September 2018
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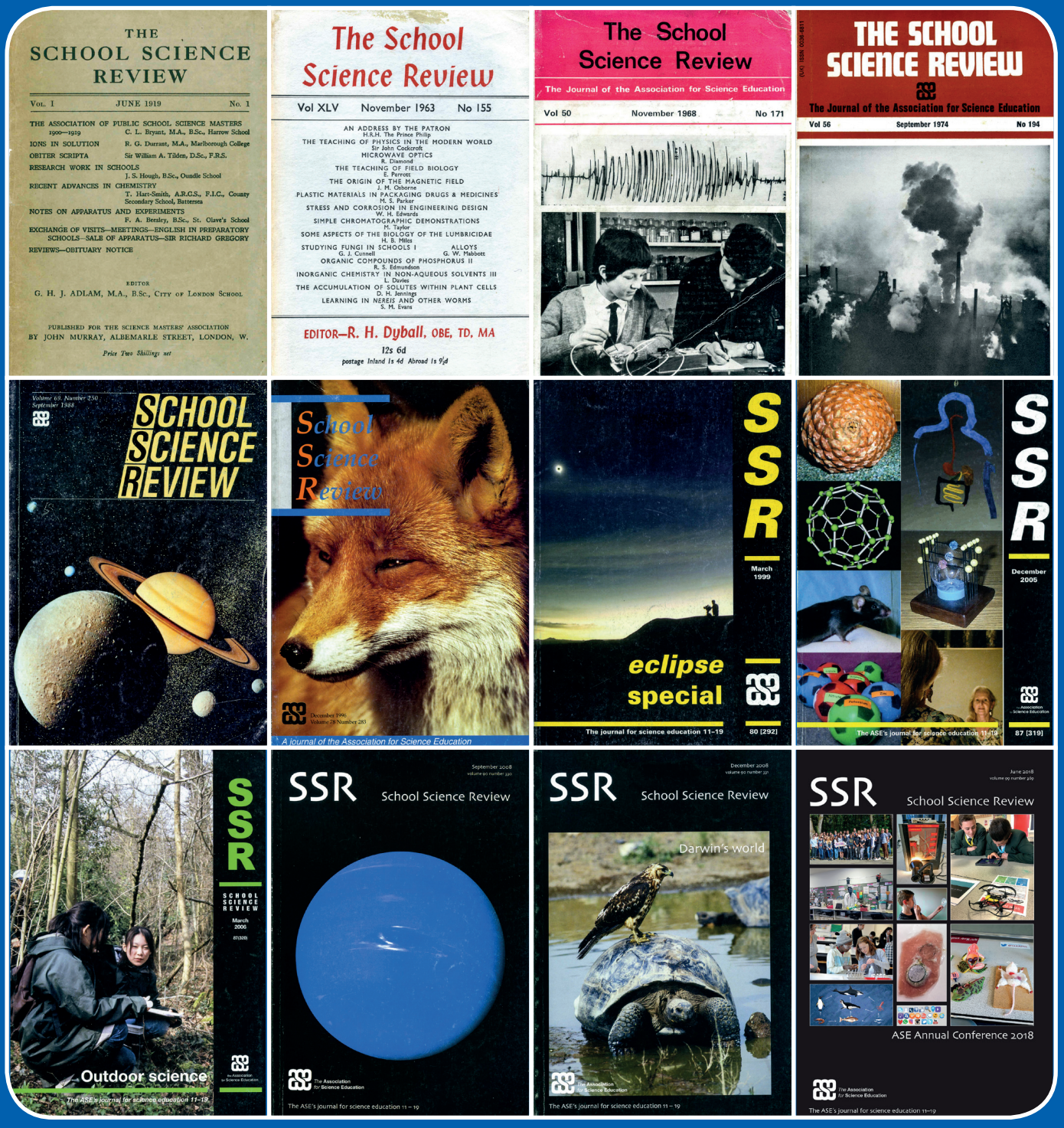
SSR School Science Review

Celebrating 100 years of *SSR*



Framing the secondary science curriculum

The Association for Science Education

The ASE's journal for science education 11–19

FSC A level biology fieldwork

www.field-studies-council.org/alevelbiology

Up to **5** named practicals ticked off*

All **5** practical endorsement criteria assessed

3 stats tests taught

3 different ecosystems studied

36 hours of teaching

Just **5** days off the school timetable

FSC

Field Studies Council, FSC, is an environmental education charity providing informative and enjoyable opportunities for people of all ages and abilities to discover, explore, and understand the environment

*Actual course content will vary per specification

School Science Review

The ASE's journal for science education 11–19

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Contributing to SSR

We welcome contributions for all sections of *School Science Review*.

These can be emailed to The Editor, ssreditor@ase.org.uk, or posted to The Editor, *School Science Review*, ASE, College Lane, Hatfield, Herts AL10 9AA. Detailed advice on the submission of articles and Science notes is available on the ASE website at: www.ase.org.uk/content/submission-guidelines.

Themes being considered for the future for which submissions are invited:

- Everyday science
- The periodic table

Contents

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Editorial

This edition of *SSR* looks different. In education, we teach about scientific method. We suggest that scientists start with a theory – an idea. In this case, the idea is that the journal would be better in the popular A4 size. The next step is the experiment. In this example, the outcome is in your hands. You are holding the evidence; having an A4 edition to inspect. I will explain more about that on the page opposite, linked to the fact that *SSR* is now in its 100th year. I discovered just before writing this comment that that is 4 years longer than *Radio Times* has been in existence. Also, I have been associated with *SSR* for 50 years (from when my first submitted article appeared).

Following my historic account, we open Science notes with a practical article from Steven Weir, explaining a technique for watering plants during holidays. This is aimed at home use but could equally apply to school sites that have gardens only fully tended in term time. Gareth Price offers an alternative design to the basic paper aeroplane, which generates thinking about how things can fly. The last note is from Iain MacInnes who has probably been contributing longer than I have. He offers an alternative mathematical solution to establishing the link between fringe width and wavelength in the Young's slits experiment – not the normal textbook version that physics teachers will know.

A meeting to consider the way forward in science education was held at the beginning of the year. Presentations from some high-profile contributors on the background and the future, and thoughts from representatives of the three major subject associations, have created the main theme in this edition, which has been coordinated by Anthony Tomei who provides an introduction on p. 19.

In the major articles from individual teachers, frequent contributor Christopher Talbot describes how to teach aspects of chemistry using LEGO bricks. If my grandchildren are typical, students will find this a fascinating alternative to standard methods of molecular modelling.

A very different offering comes from John Turner. As a way of developing understanding in the mathematical aspects of science, he suggests developing wrong answers and then challenging students to find the flaw. John now works in a university, but the technique could be adapted to any level in the 11–19 age range, but especially 16–19.

Finally, reporting a presentation at the ASE Annual Conference, Sarah Longshaw has provided an article on methods of asking questions in class to enhance effective learning. This was held over from the theme section of our previous edition.

Geoff Auty
Editor, *School Science Review*

Health & Safety

For all practical procedures described in *SSR*, we have attempted to ensure that:
- all recognised hazards have been identified;
- appropriate precautions are suggested;
- where possible procedures are in accordance with commonly adopted model risk assessments;
- if a special risk assessment is likely to be necessary this is highlighted.

However errors and omissions can be made, and employers may have adopted different standards. Therefore, before any practical activity, teachers should always check their employer's assessment. Any local rules issued by their employer must be obeyed, whatever is recommended in *SSR*.

Unless the context dictates otherwise it is assumed that:
- practical work is conducted in a properly equipped laboratory;
- any mains-operated and other equipment is properly maintained;
- any fume cupboard operates at least to the standard of CLEAPSS Guide G9;
- care is taken with normal laboratory operations such as heating substances or handling heavy objects;
- good laboratory practice is observed when chemicals or living organisms are handled;
- eye protection is worn whenever there is any recognised risk to the eyes;
- fieldwork takes account of any guidelines issued by the employer;
- pupils are taught safe techniques for such activities as heating chemicals or smelling them, and for handling microorganisms.

Readers requiring further guidance are referred to:
Hazcards (CLEAPSS, 2016 and updates)
Topics in Safety, 3rd edn (ASE, 2001; updates available at www.ase.org.uk/resources/topics-in-safety
Safeguards in the School Laboratory, 11th edn (ASE, 2006)
Preparing COSHH Risk Assessments for Project Work in Schools (SSERC, 1991)
SSERC hazardous chemicals database (www.sserc.org.uk/health-safety/chemistry-health-safety/hazchem_database-2/)
Be Safe! Health and Safety in School Science and Technology for Teachers of 3- to 12-Year-olds, 4th edn (ASE, 2011)