

From the Editor

# An Update and An Offering

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second issue of  
The Chemical  
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**A**lthough the “From the Editor” column is not intended to be a regular feature, I thought that it was important to let you know about important changes that have been made in order to make articles easier and faster to download. Also, *The Chemical Educator* forums and other features will continue to be available to both subscribers and registered guests. I also make the offering of a “mostly organic” crossword puzzle for both you and your students’ Summer enjoyment.

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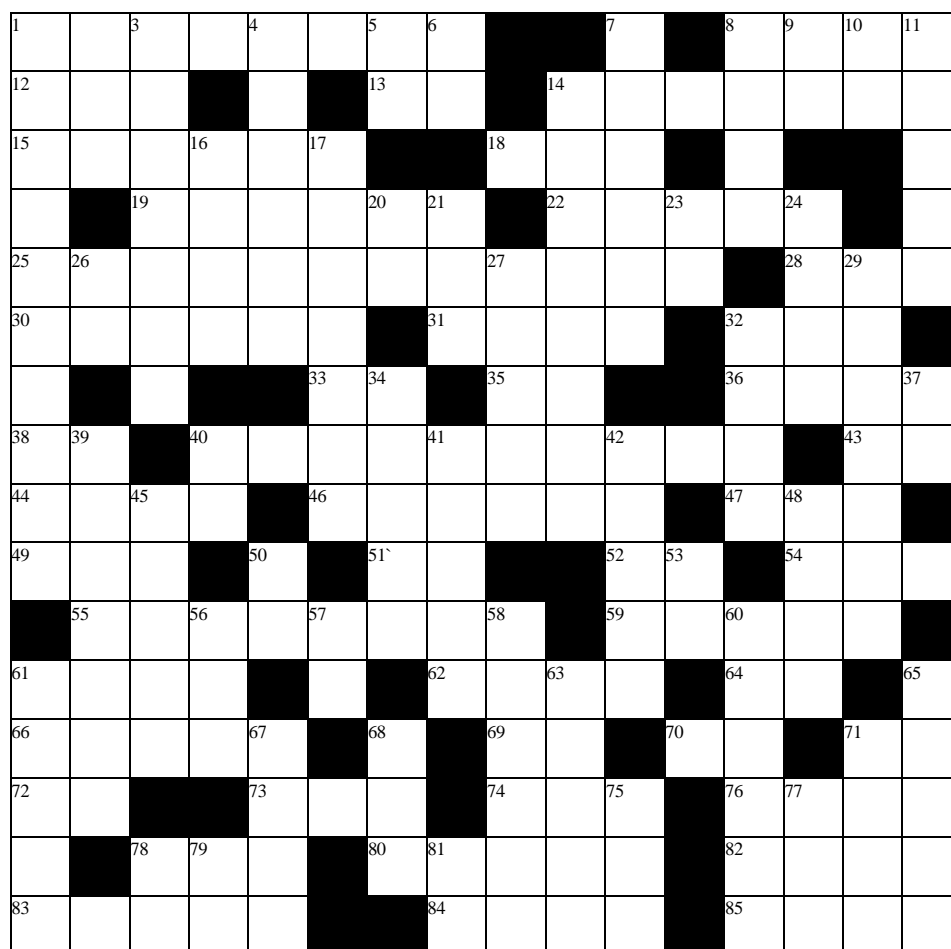
## The Update

For this, the second issue of *The Chemical Educator*, the sizes of the article PDF files have been dramatically reduced. Full articles with figures are as small as 21 Kbytes. This should allow easier access to articles for readers using modems or having slow Internet connections. Moreover, articles that exceed 100 Kbytes due to multiple graphics are produced in two versions, a full version that includes all figures and a “text-only” version. As an example, the article by Smith and Gustavson “The Liquid Nitrogen Fueled Engine: A Cool Demonstration” is 311 Kbytes in its full version. Because this article is over 100 Kbytes and is graphics heavy, a text-only version of only 31 Kbytes is also available for downloading from the abstract page.

Also, the forums and features of *The Chemical Educator*, other than the full articles, will continue to be open to subscribers and non-subscribers, who register as guests. One of the novel uses of *The Chemical Educator* forums is that files may be shared with other educators by depositing them in the CHEDR exchange and creating a link to them in the body of the forum message. As an example, I have posted an experiment “Chromatography of Food Dyes and Determination of the Dyes Present in M & M™ and Skittles™ Candies” on *The Chemical Educator* forum with a link for downloading either the MS Word 2.0 (PC) or PDF version.

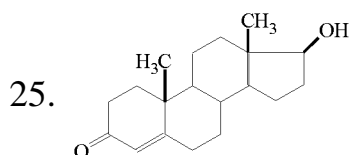
### The Offering

Students often find that crossword puzzles are a fun self-test of their knowledge of course content. I often pass puzzles out to students in my courses at the end of the semester and many find it fun to complete them. Here is presented a crossword puzzle that should be solvable using a standard Organic Chemistry textbook. The key will be posted on *The Chemical Educator Forum* sometime next month.



## Across

1. A twenty carbon alkane.
8. Carbon that undergoes nucleophilic attack in the base-catalyzed hydration of an  $\alpha,\beta$ -unsaturated aldehyde or ketone.
12. Prefix indicating that a compound is the parent form of the compound denoted by the base word.
13. Type of spectroscopy characterized by absorption of radiation that causes vibrational excitation.
14. An optically inactive mixture of two substances with exactly the same chemical composition, but which, when separated, rotate plane-polarized light by equal amounts in opposite directions.
15. A diastereomer formed when a monosaccharide cyclizes to a furanose or pyranose.
18. A semi-rigid polymer (e.g. polyacrylamide, starch, cellulose) cast into slabs or cylinders for the electrophoretic separation of nucleic acids or proteins.
19. The compounds methane, propane, butane, pentane, and hexane form a homologous \_\_\_\_\_.
22. Bond that has a circular cross-section and is formed by head-on overlap of two atomic orbitals.



28. A prefix used to identify geometric isomers that have a carbon atom attached to four other carbon atoms.
30. Plural of the word used to describe a gas that obeys the equation  $PV = nRT$ .

31. A deposit of mineral ores or coal or the excavation process for removing them.
32. Thymidine triphosphate.
33. The tetraoxide of this element can be used for the hydroxylation of alkenes.
35. Hard grey metallic element that is resistant to acid corrosion. Named after the Phrygian king who was condemned to stand chin deep in water with fruit hanging above his head, but if he tried to drink or eat, the water and fruit receded just out of reach.
36. What bread does when yeast cells break down glucose into carbon dioxide and alcohol.
38. Metal present in Grignard reagents.
40. What happens to the amidate ion in step two of the mechanism for the Hoffmann Rearrangement.
43. First element to be produced artificially, from which it got its name.
44. The first four letters of the first name of the formulator of the rule that states “cyclic conjugated polyenes are aromatic if they contain  $4n + 2$  ( $n = 0, 1, 2, \dots$ )  $\pi$  electrons.”
46. Amorphous polymers that spring back to their original shape after stretching are called \_\_\_\_\_mers.
47. Ending used to indicate an alkene.
49. A metallurgical term for an outer layer of metal having a composition different from the center.
51. Third person singular neuter pronoun.
52. Letters used to indicate the configuration about a chiral center.
54. Ending used to indicate a carboxylic acid.
55. Two element compounds in which the more electronegative element is nitrogen.

59. One of the sons of Uranus and Gaea that name the element  $[\text{Ar}]4s^23d^2$ .
61. Mediterranean juniper whose wood upon destructive distillation yields an oily liquid used to treat skin diseases.
62. The amino acid, synthesized from 3,4-dihydroxyphenylacetaldehyde by the Strecker Synthesis. Its levorotatory form is used to treat Parkinson's disease.
64. Silvery-white metal whose name is derived from the Greek word for rose, because its salts form rose-colored solutions. It is often electroplated on microscopes and instrument parts to prevent corrosion. On carbon, it is used as a catalyst to reduce aromatic rings to cyclohexanes.
66. An alkyl-substituted benzene.
69. A metallic element present in a strong reducing agent that is particularly useful for reducing unsaturated ketones to the allylic alcohols.
70. The bond in a carbon-carbon double bond that is not 19 across.
71. Abbreviation for hectoliter.
72. Metal catalyst used instead of 59 across when it is necessary to selectively reduce alkenes in the presence of aromatic rings.
73. Root used in organic nomenclature to indicate a molecule or group with nine carbon atoms.
74. Chemical symbol for element number 105. Also called hahnium.
76. An electrified rod that administers a mild shock; especially used on cattle.
78. Health Maintenance Organization.
80. An organic compound containing the functional group  $\text{C}-\text{O}-\text{C}=\text{O}$ .
82. The orbital that determines the stereochemistry of a photochemical electrocyclic reaction.

83. A straight-chain unsaturated eighteen carbon alcohol.
84. A compound that contains chiral centers, but is superimposable on its mirror image by virtue of a symmetry plane.
85. A compound that has a hydroxy group attached to one of the carbon atoms of a carbon-carbon double bond. See 62 down.

### Down

1. A molecule that is a nonsuperimposable mirror image of another.
2. An electrically charged atom or group of atoms formed by the loss or gain of (an) electron(s).
3. An aldol condensation reaction involving two different aldehydes that can result in a single product only if one of the aldehydes has no enolizable hydrogens.
4. A solid, mostly saturated polycyclic alcohol.
5. A hydrogenation catalyst: Raney \_\_\_.
6. One (of the three) Lanthanide elements named after the town in Sweden where they were discovered. It forms pink salts.
7. A solution of sodium chloride in water, often sterile.
8. In mass spectrometry, the gas stream from the inlet enters an ionization chamber where it is bombarded at right angles by an electron \_\_\_\_, producing positive ions.
9. Chemical symbol for a gaseous product of radioactive disintegration (e.g.; radon, thoron, and actinon).
10. Metal used to make a lightweight heat and corrosion-resistant steel. Its dioxide is used as a pigment.

11. Prefix indicating the group  $-\text{COCH}_3$ .

14. In PMR spectroscopy, the frequency of an oscillating magnetic field at right angles to a constant main magnetic field is varied until the angular velocity of the rotating magnetic field is \_\_\_\_\_ with the angular velocity of a precessing proton.

16. Prefix used to indicate that there are substituents at the one and three positions of an aromatic ring.

17. To brown in deep fat or the small pastry filled with meat or fish and browned in deep fat.

20. An extraterrestrial of movie fame.

21. Scanning electron microscope

23. Important semiconductor element:  $[\text{Ar}]4s^24p^2$ .

24. On opposite sides of a double bond.

26. Ending used to form the past tense of a verb.

27. One who inhales cyanide gas is in need of last \_\_\_\_\_.

29. One of the two discoverers (1964) of the herpes virus that causes mononucleosis. It was sequenced in 1983 using the Maxam–Gilbert method and has ~170,000 base pairs.

32. Diagram used to show the effects of multiple coupling constants on an NMR spectrum.

34. The state of matter occupied at STP by all normal alkanes with greater than 17 carbon atoms.

37. First and middle initials of the discoverer that treatment with zinc amalgam and concentrated HCl reduces  $\text{C}=\text{O}$  to  $\text{CH}_2$ . This process is most useful for aromatic compounds because, unlike with Friedel-Crafts alkylation, rearrangement does not occur.

39. Organomagnesium compounds,  $\text{RMgX}$ , or the last name of their discover, who won the 1912 Nobel Prize in chemistry.
40. First and middle initials of the discoverer of hydroboration. He won the 1979 Nobel Prize in chemistry.
41. If an NMR spectrometer is operated in \_\_\_\_\_-decoupled mode, the peak areas in a  $^{13}\text{C}$  spectrum are proportional to the number of carbon atoms the peak represents.
42. The main trunk of the arterial system that carries blood from the heart's left ventricle to all parts of the body except the lungs.
45. Organic compound containing the group  $-\text{CO}-\text{NH}-\text{CO}-$ .
48. Biblical figure credited with saving the gene pool of all species.
50. Metal contained in the reagent PCC, which is used to prepare aldehydes from primary alcohols and ketones from secondary alcohols. Also found in Jones' reagent, which oxidizes secondary alcohols to ketones and primary alcohols to carboxylic acids.
53. Element that forms  $n$  and  $p$  type semiconductors when impurities with one more or one less valence electron than itself are added.
56. The number of carbon atoms in decanoic acid.
57. Group 3 metal named for the brilliant indigo line in its atomic spectrum.
58. The substance dissolved in a solvent.
60. Type of carbon to carbon bond that characterizes an alkyne.
61. Lactam that when polymerized with 6-aminohexanoic acid gives Nylon 6.
63. Evergreen coniferous trees from which turpentine is obtained.
65. Product formed when enolizable aldehydes are treated with catalytic base at low temperatures.



67. Tautomer of an aldehyde or ketone. See 85 across.
68. Number of hydrogens attached to the nitrogen of a secondary amide.
71. The orbital that determines the stereochemistry of a thermal electrocyclic reaction.
75. Biochemical abbreviation for a common amino acid with a secondary amino group.
77. In organic chemistry laboratory, we \_\_\_\_ a lot of reactions.
78. Cryogen used to cool the superconducting magnets of NMR spectrometers.
79. First person singular possessive pronoun.
81. Rare earth metal named after the ore in which it was discovered spectroscopically. The ore was named after a Russian mine official.