are usually well preserved.

The cells show vacuolation of the cytoplasm, which is often differentiated into a central, lighter staining endoplasmic area and a deeper staining ectoplasmic zone.

The nuclei, when well preserved, are round or oval and have a fine chromatin network with one or more small karyosomes. They vary greatly in size.

Another characteristic of ureteral specimens is the frequent presence of bi- or multinucleated cells.

2. *Cytology of catheterized bladder urine:*

Most of the cells found here are desquamated from the epithelium of the bladder. Some are similar to cells found in ureteral specimens, while others exhibit forms resembling the superficial squamous cells seen in vaginal smears. Vacuolisation may often be noted.

The nuclei are of the vesicular type and have a lightly stained chromatin network and one or more small though distinct karyosomes. Their structure shows some resemblance to that of the nuclei of endocervical cells. In the larger, more superficial cells the nuclei may show shrinking or pyknosis.

3. *Cytology of prostatic secretions:*

Exfoliated prostatic cells exhibit extreme variations in size ranging from very small undifferentiated epithelial cells of apparently glandular origin with a small nucleus and a minimal amount of cytoplasm, to very large cells with one or more vesicular nuclei resembling the transitional or squamous cell types. Intermediate cell types are also seen, some with a cuboidal or columnar form.

Respiratory System:

1. *Bronchial aspirates or washings:*

The epithelial elements found here are differentiated cells of the ciliated and goblet type and undifferentiated reserve cells from the basal areas of the epithelium.

The ciliated cells have a columnar form and may be identified by their cilia or, in their absence, by the heavy cuticular membrane covering their surface. The cytoplasm is often vacuolated, particularly in the distal portion of the cells. The nuclei of the

ciliated cells have an ovoid or rounded form and when well preserved show a characteristic granular arrangement of the chromatin.

The ciliated cells show marked variation in size and form. Those found in naso pharyngeal washings tend to be taller, whereas those from the laryngeal mucosa are larger and stouter than those of the bronchial mucosa.

The secretory or goblet cells have a columnar form and a basally located nucleus and may be recognised by their mucoid content. A relatively large increase in their number has been observed in certain pathologic conditions involving a more abundant secretion of mucus, as in asthma.

The undifferentiated cells are considered to be reserve cells from the deeper layers of the epithelium. They are small and usually appear in compact groups. Their nuclei are round and show a granular arrangement of the chromatin.

Bronchial aspirate or washing smears from normal cases contain, as a rule, a small or moderate number of leucocytes and histiocytes. The presence of a large number of polymorphonuclears, including eosinophils, or of plasma cells is suggestive of an inflammatory condition or an infection. Erythrocytes are generally present, but their diagnostic value is limited since they are frequently the result of trauma caused by bronchoscopy.

2. *Sputum:*

Most of the cells are of the squamous type. These are acidophilic and display great variation in size and form. Smaller cells of the parabasal type, both basophilic and acidophilic, are also present.

It is of interest to note that cells with atypical features, which in some instances may cause a suspicion of malignancy, are often seen in cases of chronic inflammatory conditions including pneumonia, tuberculosis and bronchiectasis. Some of these cells have a distinctive form and therefore a diagnostic value such as the 'Pap' cell. It is a relatively small acidophilic cell with an elliptic form and an ovoid pyknotic nucleus. According to one view 'Pap' cells are small squamous cells from the upper portion of the respiratory tract. Another view states that they represent a squamous metaplastic change of epithelial cells of the ciliated type.

Leucocytes and histiocytes are commonly seen in sputum and bronchial aspirates. Red blood cells have a greater diagnostic significance in the sputum than in the bronchial aspirates and washings, because as mentioned before their presence in the latter may be the result of trauma.

Digestive System

1. *Cytology of the oesophagus:*

Most of the cells found in smears of oesphageal washings are of the squamous type and may be divided into the superficial cells and the cells derived from the deeper epithelial layers (parabasal). The superficial cells are large and have an irregular or polygonal form and a pyknotic nucleus. The deeper cells are smaller and have a round or ovoid form and a larger and better preserved nucleus.

2. *Cytology of the stomach:*

The gastric mucosa is lined with a simple columnar epithelium composed of mucus secreting cells. Well-preserved exfoliated cells of this type usually retain their columnar form, which can be clearly seen in single cells and small clusters.

Also present in smears from gastric fluid are cells of the squamous type, e.g., large superficial cells of the cornified type as well as smaller cells closer to the parabasal type, which are carried into the stomach from the oesophagus and the oval mucosa.

Other extraneous cells often found in the gastric fluid may be derived from the respiratory epithelium—these are generally recognised by the presence of cilia—or the duodenum and even the pancreatic and common bile ducts. Lung histiocytes (dust cells) are often seen in gastric specimens and can usually be identified by their characteristic cytoplasmic inclusions.

Cells from various foodstuffs are sometimes found, particularly in impure specimens. These may be identified by their morphologic characteristics.

Polymorphonuclear leucocytes are found in gastric smears in varying numbers and are particularly prominent in chronic irritations. Lymphocytes are more rarely seen and acquire diagostic significance only when present in large aggregations. Erythrocytes may be noted occasionally in normal smears, but are of little importance unless found in large numbers indicating actual bleeding, or unless they are in a state of degeneration revealing the presence of chronic bleeding. Histiocytes, excluding the extraneous dust cells, vary greatly in number and size but are not so prominent a constituent of the normal gastric smear as of smears of other fluids. Their activity increases in cases of inflammatory processes.

Pleural, peritoneal and pericardial exudates:

The pleural, peritoneal and pericardial cavities are lined with mesothelium—a simple squamous epithelium. Fluid aspirated from these cavities contains chiefly mesothelial cells and a varying number of histiocytes, leucocytes and erythrocytes.

Breast:

Most of the desquamated cells are cuboidal, columnar, pseudostratified or stratified squamous epithelial cells. They vary in size and form and may appear singly or in dense and compact clusters. Their nuclei are relatively large, often wrinkled and the cytoplasm usually shows distinct vacuolation. Histiocytes and leucocytes are also present in small numbers in breast smears.

CRITERIA OF MALIGNANCY

In exfoliative cytology the recognition of malignancy is based on general criteria, which may apply to a variety of cells, and also on specific criteria which apply only to characteristic cell types. By general criteria malignancy may be recognised as such; but it is by the specific criteria that its distinctive type can be determined. At this stage in the use of the cytologic method in the diagnosis of cancer, chief reliance is still on the general criteria, since the number of specific cell forms which have been conclusively linked with the presence of a particular type of malignancy is still limited.

The general criteria of malignancy may be divided into three groups.

I. Structural modifications of cells and their nuclei:

A. Nuclear changes:

1. Disproportionate enlargement of the nucleus, altering appreciably the normal nuclear-cytoplasmic ratio.
2. Increase in the chromatin content, causing hyperchromasia.
3. Structural abnormalities such as an aberrant chromatin pattern, elongation, irregularity in outline, deep indentation and furrowing, lobulation and budding.
4. Enlarged nucleoli or an increase in their number beyond normal variability.
5. Multinucleation, when associated with nuclear atypia.
6. Mitotic activity with abnormal mitotic figures.
7. Marked thickening of the nuclear membrane.
8. Degenerative changes, such as abnormal vacuolation, fading or complete resorption of the nucleus.

B. Cytoplasmic changes:

1. Changes reflected in the staining reaction, i.e., certain types of malignant cells may exhibit pronounced basophilia or acidophilia.
2. Cytoplasmic inclusions such as pigment granules, leucocytes or cellular debris.
3. Atypical vacuolation.

C. Changes of the cell as a whole:

1. Enlargement of cells beyond their normal range.

2. Aberrance in the form of the cell, e.g., elongation and bizarre shapes.
3. Degenerative or necrotic changes.

II. Criteria based on the inter-relationships of cells:

1. Irregularity of pattern, i.e., lack of uniformity in the orientation of the cells and their nuclei.
2. Anisokaryosis and anisocytosis. These terms refer to marked variations in size of nuclei and cells of the same type within a cluster, not to the variations found in single cells scattered throughout the smear.
3. Lack of distinct cell boundaries.
4. Dense grouping and crowding of cells and nuclei.
5. Engulfment of one cell by another.
6. The grouping of cells into characteristic patterns.
7. Pronounced stratification.

III. Indirect criteria:

1. Presence of blood. Profuse bleeding and the presence of fresh blood do not suggest cancer as much as old fibrinated blood, with degenerated erythrocytes, as seen in adenocarcinoma of the endometrium.
2. Excess of lymphocytes.
3. Prominence of histiocytes.
4. Polymorphonuclear leucocytes. These are primarily characteristic of infection. In malignancy, they are numerous chiefly in advanced stages where secondary infections are common.

No single criterion is sufficient to establish conclusively the presence of malignancy. Sufficient evidence for a positive diagnosis is provided only by the fulfilment of a number of criteria.

MAIN TYPES OF CARCINOMA RECOGNISED

The essential diagnosis of malignancy is by the nucleus of the cell alone. The cytoplasm designates the type of tumour.

I. Squamous carcinoma:

A. Undifferentiated malignant cells:

1. Irregularity of chromatin network and increase in chromatin content.
2. Sharp nuclear borders.
3. Absence of cellular borders. If single cells, inadequate cytoplasm and no cellular border.
4. Variation in size and shape.

B. Differentiated malignant cells:

Show a multiplicity of forms. Cytoplasm is present and cellular borders are apparent. Included in this group is the Fiber and Tadpole Cell.

(a) Fiber cell:
1. Thin elongated cell with fairly distinct cellular borders.
2. Deep staining elongated nuclei.
3. Variation in size and shape of nuclei.

(b) Tadpole cell:
1. Cytoplasm is present but abnormally distributed, i.e., the cell has a 'head' containing nucleus or nuclei and a long tail of cytoplasm.
2. Cellular borders are distinct.
3. Nuclei exhibit increase in chromatin content, irregularity of chromatin pattern and sharp nuclear border.

C. Third type differentiated malignant cells:

1. Nucleus has an irregular chromatin network. There is an increase in chromatin content. Nucleus often appears wrinkled. Border of nucleus is sharp.
2. Cellular border is distinct.
3. Cytoplasmic-nuclear ratio is often abnormal but this is not a reliable criterion, since cells may occur in which the ratio is within normal limits.

Only if differentiated cells of one or more of these three types are present may a smear be called "consistent" with squamous cell carcinoma.

II. Adenocarcinoma:

A. Differentiated cells:

1. Round cell with eccentric nucleus with irregular chromatin arrangement.
2. Cellular border is visible but not distinct.
3. Cytoplasm is inadequate for size of nucleus, is not smoothly stained and often contains large vacuoles.
4. Cells occur in groups.

B. Undifferentiated cells

1. Round or oval nuclei with irregular chromatin arrangement.
2. Variation is more in size than shape.
3. No cellular borders are present and cytoplasm appears as a background which may show vacuolization. These cells occur in tight clusters with nuclei overlapping.

The structure of the nuclei identifies the cells as malignant, the vacuolization classifies the cell as adenocarcinoma.

III. Oat cell or small cell carcinoma:

1. Discrete, small, oval or round nuclei showing some variation in size but little in shape, occurring in large sheets.
2. Cytoplasm is absent.
3. Hyperchromasia of the nuclei varies from seemingly normal content to a definite increase.

4. Nuclear pattern is irregular and chromatin is deposited at periphery of nucleus.

IV. Undifferentiated carcinoma:

1. Cells may occur either in tight groups or singly.
2. Cellular borders are absent and cytoplasm either appears as a faint background or is entirely absent.
3. Nuclei are hyperchromatic, irregular in size and shape.
4. Chromatin arrangement is abnormal and nuclear borders are very sharp.

V. Alveolar cell carcinoma:

1. Cells occur generally in groups.
2. Cytoplasm often has a foamy appearance and may contain vacuoles.
3. Cellular borders quite distinct.
4. Nucleus rimmed and sometimes folded. Faded appearance and even distribution of chromatin give a punched out effect.
5. May contain nucleoli.

CLASSIFICATION OF CYTOLOGIC FINDINGS

Smears cannot always be judged as positive or negative. There are cases in which cytologic findings are inconclusive. In some laboratories results are reported as positive, suspicious or negative. However, a subdivision of both positive and negative groups into two sub-groups constitutes the basis of the Papanicolaou classification.

Class I — Absence of atypical or abnormal cells.
Class II — Atypical cytology but no evidence of malignancy.
Class III — Cytology suggestive of but not conclusive for malignancy.
Class IV — Cytology strongly suggestive of malignancy.
Class V — Cytology conclusive for malignancy.

RADIATION CHANGES

The vaginal smear is used primarily for the diagnosis of untreated malignancy, but since the cellular changes produced by radiation are pronounced and varied it has a definite application for detection of possible recurrence in the follow-up cases of radiation treated carcinoma.

The effects of radiation on the normal cells of the vaginal and cervical mucosa are unique. Specific effects are; great increase in size of both nucleus and cytoplasm with no disturbance of the cytoplasmic-nuclear ratio, marked vacuolization of the cytoplasm and occasionally of the nucleus; and production of many bizarre forms. The effects on undifferentiated maligant cells are increase in size and vacuolization of the small amount of cyto-

plasm present. The differentiated cells appear to show the effect of radiation only in rare instances.

The first studies on radiation effects were made by Ruth and John Graham. Because there seemed to be such poor correlation between the presence or absence of malignant cells and the possible success of radiation treatment they attempted another type of correlation. In some cases of carinoma of the cervix treated by X-ray and radium both the normal and malignant cells show radiation effect. In others few of either type show changes. At the present time the Grahams believe that those patients in whom the majority of both normal and malignant cells show distinct radiation effect have a good prognosis. Conversely those patients in whom there is little response in either type of cell have a poor prognosis.

Sensitization Response (S.R.):

This determination is made only on basal cells, which are well-preserved, i.e., have an intact cytoplasmic and nuclear border. Cells showing the S.R. phenomena exhibit increased density of basophilic cytoplasm containing fine vacuoles. Cells which lie in groups of six or more are omitted from this count. The count is made at random spots on the smear, which is prepared by aspiration from the vaginal fornix. The cells encountered in the examination are classified as cornified, pre-cornified, basal S.R. and malignant cells. After 100 cells have been counted, the percentage of malignant cells is assessed and the count continued beyond 100 to compensate for the number of malignant cells counted.

Cornified cells are those with eosinophilic cytoplasm, containing pyknotic nuclei, in which no nuclear structure is evident.

During radiation, Radiation Response (R.R.) counts are performed three times weekly, and on the 14th day after radium, if the R.R. changes reach a level of 70% then cytologically, the patient is presumed to have had a good response to radiation.

Radiation Response:

This response, maximal at the 14th day after the institution of radiotherapy is made on cornified cells, pre-cornified cells and basal cells. Each cell is examined for (1) vacuolization, (2) nuclear change, (3) size increase (size increase denotes an increase both in the size of the cell and in the size of the nucleus), and (4) double nucleus. All these factors are considered when examining cells from the above three groups, with the exception of cornified cells where the examination is restricted solely to vacuolization, size increase and double nuclei, since nuclear change is not evident in these cells following radiation.

SOURCES OF ERROR IN EXFOLIATIVE CYTOLOGY

Apart from errors in interpretation there are others which may result in an incorrect evaluation of cytologic findings:

1. Mislabelling or interchanging of specimens either at collection or in the laboratory.
2. Deterioration of specimens because of delayed processing or poor fixation.
3. Drying of smears, particularly prior to fixation. This may cause distortion and enlargement of cells and their nuclei and loss of structural detail.
4. Improper staining. Overstaining with haematoxylin or other nuclear stains may give to the nucleus or even the whole cell a hyperchromatic appearance. Understaining on the other hand, gives a poor definition of cell structure and does not permit the proper evaluation of the chromatin content of the nucleus.
5. Incomplete or erroneous marking of the specimen type.
6. Contamination. This may occur at the time of or prior to collection of specimens or at staining. When many cells are processed together cells or clusters may become detached from one smear and adhere to the smear surface of another slide.
7. Lack of an adequate history. Operative procedures may cause marked cytologic changes which in the absence of adequate information may lead to misinterpretation of smear findings.

The above-mentioned possibilities of error should always be taken into consideration in the final evaluation of smear findings.

SUMMARY

Exfoliative cytology deals with desquamated cells which may vary according to the site of their origin. Its use has been extended to aid in the localising of infection, the evaluation of the hormonal states of patients, cancer screening, and in chromosomal sex determinations.

Much progress has been made in the adaption of the cytologic method in the diagnosis of cancer. This is attested by improved techniques and the expanding use of the method to cover a greater number of organs.

A thorough knowledge of normal exfoliated cells and the range of their variability is of the utmost importance not only as the logical foundation for an understanding of the abnormal but also as a pre-requisite of an adequate diagnostic evaluation.

No single criterion is sufficient to establish conclusively the presence of malignancy. Disproportionate nuclear enlargement, hyperchromasia, multinucleation, abnormal mitosis, vacuolation,

anisocytosis and anisokaryosis, stratification, etc., are morphologic aberrations which may be observed singly in apparently normal cells. Sufficient evidence for a positive diagnosis is provided only by the fulfilment of a number of criteria.

The study of known cases of malignancy has disclosed typical cytologic pictures varying with the site of the tumour and resulting smear. Essential diagnosis of malignancy is by the nucleus of the cell alone. The cytoplasm designates the type of tumour.

Some laboratories report smears as positive, suspicious or negative. A subdivision of both positive and negative groups into two sub-groups constitutes the basis of the Papanicolaou classification.

Sensitization response and radiation response as evaluated quantitatively from cells before and after radiation appears to influence the prognosis in carcinoma of the cervix.

Errors in interpretation, mislabelling, interchanging of specimens, deterioration, drying, improper staining, incomplete or erroneous marking, contamination, or lack of adequate history may result in an incorrect evaluation of cytologic findings.

CONCLUSION

Exfoliative cytology has many wider applications other than the detection of carcinoma. Although fixed tissue sections still remain the final criterion of malignant disease, cytology has established itself as the most accurate screening procedure currently available for the detection of uterine carcinoma, and has stimulated the study and understanding of malignant disease generally. Because of this cytology as a special branch of laboratory medicine is of the utmost importance in modern medical centres.

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REPORT ON AN INCIDENT OF BACTERIAL FOOD POISONING

MISS ROBYN M. JENKIN
(*National Health Institute, Wellington*)

INTRODUCTION

From the earliest times food poisoning by chemical agents has been recognised, but it is only since the discovery of bacteria as a causative agent, that much headway has been made in our knowledge of bacterial food-poisoning. Since the turn of the century, food poisoning has been on the increase and this is not so much related to improved methods of diagnosis as to changes in the eating habits of the world population. Over the past few years, more use has been made of restaurants, canteens and other communal eating houses, where the food is handled in bulk, and often precooked before serving. Careless handling and lack of hygiene by even one employee could result in widespread infection. In the small family group, infection is not likely to go beyond those members directly involved, unless they are careless in their habits and then handle food to be eaten by others.

The organisms which most frequently cause bacterial food poisoning are salmonellae, staphylococci and clostridia, the salmonellae causing actual bodily infection, the staphylococci and clostridia producing toxic substances in the food which is later eaten by the patient. However it is now recognised that the ingestion of large numbers of many otherwise harmless organisms can give rise to gastric upsets.

A recent small outbreak of food poisoning in Wellington showed a typical history. Several people gathered for a child's birthday party and all partook of some brawn made with calves' foot jelly. At periods from 3 to 24 hours later, all involved experienced acute abdominal pain, diarrhoea, and vomiting. In most cases of food poisoning, the food causing the original outbreak has either been eaten or discarded by the time a history points to possible food poisoning, but in this incident, prompt action by the doctor established the only common food eaten, and there was enough of this left for laboratory investigation.

Salmonella typhi-murium and coagulase-producing staphylococci were isolated from the calves' foot jelly and the staphylococcus was found to have a phage pattern associated with the production of enterotoxin commonly found in staphylococcal food poisoning.

HISTORY

On Tuesday, 25th of February, the National Health Institute received some calves' foot jelly and a specimen of faeces from

a woman of 45, and S. typhi-murium was isolated from both. The patient, her mother, aged 78, and her son, aged 13, had all been attended by her local doctor on Sunday, 23rd, after suffering muscular pain on Saturday and acute abdominal pain and diarrhoea on Sunday. Specimens of faeces were obtained from all patients and all were found to contain S. typhi-murium.

It was learnt that the older woman had prepared some brawn, made with calves' foot jelly, for her grand-child's birthday on Saturday, 22nd, and part of this brawn had been consumed by all three patients.

On February 26th the older woman died, and post-mortem specimens of liver and intestinal contents were sent to the National Health Institute. These were all found to contain S. typhi-murium. Meantime, inspectors from the Health Department visited all those who had attended the party on Saturday. Eight other persons in three families were found to have suffered to a greater or lesser extent from diarrhoea and vomiting. Specimens of faeces from all were found to contain S. typhi-murium.

In family (A), two adults and one child were affected. Calves' foot jelly had been brought home on the Sunday afternoon and placed in a refrigerator, where it remained until produced for the evening meal on Monday. Father and son developed severe diarrhoea and vomiting 3-4 hours later. The mother developed symptoms 24 hours later.

Only one member in family (B) was involved. After returning from the party on Saturday, he ate some of the brawn and developed diarrhoea and vomiting 6 hours later.

Family (C) took some brawn home on Saturday, 22nd, and two adults and two children ate it the following evening about 6 p.m. It was not stored in a refrigerator between the time they left the party and the time it was consumed. At 8.15 p.m. one child began vomiting, followed by the father. It was not until 5 p.m. on the following day that the mother and the other child began to show any symptoms.

Of the 11 cases, all except the four persons in family (C) produced negative specimens 4 days after the initial specimen. These four persons produced the first negative specimen 9, 11, 16 and 18 days after infection. The father ran a small grocery business handling, among other things, ice-cream and cooked meats. His wife also helped him in the business.

METHODS USED

The original specimens of faeces and calves' foot jelly underwent the usual laboratory procedure for the isolation of pathogens from faeces, viz:—

Direct plating on McConkey agar, inoculation into Selenite broth and from this on to McConkey agar, carbohydrate reactions with lactose, glucose, sucrose, adonite and mannite, motility on semi-solid agar, indol reaction, utilization of urea, and serological identification of "O" and "H" antigens.

The organisms exhibited the biochemical reactions of salmonellae and in slide tests were agglutinated by IV. V. XII somatic sera. The flagellar antigens were identified by tube tests to titre as i and 1, 2. After the identification of the infecting organism, all subsequent specimens were plated on McConkey and tested direct from the plate with typing sera. In addition, the calves' foot jelly was inoculated into 10% saline broth, with subsequent plating on to blood agar. A coagulase positive staphylococcus was isolated with the phage pattern 6/7/47/53/54/75, a type commonly associated with food poisoning.

DISCUSSION

A thorough investigation was carried out at the home of the deceased to find how the brawn could have become infected in the first place. The brawn was a jewish delicacy which had been prepared by the deceased on many previous occasions with no ill effects. A shin of beef had been obtained from a local meat company and the bones, together with vegetables and the raw legs of a fowl, were liberally covered with salt and left for an hour. These ingredients were then placed, with a little water, in a pressure cooker and cooked for an hour. When the meat was thoroughly cooked it was lifted from the bones and placed, with the vegetables, in a pyrex dish, to which was added some of the liquid and some sliced hard-boiled eggs. When cool, the dish was placed in a refrigerator until removed for the meal the following evening. After this meal it was returned to the refrigerator.

As the preparer of the brawn had died before these investigations could be carried out, the exact details of how the brawn was handled can only be a matter for conjecture. However it is known that the deceased was most particular about correct and hygienic food handling and the bench on which the food was prepared was of clean, good quality linoleum.

As all the ingredients constituting the brawn had been well cooked, the salmonellae and staphylococci must have gained entry at some later date. It is known that uncooked poultry was in the house at the same time the brawn was being prepared and this seems a possible vehicle of transport. With a day intervening between preparation of the brawn and the party it is more than likely that the poultry was handled and cooked on this intervening day.

In six out of the 11 cases, the incubation period, from time of meal to onset of symptoms, was from 16-24 hours as might be expected in a case of S. typhi-murium infection. However, in five out of the 11 cases, the incubation period was from 2-6 hours.

The short and longer incubation periods are in keeping with the bacteriological findings which demonstrate a staphylococcus of phage type associated with incidents of food poisoning and S. typhi-murium.

It is of special interest in this case to visualize how an epidemic could spread from such small beginnings. Each family involved came from a different suburb of Wellington, all widely separated from one another. Of these four families one ran a small grocery business, and the husband returned to work on Tuesday, 25th of February, three days after he had first become ill. When interviewed on Thursday, 27th, he was instructed not to handle cooked meats, ice-cream, any unwrapped food until a faecal clearance of two negative specimens was obtained. The same restrictions were also placed on his wife who helped her husband in the shop. As it turned out in this particular case, it was 18 days before two negative specimens were obtained from the husband. From this it will be seen how easily infection could have been passed on to customers if the proprietor was not very clean and careful in his habits and had been allowed to handle food.

The main interest in the case lies in the completeness of the investigations. This is unusual, because in most cases of food poisoning some links in the chain are missing, the most common being the food responsible. In this case, the food was available for investigation, the group involved was small and all were available for examination. Each case was followed till two negative specimens were obtained and the food handlers received expert instruction on how to handle wrapped food while still carriers.

SUMMARY

A small incident of food poisoning is described resulting from calves' foot jelly infected with S. typhi-murium and an enterotoxin producing staphylococcus, being served at a birthday party and infecting 11 in four families. The members of one family were food handlers and the implications of this relation to the start of an epidemic are discussed.

ACKNOWLEDGMENTS

The history of this incident was kindly provided by Mr W. R. Johnson, Inspector of Health. Wellington, and the staphylococcal phage typing was carried out by Mrs Joy Lange, bacteriologist, National Health Institute.

ABSTRACTS

STAPHYLOCOCCAL INFECTION IN GENERAL AND HOSPITAL PRACTICE

N. P. Markham and H. C. W. Shott (1958)
N.Z. med. J., 57, 55.

Staphylococcal strains isolated from 756 lesions occuring in non-hospital, hospital in-patients, maternity hospital patients and nurses have been studied.

An analysis of staphylococcal infection in relation to age has shown that there is an increased incidence of infection in children under one year, more especially in the first month of life, in women in the third decade and in males over 70 years of age. The increase in the first two groups was due to maternity hospital acquired infections.

Superficial skin infections were most common in children under 10 years and boils were most usually found in the 10-30 age group. Deep infection occurred most frequently in children under one year and in adults over 70 years of age.

Sensitivity tests to a variety of antibiotics and to sulphadiazine showed that staphylococci found in hospital acquired lesions were generally less sensitive than those in lesions acquired outside hospital. Over 50 per cent of staphylococci encountered in private practice were sensitive to penicillin or sulphadiazine or to both.

Attention has been drawn to the fact that staphylococcal lesions, which required hospital treatment, when encountered in general practice were more frequently caused by drug resistant staphylococci than were those which could be treated adequately without hospital admission. There is thus a constant feeding into the hospital environment of relatively drug resistant staphylococci and this factor must contribute towards the perpetuation of this type of organism in hospitals.

In the circumscribed geographical area in which this work was done staphylococci of phage type 80/81 usually had a distinctive antibiotic sensitivity pattern. This type of organism was found significantly more frequently in lesions acquired in general and maternity hospitals and in lesions of nurses than it was in private practice.

ESSENTIAL CRYOGLOBULINAEMIA

J. V. Cable, P. M. Dennis and J. Mattingley (1958)
N.Z. med. J., 57, 236.

A case of essential cryoglobulinaemia is described, together with autopsy findings. Studies undertaken on the abnormal protein are outlined and the correlation between the patient's symptoms and laboratory findings is assessed.

ANTI-GLOBULIN CROSS-MATCHING TEST. ITS USEFULNESS FOR URGENT BLOOD-TRANSFUSIONS

E. E. French and M. D. McGill, D.C.P. (1958)
Lancet, 1, 664

The efficacy of an emergency cross-matching procedure for incomplete antibodies, using the anti-globulin (Coombs) method, was investigated. Sixty-nine sera containing incomplete antibodies of the Rh., Kell, Lewis, Duffy, S., and Kidd system were tested undiluted and diluted so as to simulate low-titre sera in order to determine how quickly the cells became detectably sensitised.

97% of the sera used undiluted sensitised the appropriate cells after 15 minutes incubation in a water-bath at 37°C. 39%, when maximally diluted, were still able to sensitise cells after 15 minutes incubation; 61% of these diluted sera needed between 30 and 120 minutes incubation.

It is concluded that the shortened (15 minute incubation) anti-globulin cross-matching test is well worth carrying out.

ADDITIONAL SALMONELLA TYPES IN NEW ZEALAND—IV

S. W. Josland, 1958

N.Z. med. J., **57**, 155.

In three previous papers (1952), (1954), (1956), the writer reported the occurrence of the Salmonella types in material from human or animal sources in this country.

This paper reports the identification of an additional three types, all from human sources in New Zealand. The types are S. mississippi, S. victoria and S. pensacola, all of which exhibit the biochemical properties of the genus Salmonella.

EFFECT OF TEMPERATURE ON SURVIVAL OF BACTERIA IN BLOOD FOR TRANSFUSION

J. D. James and E. J. Stokes (1957)

Brit. med. J. **11**, 1389

The object of the investigation was to determine whether the use of refrigeration provides an additional safeguard or introduces an additional risk. Prevention of contamination by cold-growing bacteria is discussed and a method is recommended for the examination of blood suspected of infection.

CAUSE OF ANOMALOUS RESULTS IN THE E.S.R. USING WINTROBE'S METHOD

F. T. Shannon and E. G. L. Bywaters (1957)

Brit. med. J. **11**, 1405

The main factors which cause discrepancies in the E. S. R. are the tube diameter, plasma viscosity and increased haematocrit values. The results of experiments reported here confirm these faults and may be integrated into a reasonable and simple explanation of anomalous results.

RAPID COLORIMETRIC MICRO-METHOD FOR ESTIMATING GLUCOSE IN BLOOD AND C.S.F. USING GLUCOSE OXIDASE

J. E. Middleton and W. J. Griffiths (1957)

Brit. med. J. **11**, 1525

A rapid and accurate colorimetric micro-method for the estimation of glucose in blood and C.S.F. is described in which no heat is required. This is an enzyme method and is of such a high order of accuracy that it is suggested the method could be used in large laboratories to replace the usual copper reducing methods.

MINUTES OF A COUNCIL MEETING OF THE N.Z.A.B.

Held at Wellington Hospital on Wednesday, July 16th, 1958.

1. *Present:*

Messrs Reynolds, Olive, Murphy, Donnell, Walsh, Bloore, Tanner, Miss Evans.

2. *Minutes of the Previous Meeting:*

Moved: That these be taken as read. Olive-Murphy.

3. *Business Arising from the Minutes:*

The President explained the action by the sub-committee on the proposed change to the Rules to allow for the formation of branches.

Moved: That the Council approves the action of the sub-committee in formulating the new Rule. Donnell-Walsh.

4. *Applications and Resignations:*

The President raised the question of mass applications. Members agreed that in future all applications for membership should be personal.

The following new members were elected:

Miss A. M. Macphail (Blenheim); Misses A. E. Etherton, V. Wilson, J. A. O'Grady, J. Court (Wellington); Miss L. Nijenkamp-Beltman (Auckland); Mr F. B. O'Meara (Rotorua). Olive-Bloore.

The following resignations were accepted with regret:

Miss A. Brooks (Auckland); Miss E. N. Eglinton (Palmerston North); Mr D. B. Jones (Wallaceville); Mrs M. Green (Whangarei); Mrs L. Walker (Rotorua); Mrs J. M. Carter (Waipukurau); Mr G. J. Schafer (Wellington). Evans-Tanner.

5. *Financial Report:*

The Hon. Treasurer presented the Balance Sheet for the year and indicated the current state of finances.

Moved: That the Treasurer be authorised to pay Council Members' expenses to the Council Meeting. Olive-Bloore.

6. *Journal Report:*

The Editor reported on the Journal affairs, and indicated that there had been a decrease in the number of articles. She reported an increase in the number of entries for the Junior Essay Competition.

Moved: That the Editor's report be adopted with thanks for the Editor's work. Olive-Donnell.

7. *Correspondence:*

(a) Standard methods in biochemistry: Mr Olive indicated the main weaknesses in the proposals. He questioned the accuracy of the assertion that the methods were those in common use in the country. He thought that the smaller laboratories should have some say in the methods selected.

The President thought that the matter could best be handled by correspondence through a sub-committee.

Mr Olive said that such a committee still existed.

Moved: That charge bacteriologists be asked to send notice of the methods employed in their laboratories to Mr Olive by August 10th, 1958. Donnell-Murphy.

(b) Enquiry from Mr Buxton re Annual Leave: The Secretary read correspondence with the Health Department, and Mr Buxton in response to his enquiry.

(c) Letter from Mr Curtis expressing concern at the conduct of the recent Intermediate Examination and at the principle of accrediting.

Mr Tanner endorsed the complaint about the examination.

The President suggested that decentralisation of the examinations with travelling examiners might be an improvement.

The Secretary suggested that the matter be referred to the next meeting for other opinions to be collected.

The President proposed that charge bacteriologists be asked to report suggestions to a sub-committee to report back to the Council.

The Secretary offered to handle the correspondence.

The President asked members if they thought that the Association should send a letter expressing disapproval at the conduct of the last Intermediate Examination.

Moved: That the Secretary be instructed to write to the Department of Health indicating that the Association has received formal complaint at the conduct of the last Intermediate Examination, and that the Council is considering suggestions for improvements to the examinations which will be conveyed to the Department in due course. Tanner-Walsh.

Moved: That inward correspondence be received and the outward approved. Evans-Olive.

8. *General Business:*

The Editor was requested to put a notice in the Journal indicating the correct procedure for membership application.

The Hon. Secretary asked that members give some consideration to the question of training for the future formulation for proposals to improve on present methods.

Library proposal: The President said that the Health Department and National Library Service would co-operate, but no reply had yet been received from the Canterbury Medical Library.

The meeting closed at 6 p.m.

MINUTES OF THE FOURTEENTH ANNUAL GENERAL MEETING OF THE N.Z. ASSOCIATION OF BACTERIOLOGISTS (INC.)

Held at Wellington Hospital on 17th July, 1958

The President introduced Dr. Cairney, Director-General of Health.

Dr. Cairney spoke of his real interest in laboratory staff. He referred to the early days in laboratory work when things were simpler, and to the increasing complexity of the work. He felt that there was a consequent increasing need for conferences of this type. Dr. Cairney then spoke to delegates about the examination system and the salary fixation procedure. He then declared the Conference open.

The President thanked Dr. Cairney and introduced Dr. J. O. Mercer, Director of Laboratory Services, Wellington Hospital, who expressed his pleasure at being invited to address the Conference and his good wishes to the Conference. He spoke of the close liaison between pathologists and laboratory staff. He paid tribute to the sole hospital bacteriologists and to the early workers in laboratory medicine in New Zealand. He thought that the Association had maintained the integrity of the early workers. Dr. Mercer also referred to the increasing complexity of laboratory work as distinct from the increased volume of work. He thought that these changes were concerned mainly with diseases whose character does not and will not change. This increased the need for good equipment in laboratories. Dr. Mercer suggested that the matter of changing the name of the Association should be considered by members.

The President thanked Dr. Mercer.

Roll Call:

The following delegates attended Conference 1958:

Miss A. Johnstone, Mr A. C. Howell (Waikato); Miss L. Evans, Miss C. Curtis, Miss J. Speden, Mrs J. Hough, Mr B. W. Main, Mr T. Tanner, Miss M. Taylor (Christchurch); Mr K. B. Ronald (Whangarei); Mr L. Stenbeck, Mr D. J. Philip, Mr M. Donnell, Mr D. M. Taylor, Miss A. H. Henderson, Miss B. Pearce, Mr R. Aitken, Mr A. M. Murphy, Mr J. P. Walsh, Mr J. G. Meredith, Str. M. Paula, Mr J. H. Carter (Auckland); Mr H. E. Foster (Ashburton); Mr G. R. George, Miss M. J. Stewart (Rotorua); Mr L. B. Fastier (Upper Hutt); Mr K. G. Clarkson, Mr L. M. Paul, Mr I. C. Lyon (Lower Hutt); Mr J. J. G. Peddie (Upper Hutt); Mr K. Reeve (Dannevirke); Mr J. W. Carroll (Hastings); Mr J. B. Rankin, Miss Y. R. Young (Napier); Mr G. C. Thompson (Invercargill); Mr G. B. Winders, Mr K. Handley (Tauranga); Miss L. McKay (Timaru); Mr S. C. Marshall, Mr G. Tait (Wallaceville); Mr F. C. Dixon (Nelson); Miss J. Grey, Mr T. E. Miller, Mr I. M. Saunders (New Plymouth); Mr A. F. Harper, Mr J. F. Lyon, Mr E. L. F. Buxton (Wanganui); Mr I. R. Buxton (Oamaru); Mr H. G. Bloore (Blenheim); Mr M. E. Evans (Masterton); Mr M. O. Ekdahl (Gisborne); Mr I. D. Scott (Thames); Mr W. Don, Mr H. E. Hutchings, Mr K. B. Ash (Palmerston North); Mr D. C. Smith (Balclutha); Mr G. W. McKinley (Waipukurau); Mr N. J. Ellison (Wellington). Members of the staff of the Wellington Hospital laboratories attended as their duties permitted.

Apologies:

Apologies were received from the following:

Miss Kirk (Masterton); Mr Smith, Miss N. Davies, Mr M. Keenan, Miss Harper (Waikato); Messrs P. H. Curtis, F. M. Rush-Munro, K. M. Bilkey, C. Masters, V. Jones, Misses M. Lindsay, R. McLeay, H. Chesterman, S. Lamont (Auckland); Mr R. Kennedy (Auckland); Miss W. Cors-

Mr Meredith enlarged on the letter and spoke of the necessity for bringing the name of the Association into line with international usage.

Mr Rankin thought it unwise to raise the matter again.

Miss Evans emphasised the need for the change for correspondence overseas.

Mr Meredith asked if the Council could examine the proposal.

Moved: That the Council examine the proposal to change the name of the Association. Meredith-Bloore.

Mr Bloore suggested a referendum.

Mr Ronald agreed and suggested that comments on the proposal be sought.

Mr McKinley said that the Council should collect opinions, examine them and seek members' opinions.

The President agreed.

The motion was put to the Meeting and carried.

3. Mr L. Cameron of the Health Department, Wellington, then addressed the meeting and answered members' questions.

4. Remit from Mr Main re publication of votes cast for elected officers:

The Motion lapsed for want of a seconder.

5. Honoraria:

Moved: That all the Honoraria be increased by £2/2/0.
Olive-Murphy.

Mr Bloore moved that the Auditor's Honorarium be not increased.
Bloore-Buxton.

Carried.

The amended motion was carried.

6. Conference 1959:

Mr Thompson, Invercargill, invited the Association to Invercargill, Miss Evans, Christchurch, invited the Association to Christchurch.

The meeting voted in favour of Invercargill.

7. Donations received:

Moved: That this Meeting express its grateful thanks for donations received from Biolab. and W. Warner Ltd. Olive-Hutchings.

8. Voting system:

Mr Ronald thought the voting system should be altered to a direct voting system. This proposal was not supported.

9. Life membership:

After considerable discussion and accord the following motion was put to the Meeting and carried unanimously with acclamation.

Moved: That Mr G. W. McKinley be elected a Life Member.
Reynolds-Buxton.

Mr McKinley expressed his appreciation at the honour accorded him.

Moved: That the Secretary write letters of appreciation to all persons to whom we are indebted for assistance. Foster-Walsh.

The Meeting closed at 5.25 p.m.

NOTICE OF MOTION

RULE 30: The Association may form Local Branches in New Zealand provided that each such branch has not less than 15 members and provided further that the written consent of the majority of the members proposing to form such a branch has been previously obtained.

PROVIDED ALSO:

(a) No local branch shall be formed within 50 miles of any existing branch.

(b) The Council shall limit and define the territory from which any such branch or branches may draw members and within which such branch may operate.

(c) The name of any local branch shall be "The New Zealand Association of Bacteriologists, Incorporated (Branch)".

(d) The rules of any local branch shall be subject to the approval of the Council of the Association, and shall include the following—

  (i) To report to the Council any matter which may affect the interests of the Association or any of its local branches.

  (ii) To convene local meetings of the members of the Association from time to time.

  (iii) To compile a roll of members of the local branch and forward this to the Secretary of the Association together with such other particulars and information as the Council may require from time to time.

  (iv) The local branch by majoriity decision may levy such sums as approved by the Council in addition to the subscription payable to the Association.

  (v) The local branch shall be entitled to use such sums levied for the benefit of its members and the Association shall not be responsible or incur any liability in respect of the financial obligations or contracts of a local branch.

  (vi) The local branch shall not undertake any activities in regards to the conditions and employment of the members of the Association except through the Council of the Association.

(e) No person shall become a member of a local branch unless he or she is a financial member of the Association.

N.Z. Association of Bacteriologists (Inc.)

APPLICATION FOR MEMBERSHIP

NOTICE IS HEREBY DRAWN TO RULE 9 OF THE RULES OF THE ASSOCIATION OF BACTERIOLOGISTS:

That every application for membership shall be made in writing to the Secretary of the Association and shall be considered at the next meeting of the Council.

No person shall be admitted to membership unless his or her application shall be approved by a majority of the members of the Council present or represented by proxy at the meeting.

STANDARDISATION OF BIOCHEMICAL METHODS

Charge bacteriologists who have not done so, are asked to compile a list of the biochemical methods in use in their laboratories, in order that these methods may be standardised for examination purposes.

Suggestions for the conduct of both the Intermediate and Final Examinations may also be enclosed.

These returns are required URGENTLY.

Mr HUGH OLIVE,
Biochemist,
Pathology Department,
Wellington Hospital.

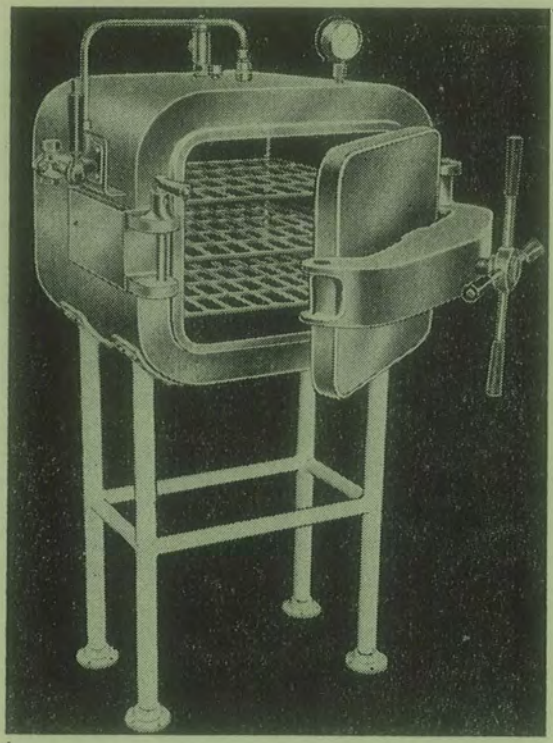
Communications regarding this JOURNAL should be sent to the Editor, Department of Pathology, Christchurch Public Hospital, Christchurch.

Communications primarily affecting the Association should be addressed to the Secretary, Mr M. McL. Donnell, 17 Anzac St., Takapuna, Auckland, N.2.

All moneys should be paid to the Treasurer of the New Zealand Association of Bacteriologists (Inc.), Mr J. P. Walsh, 44 Onslow Avenue, Epsom, Auckland.

Subscription to this JOURNAL is five shillings per year or two shillings per copy, post free.

Contributions to this JOURNAL are the opinions of the contributor and do not necessarily reflect the policy of the Association



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4. All stainless steel construction.
5. Can be supplied with steam ejector fitting for creation of vacuum.
6. Can be arranged for "streaming steam" sterilising, and supplied with or without fully automatic control.

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