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# **GCSE EXAMINERS' REPORTS**

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**GCSE (NEW)  
BIOLOGY**

**SUMMER 2018**

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**BIOLOGY**  
**GCSE (NEW)**  
**Summer 2018**  
**UNIT 1 FOUNDATION TIER**

**GENERAL COMMENTS**

As with other papers, only those candidates who had prepared thoroughly and undertaken revision coped well with the demands of the questions on this paper. When factual recall was tested there was evidence that despite key words being known, they were frequently not used appropriately. Calculations were generally completed successfully. When reading graphs it was often the case that data was repeated when comparisons of trends in the results were required. In contrast, with the extended response question there was evidence of relevant specification content being known and some creditworthy answers were produced. Also, there were instances when it was clear that experience of practical work had been beneficial. All candidates would be well advised to re-read answers to avoid unnecessary errors and for some, poor handwriting may well have led to valuable marks being lost.

**QUESTION SPECIFIC COMMENTS**

1.
  - (a) This question required candidates to use information about diet and identify correct statements which were related to it. Most were able to give some correct answers but few gained full marks.
  - (b) Most answers correctly identified obesity as a condition resulting from excess dietary sugar. However, in the case of excess salt many made vague references such as 'heart problems' which did not score marks.
  
2.
  - (a) The magnification of the microscope was correctly identified in most cases.
  - (b) The majority of responses gave good descriptions of the method for preparing a specimen on a microscope slide with many gaining full marks.
  - (c) In part (i), measurements were made accurately from the drawing of a cell but marks were often lost because the calculation of magnification was not correct. The most frequent error was for the measurement to be multiplied by the given actual length rather than being divided. Part (ii) was well answered with most responses referring to the cell wall.
  - (d) The value of the electron microscope in studying cell structure was not well understood.
  
3.
  - (a) Despite some confusion with other blood vessels, many candidates correctly labelled the blood vessel on the diagram as the pulmonary vein. Similarly, most could state the function of the valve shown.
  - (b) Most calculations from the tabulated data were correct in (i). The importance of the difference in the thickness of the ventricle walls was generally well understood, although marks were lost when answers referred to blood being pumped by the arteries. In part (ii), the link between a slow blood flow and low pressure was well understood and the fact that capillaries have thin wall was known.

4. (a) Here the question required analysis of tabulated and graphical data relating to cigarette smoking and lung cancer. Many answers gained marks for identifying trends but others simply transposed the data into words and this did not gain credit.  
 (b) These multiple-choice answers showed adequate understanding of the data presented in a graph related to smoking cessation.  
 (c) The majority of candidates knew that nicotine was an addictive substance.
5. (a) Marks were lost in (i) when candidates gave imprecise answers about wheat growth in the presence of fertilizer but did not refer to yield. Few answers in (ii) used the recognised the control in the investigation but references to making a comparison gained some credit.  
 (b) Very few candidates were able to state correctly the effects of NPK fertilizer on leaves and roots.
6. (a) It was very disappointing to see very few candidates gaining a mark in (i) for identifying the trachea and bronchus on a diagram. Frequently there was confusion with the oesophagus and bronchioles. It was also disappointing in (ii), that so few candidates could correctly describe pressure and volume changes in the thorax during expiration.  
 (b) Responses to data from an investigation about the link between exercise and breathing rates showed good understanding of the data.  
 (c) Most candidates knew that during exercise the muscles required oxygen but few referred to an increased oxygen supply being required for respiration energy release in respiration.
7. (a) In a description of an investigation of amylase activity, very few answers gave pH value as a variable which should be controlled.  
 (b) Graph plotting of the tabulated results was done quite well in most cases but errors were made in adding the scale for temperature on the horizontal axis and in drawing a clear line.  
 (c) The trend of increased activity was usually described correctly but explanations often failed to show an understanding of increased successful collisions. Most candidates had no difficulty in recognising denaturation of the enzyme at high temperature. In part (iii), the optimum temperature for the enzyme was, almost invariably, stated correctly and whilst most candidates appreciated that insufficient data had been collected few suggested that extra temperatures within a particular range would be needed to identify the optimum more accurately.
8. (a) In contrast with previous years, this quality of extended response question, set in the context of a food web, produced some good responses with many answers being placed in the middle band and a smaller number in the higher band. Candidates could identify the herbivores and the secondary consumers and were able to make relevant comments on the effects on other species when one species was removed.  
 (b) Most answers here correctly referred to dead bodies of rabbits decaying or decomposing.
9. (a) Many answers referred to selectively permeable membranes allowing certain molecule to pass through without mentioning molecule size and so did not gain credit.  
 (b) The term diffusion was well known but often there was no reference to the size of pores in the membrane, resulting in loss of marks.

- (c) With reference to two diagrams showing an investigation using Visking tubing, almost all answers showed a knowledge of the colour change in iodine in the presence of starch. Marks were lost, however, because of a failure to relate molecular size in iodine and starch to passage of these substances through the membrane.
  - (d) This was very well answered. The vast majority of answers given oxygen or glucose.
- 10.
- (a) Often marks were lost in (i) in writing a word equation for photosynthesis because, despite relevant terms being known, they were not applied appropriately.  
Apart from the occasional confusion in (ii) with the term chloroplast, most responses identified chlorophyll correctly.
  - (b) The missing mean value was usually completed accurately in the results table obtained from an investigation of photosynthesis in pondweed which involved counting bubbles of gas per minute.
  - (c) Candidates had little difficulty in seeing that the distance between the lamp and the jar containing pondweed was related to the rate of photosynthesis. Problems occurred however when they were asked for an explanation.
  - (d) Few responses here recognised that the purpose of the beaker of water placed between the pondweed was to absorb heat.
  - (e) This question tested the understanding of an improvement to the method in order to give increased accuracy. Although a number of answers stated that a gas syringe could be used in preference to bubble counting, very few referred to the measurement of volume of gas.

**BIOLOGY**  
**GCSE (NEW)**  
**Summer 2018**  
**UNIT 1 HIGHER TIER**

**GENERAL COMMENTS**

The challenge of higher tier questions is for candidates to consistently apply higher-order thinking skills to answer questions. There were some examples of very good candidates demonstrating the ability to generalise and transfer their learning in new situations, however this was not common. The main barrier to success in scoring well in many questions for far too many candidates was the inability to recall core scientific knowledge. Candidates also tended to respond to questions in an immediate unthinking manner, e.g. the presence of a selectively permeable membrane in question 1 caused a large number of candidates to automatically reference osmosis while discussing the movement of iodine. Evaluation of experimental methods remains a challenge for most candidates. It was pleasing to see that candidates are showing their working out while carrying out calculations. This allowed many candidates to pick up some marks for extended calculation even though their overall answer was incorrect.

**QUESTION SPECIFIC COMMENTS**

1.
  - (a) The most common response was that only '*certain size*' molecules are able to pass through. A qualified answer was required based on an understanding of the membrane model, i.e. only small molecules can pass through.
  - (b)
    - (ii) Most were able to identify the correct molecule, but some were not using the diagram provided to reference molecules moving through 'pores'.
  - (c)
    - (i) Many candidates recognised the food starch/iodine test and the movement of iodine, but then once again did not use the information from the diagram to help them recognise that iodine therefore must be a small molecule. Evidence of a knee-jerk response to the membrane was seen here by some candidates explaining that iodine moved by osmosis.
  
2.
  - (c) Well answered; this was a practical that was familiar to most candidates.
  - (d) This part was answered correctly by candidates who probably had first-hand experience of carrying out this practical in the classroom.
  - (e) Many candidates mentioned collecting gas, but failed to qualify their explanation. For example, some candidates talked about collecting gas using a gas syringe without explaining that it is the measurement of volume that is improving the accuracy not just using another piece of apparatus.
  
3.
  - (a) Surprisingly poor response indicating that many candidates had not learnt their work.
  - (b) Both parts (i) and (ii) were poorly answered. This content is new to the current specification, and centres should ensure that candidates are familiar with these concepts.

- (c) Well answered, reflecting that this is a new skill that is being taught to the candidates.
4. (a) Candidates struggled to present a straightforward definition of a double circulatory system.  
 (b) This was well-answered.  
 (c) Candidates were able to score a mark by recalling the role of a valve as preventing backflow of blood, but only the best were able to apply this correctly in the context of the semi-lunar valve.  
 (e) The best candidates were able to unlock this question by recognising that the heart is a muscle and the subsequent effect of exercise on it.  
 (f) (ii) Candidates still appear to struggle when asked to calculate a percentage change even though this type of question is a common mathematical skill tested almost annually. The main problem seems to be choice of denominator in the calculation.
5. (a) Most candidates failed to score in this part because their answers were not comparative. For example, they recognise that increased rainfall causes fertilisers and sewage to be washed into the lake, but fail to understand that this is happening all the time and that the conditions described in the article would mean that **more** fertilisers and sewage would be washed into the lake.  
 (b) This part was well-answered. Some candidates incorrectly linked lack of oxygen in the water to lack of photosynthesis because plants were dying.  
 (c) (ii) Candidates still appear to struggle when using indicator species to interpret levels of pollution. Most tended to state a range of pollution levels, e.g. moderate to no pollution, rather than recognising that the presence of mayfly and stonefly nymphs in the river can only indicate no pollution. The same was true in identifying oxygen concentration.  
 (iii) This part was beyond most candidates with most wanting to test fields or different parts of the lake. If candidates had studied the map presented in the stem and the command given in the question '*... to extend their survey ...*' perhaps more would have scored in this part.
6. (a) (iii) Some candidates are still using the term 'amount' when referring to specific quantities, rather than concentration, mass or volume.  
 (c) Many scored one mark, but not many scored both.
7. (a) (i) This was a difficult multi-step calculation and it was good to see candidates showing their workings out. This allowed many to pick up one or two marks even though they failed to get the correct answer.  
 (ii) Candidates find it difficult to identify errors in experimental methods. Most interpreted this part as being due to some problem with the apparatus provided rather than why the method is unable to give us a result close to the '*true value*'.  
 (b) (i) Candidates on the higher tier need to qualify their use of respiration. Far too many lost marks here by discussing respiration as opposed to aerobic respiration.  
 (c) Another example of an evaluation of experimental method that candidates struggled with.
8. (b) Well answered, as would be expected from a familiar topic although some unthinking responses relating to active transport were seen.  
 (c) This was a demanding extended response question that required higher-order problem solving. Candidates should have considered two points before attempting to answer this question. What do I see? (the information provided

in the stem) and what do I know? Some candidates discussed at length the effect of reduced oxygen levels on denitrification which showed that they had not read the command line which referred to '*.... reduced oxygen levels for root hair cells ...*".

The better candidates linked reduced oxygen levels to its effect on active transport of nutrients, however many failed to access the top band for this question because they referred to respiration rather than aerobic respiration. It was worrying that a number of responses stated that plants require oxygen for photosynthesis!

**BIOLOGY**  
**GCSE (NEW)**  
**Summer 2018**  
**UNIT 2 FOUNDATION TIER**

**GENERAL COMMENTS**

Generally those candidates who had prepared thoroughly and undertaken revision coped well with the demands of this paper. With questions aimed at testing recall of factual information there was evidence that key words were known but often they were not used appropriately. Mathematical questions were generally completed successfully if the task was straightforward but calculations such as percentages caused some problems. With extended response answers, there was often evidence of relevant specification content being known but difficulties occurred in applying their knowledge in particular contexts. All candidates would be well advised to read questions carefully and to check answers to avoid unnecessary errors. For some, poor handwriting may well have led to valuable marks being lost.

**QUESTION SPECIFIC COMMENTS**

1.
  - (a) This was well answered with many candidates getting full marks for classifying the hare and recognising the universal nature of scientific names.
  - (b) The table in part (i) based on a section of text gained good marks in most instances. Where errors were made it tended to be in relation to the statements testing understanding of the concepts of predation and competition. Many answers in (ii) made vague references to diseases being “passed on” rather than methods of communication by pathogens.
  - (c) This was well answered showing that candidates understood the value of the hare's coat in providing camouflage and insulation.
  
2.
  - (a) Most answers identified the pancreas.
  - (b)
    - (i) Graphs were generally plotted accurately. Where marks were lost it tended to be for failure to identify the maximum normal concentration of blood glucose or for poor line drawing.
    - (iii) Most candidates recognised that a decrease in the blood glucose concentration indicated insulin activity and that concentrations above normal were linked to diabetes.
    - (iv) When asked to compare the blood glucose concentrations for two people, many candidates lost marks because they simply repeated the data given in the graph rather than comparing trends.
    - (v) This was very well answered.
  
3.
  - (a) Many marks were lost in (i) and (ii) and answers displayed some poor recall of DNA structure. It was pleasing to see that many responses linking DNA coding to amino acids in part (iii).
  - (b) This question on DNA profiling was generally well answered
  
4.
  - (a) Almost all answers recognised Japanese knotweed as an alien invasive species and the threat to biodiversity which it caused.

- (b) The term biological control was known by the majority of candidates and the following calculation of stem length was generally completed correctly.
- (c) Most answers showed good understanding of the need to protect non-target species in biological control in part (i). However, when asked about reproducibility of results in (ii), many answers consisted of vague statements such as “do it again” and did not score marks.
5. (a) Many answers showed confusion of terminology and labelled the ureter as the urethra or another part of the excretory system, suggesting lack of revision.
- (b) In (i) and (ii) candidates were required to respond to tabulated numerical data. Most correctly identified the waste substance urea and were able to interpret the results for glucose concentration and protein in the blood adequately. In (iii), the answers showed much inaccuracy in naming the chemicals used in tests for protein and glucose. Benedict’s solution was confused with biuret reagent and many errors occurred in describing the colour changes.
- (c) When asked to draw conclusions from a bar chart relating to survival following transplants, there were some good answers seen. Often marks were lost, however, when responses consisted to verbose accounts which just repeated the data rather than making comparisons.
- (d) This was answered very well. Almost all answers give dialysis as a treatment.
6. (a) In this quality of extended response question, it was clear that many candidates had gained experience of undertaking practical work and some steps in the procedure for setting up agar plates with antibiotics were known. Unfortunately, many responses did lack detail such as temperatures of incubation and were poorly sequenced.
- (b) The need for hygiene in reducing the spread of MRSA was well understood.
7. (a) This question required candidates to respond to data on recovery comparing methods of treatment for broken bone. Most answered very well.
- (b) Answers in (i) and (ii) showed good understand of the mitosis and the significance of differentiation of stem cells. In (iii), the fact cancer was the result of uncontrolled mitosis was well understood.
- (c) There were some very good answers on the ethics involved in the use of embryonic stem cells.
8. (a) Most answers correctly identified the pupil and iris in the photographs in (i) although some weaker candidates wrongly labelled the lens. In (ii), there were some good explanations of the reflex action shown in the “before” and “after” photographs but few scored the full three marks. Where marks were lost it was generally because the answer consisted of just a general description of the alteration of pupil size in different light intensities. Also, some answers lacked precision in failing to refer to the prevention of damage to the retina. Part (iii) on the features of reflex actions was well answered.
- (b) This section of the question dealt with an investigation of reaction times in humans in the context of a keyboard linked to a data logger. In parts (i) (ii) and (iii), the calculation of the percentage change taken from data in a bar chart was done correctly by a minority of candidates. Most, however, were able to spot that the reactions slowed with age, and that practice affected the results. Some lost marks by confusing a high speed of reaction with increased reaction time in their answers. Some candidates had difficulty in (iv) in identifying the variables which needed to be controlled in order to ensure fair testing but almost all referred to the need a larger sample size as a way to improve the investigation.

**BIOLOGY**  
**GCSE (NEW)**  
**Summer 2018**  
**UNIT 2 HIGHER TIER**

**GENERAL COMMENTS**

This paper included some questions that assessed candidates' knowledge of topics new to this current specification, such as monoclonal antibodies. The responses were mixed and suggest that some centres had perhaps not covered the topic in enough detail. Hopefully this is a situation that will be rectified in future.

It would be worth teaching candidates to understand that an exam question will always carry a command and that recognising the meaning of the command words will allow them to be more targeted in their approach to answering questions.

Applying their knowledge in new or novel settings (see question 9) poses a struggle to most candidates. This is a skill that needs to be developed, and allowing candidates opportunities to practice applying their knowledge to contemporary scientific topics or unfamiliar practical settings will allow them to gain a deeper understanding of their work.

**QUESTION SPECIFIC COMMENTS**

1. Higher tier candidates did well on this question.
2. (a) (ii) Candidates managed on the whole managed to describe how the size of the pupil is controlled, but less were describing why the pupil changed size.  
(iii) This response to a straightforward recall question was disappointing and an indication that far too many students are not learning their work.  
(b) (ii) Candidates struggled to calculate a percentage change even though this type of question is a common mathematical skill tested almost annually. The main problem seems to be choice of denominator in the calculation.
3. Candidates who had learnt their work were rewarded with good scores on this question. Most achieved a middle band with their answers. However, there is still some uncertainty on the link between the triplet code and amino acids. Many stated that the triplet code 'makes' amino acids.
4. (a) (i) Well answered by most.  
(ii) The answers to this part suffered from a lack of specific detail. Candidates discussed the "... *antigens on the organs* ..." rather than on the cells of the organs and tended to repeat the stem by stating that antibodies 'attack the cells' rather than recalling that antibodies 'destroy cells'.  
(b) (i)-(iii) A disappointing response reflecting a lack of learning by many.  
(c) Very few candidates were able to give one let alone two coherent examples here.
5. All parts were well-answered by most candidates.

6. (a) (i) The best answers here were able to identify and describe the process. Many candidates discussed the movement of small molecules, but did not get a mark because they did not identify where the molecules were moving from or were moving to.  
(ii) Once again answers lacked detail with many stating that glucose was being reabsorbed, but not stating where it was being reabsorbed to.  
(b) This is a difficult concept with only the better or well-prepared candidates gaining a mark here.
7. (a) Only answered correctly by candidates who had learnt their work.  
(b) Candidates struggled to apply knowledge to solve a novel problem. Most candidates who did recognise that there was more than one variable affecting growth were unable to suggest an appropriate control. For example, some answers seen identified that negative gravitropism could also be having an effect but then went on to describe placing the dandelion in a dark container with light coming from a hole in one side.
8. (a) Well answered.  
(b) Some answers seen here included mention of Ph or PH!  
(c) (ii) Well answered  
(d) Better candidates were able to make a correct prediction here.
9. This question posed the greatest challenge to all the candidates. Even though temperature control by the skin has been repeatedly assessed over the years it seems that candidates' understanding of this topic is superficial. Not many candidates appear to understand the concept of heat being carried by the blood.  
(a) Not many were able to score two marks here with many describing homeostasis. What was missing was a basic understanding of the 'normal' or 'optimum' range; without this the candidates struggled to score any marks.  
(b) (i) An unthinking response here led to most candidates describing the temperature change over the whole experiment rather than following the command given in the question of describing the change after the hand "*... was placed in the ice ...*".  
(ii) Only the better candidates realised that this part required them to use their knowledge of how the skin responds to cold temperatures.  
(d) This was the most accessible part of question 9, with many applying their knowledge of alcohol successfully here.
10. (a) This part posed the greatest challenge with many recognising that both parasitized bees had the same genus, but less using this knowledge to suggest that it is the similarity between the bees that allowed the spread of the parasite.  
(b) This part required a fair bit of data interrogation from the table and stem, and it was pleasing to see that most candidates did well.  
(c) (i) It was also pleasing to see many candidates able to draw sensible conclusions from the data.  
(ii) Most candidates gave one correct reason. A common error was to state that "*... not all the beekeepers took part ...*". Obviously, a survey with 100% participation would not be practicable!  
(d) This part was well answered demonstrating that centres are well versed in preparing their candidates for this type of question.

**BIOLOGY**  
**GCSE (NEW)**  
**Summer 2018**  
**UNIT 3 PRACTICAL ASSESSMENT**

**General observations:**

It was pleasing that there was a good spread of marks with the vast majority of candidates attempting most questions. Some positive achievement was seen from pupils across all qualifications and abilities  
However, the use of correct scientific, descriptive or comparative language was very poor in many answers.

**Section A**

**Risk Assessment**

- Nature of the hazard was not clearly identified (e.g. Hot apparatus **can burn**)
- Risk often lacked an action (e.g. Acid splashes on skin **whilst pouring into beaker**)
- The control measure was often well answered, but candidates did not get credit for this unless the risk was also correct.

**Table of results**

- Lots of positive achievement seen with the majority of tables well-structured and logically organised.
- Candidates tended to lose marks for incorrect units or putting units in the body of the table.
- Unclear headings or use of vague terms (e.g. **Amount** of hydrogen peroxide) were another source of marks lost
- Means were generally calculated well. However, pupils should be encouraged to check that values are sensible and not larger than the values that they are calculated from.

**Section B**

**Graphs**

- Many candidates were able to plot graphs correctly, although lines of best fit were often poor. However, it was all too common to see poorly chosen scales that resulted in incorrect plotting and incorrect readings from the graph.
- While candidates should be encouraged to use at least half of the graph paper, the scale should be sensible and linear.
- A significant minority of candidates continue to use overly large dots to plot points, which led to the loss of marks in some cases as plotting accuracy, could not be determined.
- Most candidates were able to correctly link the two variables from the graph. However, they were less able to correctly describe the correct numerical pattern. Many candidates assumed that any straight line indicated direct proportionality and did not understand that the line also had to pass through the origin.

## Variables

- Generally, candidates are confident in identifying the independent and dependent variables in different investigations indicating that these terms are well understood.
- Control variables were not as well understood and answers often lacked detail in explaining how they were controlled.
- Range - most candidates were able to correctly state the range of either the independent or dependent variable. However a significant minority simply stated all values of the variable.

## Instrumentation

- When describing how to control variables or when discussing improvements to the experiment, most candidates failed to correctly name appropriate measuring instruments.
- In most cases, the term resolution was not well understood. Candidates were very poor at stating the resolution of a particular piece of apparatus. They also used vague terms when discussing improvements rather than considering the resolution of apparatus used. Many candidates simply stated, "use more accurate or precise apparatus" and showed no understanding of the meaning of these terms.

## Evaluation of quality of data

- Although many candidates seemed to have an understanding of the meaning of repeatability, they were unable to clearly link to their own or given data.
- Similarly, reproducibility was poorly explained.
- The terms accuracy and precision were very poorly understood.

## Comments on specific tasks

### Investigating osmosis in potatoes

This practical was specific to the separate biology qualification; many candidates showed a good understanding of the practical methodologies.

### Section A

This was generally well done by all candidates although a lack of positive or negative signs to indicate increasing or decreasing mass meant that the table lacked clarity.

### Section B

- (a) This question which considered variables was well done by most
- (b) The positive and negative percentages were well handled in terms of graph plotting, probably because the position of the x axis had been given.
- (c)
  - (i) There were many correct responses seen here.
  - (ii) This caused many issues for candidates who had difficulty in recognising that a larger negative percentage change indicates that percentage change has increased not decreased.
- (d) A relatively simple question although many candidates failed to attain a mark here due to their clarity of expression.
- (e) Many good responses were seen here with the best candidates able to describe osmosis confidently and attain all 3 marks.
- (f) The data analysis was generally well-done.
- (g) The judgement of the extent to which the given data supported a given hypothesis here was again done poorly in many cases with a lack of clarity of expression often causing a loss of marks.

## Investigating the effect of substrate concentration on the rate of an enzyme controlled reaction.

This was a very popular Science (double award) and separate Biology task.

### Section A

A significant minority failed to distinguish the variables or lost marks due to poor terminology. As with the majority of tasks this year the risk assessment was poorly answered with many candidates unable to correctly describe an action which would constitute a risk in the procedure.

The table of results was well constructed and clearly displayed by candidates. However, a significant minority used 'amount' instead of volume or percentage instead of concentration.

### Section B

- (a) The first three parts were well answered but many candidates lost marks in part (iv) with reference to the specific amount required for the control variable not included or the apparatus used to measure it was left out. As was the case in section A, many candidates used non-specific terms such as 'amount'.
- (b) As with all graph questions across the suite, poor scale choice led to plotting errors. Some candidates lost a mark by not following the instruction to plot the origin in this question.
- (c) (i) Responses showed a good understanding of the relationship but part (ii) was very poorly answered with candidates not using the required superlative describing the **most** concentrated.
- (d) (i) This was well answered with 22 being correctly identified but a significant number of candidates produced an imaginary third value to calculate a more suitable mean.
- (e) Most candidates gained a mark here, but the majority of answers lacked detail when discussing their own data.

As with other practicals in the suite, candidates confused the terms accuracy and precision. There were many answers which incorrectly focussed on swirling the mixture instead of the apparatus.



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